THE
ORACLE ENCYCLOPÆDIA

Profusely Illustrated

CONTAINING THE MOST ACCURATE INFORMATION
IN THE MOST READABLE FORM

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Charles V. (*Le Sage*), born at Vincennes, 21st January, 1337, son of Jean II. and Bonne of Luxembourg, practically reigned as Dauphin after his father was taken prisoner at Poitiers. 'La Jacquerie' gave great strength in the States-General to the *Tiers État* led by Bishop Robert le Coq and Étienne Marcel, Provost of the Traders of Paris, but C. played off against them the nobility, clergy, and the provincial estates. After the devastating war of Charles the Bad of Navarre and Edward III. was closed by the peace of Brétigny, there was comparative quiet till the death of Jean (1364); after which the expedition of Du Guesclin against the Captal de Buch, Pedro the Cruel, the Black Prince, and his expulsion of the English, except from Calais, Bordeaux, and Bayonne, are the great features of C.'s reign. The 'Grand Companies' continued to harass the land, and the House of Burgundy rose into dangerous eminence. C. married Jeanne of Bourbon, and died 16th September, 1380, leaving two sons. One of his *ordonnances* fixed the royal majority at fourteen. C. got his surname for his habits of life. 'He passed through the courses of study then known—an apt and eager scholar. Religious he was and learned, yet not a monk on the throne. To read in Latin and French, to know something of mathematics as then studied, of astrology, alchemy, theology, to gather round him well-known learned clerks and philosophers seeking science, to collect books and lay the foundations of the great library of Paris, to listen to grave moralities or noble deeds of olden history, or "divers fair tales from Holy Writ"—these were the occupations of the sickly king.' Kitchin's *History of France*, pp. 454, 455.

Charles VI. (*Bien-Aimé*), the eldest son of Charles V., was born 3rd December, 1368, and succeeded his father in 1380. The Dukes of Berri, Bourbon, Burgundy, and Anjou shared supreme power during the minority of the boy-king. All these 'Princes of the Lilies' behaved badly. The last-named Duke abused the right of taxation to provide himself with means for his Sicilian expedition against Carlo Durazzo. The riots of *Maillotins* at Paris and Rouen, and of *Tuchins* in Languedoc, and the massacre of the Jews, showed the exasperation of the lower citizen class. In 1382, under the advice of the Duke of Burgundy, C. interfered in a struggle between Louis de Male, Count of Bruges, and feudal lord of Ghent, and the popular party under Philip van Arteveld, who was utterly defeated at Rosbecque and Courtrai. This success was made the occasion of great severities against the Parisians, the patriotic Desmarets being executed and the taxes increased. The following year C. expelled from W. Flanders the English crusade in favour of Pope Urban, which was commanded by the Bishop of Norwich. The marriage of the King to Isabella of Bavaria (1385), the expeditions against England (1386) of Admiral de Vienne and Constable Clisson, and the dismissal (1388) of the King's uncles by the 'Marmouset' party, mark the next few years. This introduced comparative quiet and economy until C.'s insanity, which occurred in 1392, and which brought his brother, Louis of Orleans, into prominence as the rival of the House of Burgundy. Louis, partly maintained by the exactions of his friend, the 'false' Pope Benedict XIII. at Avignon, stirred up the expedition of Glendower, which was crushed at Shrewsbury; and so neglected the helpless King, and oppressed the great towns, that his murder, in 1407, by Raoul d'Octonville, a follower of the Burgundian Duke Jean sans Peur ('the Fearless') was received with 'ecstasies of joy,' and publicly defended before the Dauphin and the nobles of France, assembled at the Hôtel St. Pol, in March, 1408. The Burgundian victory over the Liégois at Hasbain led to the 'paix fourrée' of Chartres, but the struggle between Burgundy and the Comte d'Armagnac, father-in-law of Orleans (in which the city of Paris took a leading part) was continued till the treaty of Pontoise (1414). The invasion by the English succeeding at Agincourt and elsewhere, the Armagnacs became unpopular, and in 1418 were massacred in Paris by the Burgundians. In revenge, Jean of Burgundy was murdered (1419) on the Bridge of Montereau by Tanneguy-Duchatel, one of the chiefs of the Orleanist party; and his son embracing the English cause, Paris was betrayed to Henry V., who by the treaty of Troyes (1420) obtained Catherine of France in marriage and the right of succession to the throne. Charles, however, survived Henry by two months, dying 21st October, 1422. 'He had reigned for forty-two years: long he had been but a name, a shadow. His voice, heard at rare intervals on some piteous occasion, was as if it came from the tomb: it usually had a plaintive gentleness, a touch of sad forgiveness in it. . . . The people called him "C. the Well-Beloved," clinging to him with a touching helplessness.' Kitchin's *History of France*, pp. 513-514.

Charles VII. (*Le Victorieux*, or *Le Bien-Servi*), born at Paris, 22nd February, 1403, was the fifth son of the preceding, whom he succeeded in 1422. In the same year he married Marie of Anjou, daughter of Louis, King of Sicily. He had previously, in 1418, assumed the title of Regent, and had acted with the Constable d'Armagnac against the Burgundian faction. While the latter occupied Paris, C. held a Parliament at Poitiers and Bourges. The treaty of Troyes (1420) had transferred the French crown to Henry V. of England. Accordingly C. had to fight with Bedford and other English commanders at Crevant (1423), Verneuil (1424), and on the fatal 'Day of Herrings' (1429) for his existence as a sovereign. The appearance of Joanne d'Arc at the siege of Orleans, and the dismissal of the favourite La Trémouille, changed the course of events. C. himself awakened up from the frivolous sloth in which he had been living, and detaching by the treaty of Arras (1435) the House of Burgundy from the English cause, he gained several important victories over his ancient foes, organised by his *ordonnances* the first standing army (cavalry and infantry) of France, and made an honourable truce in 1444. He also, by the Pragmatic of Bourges, resisted the Pope's fiscal claims on the national Church. When war broke out again, the English were speedily driven from Normandy, Guienne, and Gascony. In 1457 they had left the country. Suspicions of the Dauphin (afterwards Louis XI.) hastened C.'s end; he died 22nd July, 1461. He had twelve children, of whom one daughter, Catherine, was married to Charles of Burgundy; another, Madeleine, to Gaston de Foix. C. was much under the good influence of Agnes Sorel. In this reign Jacques Cœur founded French trade with the Levant, but was afterwards forced to flee from his country to escape the jealousy of the nobles. See Kitchin's *History of France*, b. iv. c. 6, 7; and Vallet de Viriville's *Histoire de C. VII.* (3 vols. Par. 1862-65).

Charles VIII. (*L'Affable*), born at Amboise 30th June, 1470, was the only son of Louis XI. and Charlotte of Savoy; his legitimacy has been questioned. He was declared king on his father's death in 1483. His sister, Anne of Beaujeu, became regent, and conducted a successful war against the Orleanists, among whom were the future King Louis XII. and De Comines, the Battle of St. Aubin (1488) deciding the final campaign in Brittany. In 1491 C., who had taken Dunois as his adviser, married Anne of Brittany, who had been already married by proxy to Maximilian. This led to a war with Germany, with whom Henry VII. sided. C., however, wished to prosecute the claim to Naples, which Charles of Anjou had bequeathed to his father; he also dreamed of conquering the Eastern Empire. He led an army of 30,000 men into Italy, drove the Médicis from Florence, obtained the Turkish Prince Zizim from Pope Alexander VI., and occupied Naples almost without striking a blow. The formation of the League of the Pope, Venice, Milan, Spain, and the Emperor caused C. to return home, winning on his way the victories of Fornovo and Novara. Gonsalvo de Cordoba immediately drove the French out of Naples. C. was arranging a new Italian campaign when he died, 7th April, 1498, predeceased by his son, Charles-Orland. C. was remarkable for courage and enterprise, but very sickly in body. See the *Mémoires* of Comines; Ségur's *Histoire de C. VIII.* (2 vols. 1835); and Varillas' *Histoire de C. VIII.*

Charles IX., born at St. Germain-en-Laye, 27th June, 1550, was the second son of Henri II. and Catharine de Médicis, and succeeded his brother François II. on his death in 1560, having previously borne the title of Duc d'Orleans. C. was quite passive in the earlier years of his reign, the Queen-mother pretending to favour the Huguenots. He was, however, brought over to the Catholic side by the interview which the French court had with the Duke of Alva (representing Philip II.) at Bayonne in 1567. The Huguenots then attacked Paris, and were defeated by Montmorency at St. Denis. After the short truce of Longjumeau, Condé, who had attempted to gain possession of the King's person at Meaux, was defeated at Jarnac, and in 1570 the peace of St. Germain-en-Laye was signed with Henri of Navarre, who had now become leader of the Huguenots. C. seems to have fallen under the influence of Coligny at this time: probably suspicion of the Guises and jealousy of his brother Henri contributed to this. He married Elizabeth, the daughter of Maximilian II., and betrothed his sister Marguerite to Henri of Navarre. To the assassination of Coligny, and the general massacre of 24th August, 1572, C. consented under considerable moral pressure. The Peace of Rochelle showed that the massacre was a great blunder. C. died 30th May, 1574, leaving no legitimate children. C. wrote a book, *La Chasse Royale*, printed in 1625, and wrote verses of high merit. Singular to say, the King who consented to the Massacre of Bartholomew also authorised the famous Calvinistic version of the Psalms by Marot to be printed. See Varillas' *Histoire de C. IX.*, and Sorlin de Sainte-Foy's *Histoire de la Vie, Mœurs, et Vertus du Roi C. IX.*

Charles X., the fourth son of the Dauphin Louis and Marie Josèphe of Saxony, and grandson of Louis XV., was born at Versailles, 9th October, 1757. In 1773 he married Maria Theresa of Savoy. He was then known as Charles Philippe, Comte d'Artois. His life was extremely vicious and stupid. C. supported the oppressive fiscal measures which precipitated the Revolution. Early in the struggle he emigrated with his sons, the Duc d'Angoulême and the Duc de Berri, and afterwards meeting his brother Louis, Comte de Provence, at the Conference of Pilnitz (1791), they issued the declaration which provoked from the National Assembly a decree placing their property under sequestration, and ordering them to return to France in three months. C. took part in the campaigns of the Dukes of Brunswick and York. He also accompanied Lord Moira's expedition of 1795, which was to assist the rising of Charette and Stofflet in the royalist provinces of the W. 'Monsieur,' as C. was then called, timidly withdrew without landing, went to Holyrood, and after the peace of Amiens (1802) to London, which he did not leave till 1814, when he entered Paris, and was enthusiastically received there and in the provinces. On the return of Napoleon, C. was sent to Lyon to organise assistance, but was obliged to retire with his brother to Ghent. On the second restoration, in spite of his vows to carry out the charter of the constitution, he became the head of the reactionary party against the moderate programme of the King and his ministers. After the assassination of his son, the Duc de Berri, C. succeeded in dissolving the Richelieu ministry, and bringing in that of Villèle and Peyronnet, which engaged in the inglorious war with Spain (1823). In 1824, in his sixty-seventh year, he succeeded Louis XVIII., and at once began a retrograde policy, encouraging Ultramontane pretensions, attacking the freedom of the press (the *Courrier* and the *Constitutionnel* were both prosecuted), and strengthening the Royalist Chamber of Peers by numerous creations. The elections of 1828 produced the more enlightened ministry of Portalis, Royer-Collard becoming President of the Chamber of Deputies. In spite of this and of the popular French intervention in Greece, a rupture took place on the question of Departmental administration; and the formation of the Polignac and Labourdonnaye ministry called forth the famous protest of the 221 deputies. Immediately after the successful expedition to Algiers, C. published the ordinances of 25th July, 1830, which threw Paris into the revolution known as the Three Days of Barricades. The King, in alarm, made ineffectual efforts to conciliate the popular party. It was too late. He then departed for England, where he assumed the title of Comte de Ponthieu. The rest of his life was spent quietly at Holyrood, &c. He died, 6th November, 1836, at Görz. C. was the last Bourbon King of France.

Charles the Rash (*Le Téméraire*), Duke of Burgundy, born at Dijon, 10th November, 1433, was the son of Philippe le Bon and Isabella of Portugal. His passionate, martial nature burst into action when Louis XI. attempted to take the Somme towns. C. formed a League of the Public Good, defeated the King at Montlhéry, and by the treaty of Conflans (1466) extended his father's hereditary possessions. When in 1467 he became Duke (he was previously known as Comte de Charolais), he suppressed with terrible severity the insurrection of the people of Dinant and Liége, and strengthened his position by marrying Margaret, the sister of Edward IV. of York. Afterwards, at the interview of Péronne, a sort of agreement was come to between the great vassal and his lord; but in 1471, C., taking some excuse from the Wars of the Roses, opened hostilities in Picardy, Normandy, &c., with an army composed partly of English and Italian mercenaries, but chiefly of the old feudal levy, which he opposed to the 'Compagnies d'Ordonnance' of Louis. In spite of his excellent artillery he was compelled to raise most of his sieges. He now thought of reviving the old kingdom of Burgundy by the addition of Lorraine, Provence, and Switzerland. These designs brought him into conflict with the Emperor Friedrich at Neuss, King René II. at Nancy, and with the Swiss Cantons, who defeated him utterly at Granson, and again, with the help of Lorraine cavalry, at Morat. With a third army C. made a final effort by laying siege to Nancy (1477), where he was killed (5th January), and his army dispersed. C. was unusually well educated for his age, attentive to religious fasts and ceremonies, fond of chivalry and ancient military custom, charitable to the poor, and energetic as a ruler, but rash in war and merciless in discipline. See De Comines' *Mémoires*; De Barante's *Histoire des Ducs de Bourgogne de la Maison de Valois*; Kirk's *History of Charles the Bold, Duke of Burgundy*; and Freeman's *Historical Essays*.

Charles'ton, the chief city of S. Carolina, U.S., is situated on a tongue of land, having the Cooper river on the E. and the Ashley on the S.W. Both of these rivers are wide and deep, affording good accommodation for shipping, and the bay or estuary which they form extends eastward for 7 miles. There is a troublesome sandbar at the entrance, broken, however, by a navigable channel of from 16 to 22 feet of water. Approaching from the ocean the effect is fine, with the bay, its islands, forts, and shores spread out, and the spires and shipping of the city in the distance. C. has some thirty churches and a large orphan asylum, negro-schools, schools and charities for white people who have suffered in the war, and the State Medical College. C. is the principal commercial city of the State, and has an extensive export trade in cotton, rice, and phosphates, &c., amounting to over $20,000,000 annually. Most of its bread-stuffs and manufactured goods are imported from the N. C. was founded in 1672, and in 1685 many French Huguenots settled in it. Before the civil war it was a charming city, with beautiful villas, gardens, and promenades; and was famed for the hospitality of its citizens and the gaiety of its society. On the 12th April, 1861, the civil war began by the firing of the first gun on Fort Sumter in C. harbour. In 1863 the Union forces bombarded the city, and on 18th February, 1865, they occupied it again. During the war a fire broke out, and it left for years a track of desolation across the city. Pop. 54,955.

Charlestown, a seaport of Massachusetts, U.S., is separated from Boston by the Charles river. It stands on an elevated peninsula, containing Breed's or Bunker Hill, crowned with a monument to commemorate the first battle of the Revolution, fought here 17th June, 1775. C. contains the Massachusetts state prison, and an extensive U.S. navy yard. It was annexed to the city of Boston in 1873.

Charles' Wain or **Waggon,** otherwise called the *Plough*, a popular name for the seven conspicuous stars in the constellation Ursa Major (q.v.).

Char'let, Nicolas Toussaint, a French painter, born in Paris, 20th October, 1792, was the son of a dragoon, and was familiar from childhood with barrack life. He was employed as a clerk in the Paris mayoralty till 1816, when his Bonapartism put an end to his official career, and the pressure of circumstances drove him into art, the special tendency of his mind leading him into the department of kindly and humorous caricature. His designs chiefly represent the phases of life in the barrack, the tavern, and the homes of the poor, but are always refined and genial. In his drawing, however broad the humour may be, there is always a basis of serious sentiment. By his *Épisode de la Campagne de Russie*, exhibited in 1836—a work remarkable at once for vigour of style and elevation of feeling—C. established his claim to high rank as a painter in oils. He died at Paris, 29th December, 1845. See Jules Janin, *Notice Nécrologique sur N. T. C.*

Charleville, a town in the department of Ardennes, France, on the Meuse, nearly opposite Mézières, with which it communicates by means of a stone bridge. It lies near the base of *Mont Olympe*, has fine promenades, a valuable library, large ironworks, and an active railway and river trade in wine, coal, iron, &c. C. was founded in 1606 by Charles, Duke of Nevers, hence its name. Pop. of commune 17,390; of canton 31,356.

Charl'ois, a town 2 miles S.S.W. of Rotterdam, on the Maas, notable as the scene of a terrible catastrophe in the year 1512, when some 8000 persons in a religious procession were drowned while crossing the frozen river. Pop. 9706.

Char'lotte Am'alie, the capital of St. Thomas, W. Indies. It has a spacious harbour, and is the W. Indian station for the English mail-packets. Pop. 13,027.

Charlott'enburg, a town of Prussia, province of Brandenburg, on the Spree, 4½ miles W. of Berlin, of which it may be regarded as a suburb. It has a royal palace, built in 1699, a beautiful park, in which there are a large orangery, a theatre, and a mausoleum of granite, under which rest the remains of Friedrich Wilhelm III. and Queen Luise. The principal industries are dyeing, printing, manufactures of machines, shot, porcelain, cement, wax, chocolate, soap, glass, &c. Pop. town district 76,859.

Char'lotte Town, the capital of Prince Edward Island, Dominion of Canada, on Hillsborough Bay, at the confluence of three rivers, each navigable for several miles. It possesses a very commodious natural harbour, vessels being able to ascend each of the rivers to a considerable distance. C. has also an ironfoundry, a woollen factory, and considerable shipbuilding. Pop. 11,373.

Charm (Fr. *charme*, Lat. *carmen*, a 'song'), a form of words in verse (hence the name), believed to possess a protective, hurtful, or healing power. For this purpose verse has always been held to be more potent than prose. Latin literature abounds with examples of the use of 'carmen' in the sense of a magic spell. The occult power dwelling in the C. exerted its mysterious influence during the 'incantation' or rhythmic recital of the words. But gradually this notion of a C. died out as the belief became confined to the more ignorant of the community, and now the word denotes any unintelligible jargon scribbled on paper by a quack and carried about by his dupes. See AMULET, INCANTATION, MAGIC.

Char'nel-House (Fr. *charnier* or *charnel*, Lat. *carnatis*, from *caro*, 'flesh'), a place in which the bones of the dead thrown up by gravediggers used to be deposited, at a time when overcrowded churchyards and other burying-grounds did not invite legislation against the nuisance they constituted. The C.-H. was sometimes a building complete in itself, having a chantry attached to it; but it was commonly a crypt under a chapel—not unfrequently, indeed, under the church itself.

Cha'ron first appears in later Greek mythology as a son of Erebus, appointed by the gods to ferry across the river of Hades the shades of such dead as had been buried. He exacted as toll from each an *obolus* or *danake*, and the coin was placed in the mouth of the dead previous to burial. C. is represented as a slovenly old man with squalid beard and clothes.

Charon.

Charr, a species of Teleostean fishes belonging to the salmon genus, and included in the family *Salmonidæ*. The C. is a freshwater fish, occurring in British and European lakes and rivers. The Lake of Geneva is celebrated for its C.—the *ombre chevalier* of that lake. The body of this fish is elongated, the tail forked, and the fins of small size. The back is coloured dark olive; the sides are of lighter colour, and spotted with red or white; the belly is light in colour, and may be pale or even deep orange. The colours vary with the season and reproductive periods of these fishes. Only the front part of the vomer is provided with teeth, as in the true salmon and bull-trouts. The C. feeds on crustacea, insects, &c.; and appears to live in deep water during summer, but to come to the surface and shallower waters in the autumn season. It spawns in autumn or winter, and ascends rivers for that purpose. The fish is more plentiful in the N. of England lakes than in Scotch waters; but its numbers have greatly decreased owing to the indiscriminate fishing permitted by the want of legislative measures.

Charte (Lat. *charta*, 'a paper'). Before 1789 France had properly speaking no great written guarantee of constitutional freedom. The successive constitutions of the Revolutionary period and the First Empire will be noticed elsewhere. The first French C. is properly that of 1814. The Senate, under Talleyrand, had already, on 6th April, prepared a draft constitution, which was 'to be submitted to the acceptance of the French people, and to which Louis Stanislas Xavier, freely called by the people, was to swear conformity.' But, in spite of the declaration of St. Ouen, Louis set this aside, and submitted to a meeting of the Senate and Corps Législatif the *C. Constitutionelle* of 4th June, 1814, which is couched entirely in the language of concession, and its preamble expressly affirms that the person of the King contains all authority. The document deals with public rights, such as equality before the law, equality of contribution to public burdens, freedom of civil and military offices, personal liberty, and liberty of conscience, freedom of discussion. The Catholic religion is declared to be the state religion, conscription is abolished, and the enjoyment of the nationalised property is guaranteed to its present owners. Then comes a chapter on the forms of government, defining the supreme executive vested in the King, the responsibility of ministers, the legislative power vested in King, Chamber of Peers, and Chamber of Deputies, the initiative of legislation, and the special initiative in taxation. The Chamber of Peers is next treated of: they sit in secret, have the sole jurisdiction in high treason, are free from arrest in matters criminal. The King has an unlimited power of creating peers, but the peer must be thirty years old before he has a deliberative voice. With regard to the Chamber of Deputies from the electoral colleges, the deputies are elected for five years; each one must be forty years old, and a ratepayer to the extent of 1000 frs. The suffrage is confined to ratepayers of 300 frs. The King may dissolve the Chamber, but must call another in three months. The persons of deputies are protected during session. The Chamber has the right of accusing ministers, who may be chosen from either House. The judges named by the King are not removable, except Juges de Paix. Juries are preserved. The whole military service is to remain in possession of its honours and pensions; the public debt is guaranteed; the ancient nobility resumes its titles. The C. is modified by the *Acte Additionnel*, drafted by Benjamin Constant, which, during the Hundred Days, Napoleon passed on 22nd April, 1815, and which received 1,300,000 votes. It reduces the minimum age of deputies to twenty-five, and removes the ratepaying qualification; an indemnity is given to representatives; offences of the press are appropriated to the jury; the duty is laid on ministers to give explanations when required; and the intervention of the legislature is made necessary in loans, alienations of territory, and in the levy of forces. On the second Restoration, which had proclaimed at Cambrai the dogma of legitimacy, Louis promised to reform fourteen articles of the C., but failed to do so. After the assassination of the Duc de Berri, a long series of retrograde measures were carried by the ministries of Villèle, Peyronnet, and Polignac; the National Guard was disbanded; new peers were indiscriminately created. Then came the address of the 221 members, 'that the policy of the Government was not consistent with the wishes of the people;' and the royal ordinances of St. Cloud (25th July, 1830), the object of which was the total destruction of the liberty of the press, and the restriction of electoral power to the wealthier classes. These ordinances, which dissolved the chamber, were unconstitutional. Associations were formed in Normandy, Burgundy, Lorraine, and Paris to resist payment of taxes not voted by the chamber; then came the Revolution, the new or revised C. of 6th August, 1830, and the ministry of Laffitte, Guizot, Dupont de l'Eure, Gérard, Bignon, Casimir Périer, Duc de Broglie, Baron Louis, Molé, Sébastiani, and Dupeir. One important point in this C. was that the regulation of the franchise, or, in the French constitutional language, the organisation of the electoral colleges, was not made part of the constitution, but left to the Legislature, so that universal suffrage might have been legally introduced before 1848. A direct initiative is given to both Chambers; the deputies and the electors nominate their presidents; the sittings of the Upper Chamber are made public; the Catholic religion ceases to be the state religion in this sense that all other Christian sects are admitted to receive state aid. All the peerages created by Charles X. were annulled, and speedy legislation was promised as regards the responsibility of the executive, the organisation of primary education, the re-election of deputies receiving official posts, the franchise, the use of a jury in the trial of political and press offences. In its main features the second repeats the first C. By a subsequent law of 29th December, 1831, the twenty-third article, which gave an unlimited right to create hereditary and life peerages with pensions, was limited to the nomination of life peers without pension from certain classes which are enumerated. There were three parties concerned in the preparation of this C.: the Progressists, of whom Constant was the type; the *Doctrinaires*, or 'quasi-Legitimists,' who did not wish to go beyond the principles of 1814; and the practical majority of the Chamber led by Dupin the Elder, whose anxiety was to point out that Louis Philippe succeeded, not as heir, but by choice. In 1831 the franchise was lowered from 300 to 200 frs. of direct taxes, and the eligibility qualification from 1000 to 500 frs. The only other constitutional law of importance prior to 1848, when the republican constitution was introduced, was the regency law of 1842.

Char'ter, in the law of England, is the instrument conveying a royal grant. It is generally written in Latin. The grant may be of lands, houses, or honours, not already possessed; or it may be confirmatory of a grant already made; in which case it is called a C. of Confirmation. It was also to forgive a felony, or other crime against the crown; in which case it is called a *C. of Pardon*. In Scotch law a C. is the written evidence of a grant of heritable (real) property, made under the condition that the grantee shall annually pay money or perform a service to the granter; and this must be in the form of a written deed. The granter is termed the superior; the grantee, the vassal. The vassal is said to *hold* the subject of the superior. The annual sum or service stipulated for is called the *Duty*. Charters are either *Blench* or *Feu*. A blench-duty is nominal, as a penny Scots or a red rose, *si petatur tantum*. A Feu-duty (q.v.) is a consideration of value.

Char'terhouse (a corruption of the Fr. *Chartreuse*, Latinised Carthusian), originally a Carthusian monastery, founded about 1370 by Sir Walter Manny outside the bar of W. Smithfield. It was surrendered to Henry VIII. 10th June, 1535, and after having been possessed by several eminent personages in turn, was sold for £13,000 by the Earl of Suffolk to Sir Thomas Sutton, who founded on it a magnificent hospital, and endowed it for a master, preacher, a head schoolmaster, a second master, forty-four boys, and eighty decayed gentlemen, known as *Poor Brethren*. The poor brethren must not be under fifty years of age, and must have been housekeepers; they must also be bachelors, or widowers, and members of the Church of England. The boys, or scholars, were admitted between the ages of ten and fourteen; and both they and the poor brethren gained admission less because of their poverty, than of the influence which they could command. The poor brethren have each an apartment, food, and about £26 a year for clothing, &c., and the scholars received free board and education. The masters, however, were allowed to receive others, either as boarders or as day-scholars, and as the C. was one of the best English schools, the number of these was always considerable. Among those C. boys who distinguished themselves in after-life are Barrow, Addison, Steele, Wesley, Thirlwall, Grote, Thackeray, Eastlake, and Havelock. The poor brethren remain where they were and under the same conditions, but in 1872 the school was removed to Godalming in Surrey, and since then the number of boys not on the foundation has greatly increased. The total attendance is estimated at 500. The school staff consists of a Head Master and 34 Assistant Masters. There are 60 scholarships which can be held by boys attending the school, and ten of these are vacant every year. There are also twenty-one exhibitions of £80 and tenable for four years, open to competition among the pupils who are to proceed to the Universities.

Charter-Party, this is a contract for letting a ship or part of one to a merchant, called the freighter or charterer, for the conveyance of goods for one or more voyages. It may be under seal or in writing only. A memorandum of agreement, or the heads of an agreement for the drawing up of a C.-P., are frequently all that passes between shipowner and freighter, and they are as binding as a formal instrument. By the C.-P. the owner or master usually undertakes that the ship shall be seaworthy, and otherwise in condition to carry the goods; that the ship will be ready on the day appointed; that after receiving her lading she shall sail on the first opportunity, and safely deliver her goods at the place of consignment. The charterer undertakes to pay the freight, and load and unload within the time agreed on. Each binds himself by a penalty to fulfil his undertaking. Of course the act of God or Queen's enemies relieves the shipowner of responsibility for delay or non-fulfilment of contract. The freighter may underlet, or put in the goods of another, unless contrary to the contract. The responsibility of the owner of the ship begins when the merchandise is put on board. The freighter generally insures. See BILL OF LADING.

Char'tism was the articulate expression of the misery and sense of wrong felt by the working classes (both artisan and agricultural) in the long period after the Napoleonic wars, when, without education or political rights or trade organisation, they expected to counteract high prices and low wages by a redistribution of political power. The same movement is seen in the 'Friends of the People' (1793), and in the 'Manchester Blanketeers' (1819). In 1830 Lancashire and Yorkshire operatives were receiving 4d. a day for twelve hours' work, and in some parishes the whole available property was insufficient for the relief of the poor, although the weekly allowance for a labouring man (including earnings) was sometimes only 3s. 1d. per week, when the quartern loaf was 1s. Rick-burning and machine-breaking were frequent in that year. The influence of a bad poor-law and of the vexatious corn-laws was in 1835 intensified by a bad harvest; and the excitement which the Reform Act of 1832 had partially allayed broke out in the Dorchester labourers' meeting in Copenhagen Fields (1834), the Lancashire torchlight meetings of 1838, and the Birmingham National Convention (elected by Chartists) of 1839. The 'Charter,' drawn up in 1838 by six radical M.P.'s, and six members of the 'Working Men's Association,' demanded universal suffrage, ballot, annual Parliaments, payment of members, abolition of the property qualification of members, and equal electoral districts. A monster petition was presented to the Commons on 14th June, 1839, but the motion to refer it to a committee was negatived by a majority of 189. This was followed by riots in Birmingham, Sheffield, Newcastle, &c., by forced contributions and the attempted suppression of religious services; but fortunately the threat of a 'sacred month,' or cessation of labour during August was not carried out. The best Chartists, such as Hetherington, Vincent, Lovett, and even Feargus O'Connor, were 'moral force' men, and supported their principles in the *Dispatch* (London), *True Scotsman* (Edinburgh), *Journal* (Birmingham), *Chartist Circular*, the *Northern Star*, and other papers. Prominent among 'physical force' Chartists was a Methodist minister named Stephens, who countenanced torchlight meetings (after they were by proclamation declared illegal), and was tried and sentenced to eighteen months' imprisonment at Chester in 1839. The popularity of Vincent, and the report that he had been cruelly treated in prison at Newport (Monmouth), occasioned the armed attack on that town under the leadership of Frost (a linendraper and magistrate), Williams (a publican), and Jones (a watchmaker). These men were tried for high treason, sentenced to death, and transported for life. In 1840-42, under O'Connor and O'Brien, C. was successfully revived, joint cause being made with the Irish Repealers. Duncombe presented in Parliament the petition of the 'National Chartist Association' (which possessed 400 affiliated societies and 40,000 members); and in the N. of England there was a systematic 'turn out' from the factories, although little violence was done to person or property. In spite of numerous prosecutions (on one of which Thomas Cooper was sent to prison for two years), the 'complete suffrage union' of Joseph Sturge and the abortive land scheme of O'Connor (who was now supported by Ernest Jones) continued to fan the excitement. O'Connor, who had weakened his position by opposing the Anti-Corn-Law League, was nevertheless returned to Parliament in 1846, on the downfall of Sir Robert Peel's administration, but nothing of importance occurred till after the French Revolution of 1848, when a monster meeting took place on Kennington Common. The petition presented by this meeting (against the proposed procession of which to Westminster great military preparations had been made) was found to be in great measure a dishonest fabrication. This fact, the prosperity of trade, and the increase of emigration, all tended to extinguish C. O'Connor became a lunatic. The resolutions in favour of household suffrage and ballot, moved by Hume in 1848, indicated that portions of Chartist principles were destined to survive. The Reform Bills of 1867 and 1885, and the Ballot Act of 1872, have substantially conceded the most important demands of the Charter, but the experience of America and France does not commend the principle of 'payment of members.'

Char'tres, the capital of the department Eure-et-Loir, France, lies in a hilly amphitheatre on the Eure, 47 miles S.W. of Paris by railway. It is in great part composed of picturesque old houses, and has many fine promenades. Its large cathedral of *Notre Dame*, rebuilt during the 11th, 12th, and 13th centuries, is one of the finest in France, and is almost unsurpassed for wealth of ornamental sculpture. The façade supports two elegant spires, the principal one being 400 feet high; and the windows are traced with 5000 figures, exhibiting fine artistic design and the rarest delicacy of colour. There are several other handsome churches, as those of St. Pierre and St. André, also an imposing episcopal palace, founded by Madame de Maintenon, a massive town-hall, a theatre, &c. C. has large manufactures of steel, woollens, leather, hosiery, &c., and an active trade in grain, wine, and cattle. Pop. 23,108. C. was the capital of the Gallic *Carnutes*, and became the *Autricum* of the Romans. In the Middle Ages it gave name to a country which fell to the crown of France in 1286, was raised to a duchy by François I., and became an appanage of the Orleans family, whence the eldest son of the Duc d'Orleans generally bore the title of Duc de C.

Chartres, Duc de, Robert Philippe Louis Eugène Ferdinand d'Orleans, brother of the late Duc d'Orleans, was born in Paris, 9th November, 1840, and at the Revolution of 1848 passed into exile with the rest of the family. He was educated at Eisenach, resided for some time at Richmond, and served along with his brother in the Federal army during the campaign of the Potomac (1862) in the American civil war. In 1863 he married his cousin, the eldest daughter of the Prince de Joinville, and in 1870 returned incognito to France, entering the army of General Chanzy under the name of Robert le Fort. After the German war, the National Assembly having revoked the law of banishment against the Orleans family, he was named commander of a squadron by Thiers, and served in Algeria in 1872. By the Expulsion Bill of 1886 he with others of his family was exiled from France.

Chartreuse', La Grande, a famous monastery in the department of Isère, France, 13 miles N. of Grenoble, picturesquely situated in the valley of the Guiers (nearly 4000 feet above the sea), enclosed by lofty mountains, and almost inaccessible. It was founded 1084 by St. Bruno, broken up at the Revolution of 1789, and reoccupied since 1816. The well-known liqueur of the same name is manufactured by the monks, and is held in much repute.

Charts are the maps, used in navigation, in which are specially noted the depth of soundings, the position of rocks and sandbanks, and the direction of currents and prevalent winds. The English Admiralty Office expends a large sum annually on the preparation of elaborate C. on a large scale, and these are sold at nominal prices, ranging from 3s. to 6d. each. At various places, as Gibraltar and Cape Town, there are depots for the supply of C., which are now in almost universal use.

Char'tulary (Late Lat. *chartularia*), a collection of charters belonging to a church or religious house, a civil corporation, or even private individuals. Where these were numerous, the necessity of such a collection, consisting of copies of the original charters, would soon suggest itself; and hence we find that chartularies were made in France as early as the 10th c. Many of them have been printed, and contain matters of great interest and value, historical and antiquarian.

La Grande Chartreuse.

Chase, Salmon Portland, a prominent American statesman, was born in Cornish, New Hampshire, 13th January, 1808, graduated at Dartmouth College, 1828, and, after studying law, settled in Cincinnati about 1830. C. was at first a Democrat, but in 1841 he assisted in organising the Liberty party, and sought to denationalise slavery. He was elected a senator in 1849, and in 1855 was made Governor of Ohio. In 1861 President Lincoln appointed him Secretary of the Treasury, and C. signalised himself by his bold financial policy during the crisis of the war. He was the originator of the far-famed *greenbacks*. On 12th October, 1864, C. was appointed Chief Justice of the United States, which office he held till his death, 7th May, 1873. C. stood very high in the esteem of his countrymen. He was unquestionably a man of noble character and great intellectual vigour, and his career must always form an important part of the history of his time.

Chas′idim (Heb. *ka-sē̆thēm*, 'the pious') were the Puritans among the post-Babylonian Jews. They were distinguished by their efforts after a Levitical and sacerdotal purity; for besides their leaders, who were properly the offerers of sacrifice, each individual obtained the standing of a priest by taking part in the purifications and sacrifices. They imposed upon themselves great acts of self-denial, and to a great extent had a community of goods. In process of time the association was split up, the ultra-Puritan party being the Essenes, while the moderate party, to which the Pharisees belonged, retained the name of C. A sect of C., which has survived to the present day, with doctrines drawn from the Bible, the Talmud, and especially the Cabala, was founded in Poland in the middle of the 18th c. by Rabbi Israel ben Eliezer Baal Shem.

Cha′sing, the art of chiselling or otherwise cutting out ornamental details on metallic surfaces, principally applied to the precious metals and bronze. C., indeed, in its widest signification, may be said to be the artistic sculpture of metal-work. The tools used by the chaser are 'gravers' and other cutting implements, 'rifflers,' and 'mats' for producing a soft superficial texture. Repoussé-work (q.v.), after being beaten up into form, is finished by C., as are also cast and 'struck' or stamped ornaments; and in relief is also applied to metal in the flat.

Chass′é, David Hendrik, Baron, a Dutch general and patriot, was born at Thiel, 18th March, 1765, entered the army of his country at the age of ten, and was made lieutenant in 1781, and captain in 1787, but subsequently joined the army of France. He rose to the rank of lieutenant-colonel in 1793, distinguished himself fighting against Prussia in 1796 and 1799, and was popularly called *Général Bayonette* during the Peninsular war. In 1811 Napoleon made him a baron of the Empire. After the first restoration of the Bourbons, he returned to Holland, and was lieutenant-general of the Dutch army, fought at Waterloo, was appointed Governor of Antwerp after the peace, and defended the town for about a month in 1832 with a garrison of 6000 men against a Belgian and French force 75,000 strong. C. died at Breda, 2nd May, 1849.

Chasseurs′ (Fr. 'huntsmen'), the name originally given to a French body of sharpshooters or skirmishers, formed in 1741, in imitation of the Tyrolese jägers (chamois-hunters) of the Austrian army. The French C. were at one time both infantry and cavalry, but the name came to be applied strictly to a celebrated foot corps organised in 1835 by the Duc d'Orleans, armed with improved rifles, and called *C. de Vincennes*, from having been quartered at Vincennes. In 1838 these troops were raised to a battalion, and they have since become known also as *Tirailleurs*. There are light troops corresponding to the C. in almost all European armies.

Chas′uble (*casula*, *casibula*, a diminutive of *casula*, used by Isidore of Seville for 'a mantle'), the principal garment of a Roman Catholic priest, and as such often called 'the vestment' in old English inventories. It is worn uppermost at the celebration of mass. Originally in the form of a circle, it was retrenched in the Western or Latin Church till it became oblong. In England it was generally adorned with Y-shaped crosses and orphreys, or with embroidered ornaments down the front and along the edges; and later with a Latin cross on the back, and an orphrey in front. The hooded C. seems to have existed in France as early as the 6th c.; it is the original of the *casula processoria*, 'processional C.,' which was formerly worn at processions, but not generally at mass. The modern-shaped Roman and French C. is the invention of the last two centuries.

Chat, the name applied to a genus of Insessorial birds, including several species, and belonging to the sub-family of *Erythacinæ* or robins, which in turn forms a group of the larger division *Sylviadæ* or warblers. The stone-C., whin-C., and wheatear are three familiar species included in this genus.

Châ′teau, or **Châtel** (Old Fr. *chastel*), a word of common occurrence in the names of French towns, and derived from the Latin *castellum*, 'a fort.'

CHÂTEAUDUN, a town of France, department of Eure-et Loir, on the Loire, 26 miles S.S.W. of Chartres. It has been almost entirely rebuilt since 1723, when it was destroyed by fire. Besides a castle, which dates from the 10th c., it has several fine churches, with the interesting ruins of Notre-Dame-de-la-Boissière. Its chief industries are tanning, and manufactures of blankets and hats; its commerce is for the most part in cattle, wine, wool, and hemp. Pop. of commune 7147; of arrond. 63,758. C. was stormed in 1870 by the Germans.

CHÂTEAU-GON′TIER, a town of France, department of Mayenne, on the right bank of the river of the same name, 17 miles S.E. of Laval. Its most interesting buildings are the Church de la Trinité, erected in the 17th c., the ancient Chapel des Ursulines, remarkable for its fine stained windows, and the Church of St. Jean. C. has cornmills, tanneries, potteries, and manufactures of linens, woollens, serge, &c., and in its vicinity are mineral springs. Pop. of commune 7281; of arrond. 73,229.

CHÂTEAU-MARGAUX, a beautiful castle near the village of Margaux, in the department of Gironde, E. of Castelnau de Medoc, on the left bank of the river Gironde, 14 miles below Bordeaux. It is famous for its vineyards, which yield one of the finest class of clarets.

CHÂTEAUNEUF (de Randon), a village of France, department of Lozère, 14 miles N.E. of Mende, pop. of commune 733. It is historically interesting for the touching incident connected with its surrender by the English governor in 1380 to the dead Du Guesclin, the former laying his sword and keys on the bier of the latter. Here also, on 18th November, 1870, the Germans defeated a superior force of French Mobiles.

CHÂTEAUROUX, a town of France, department of Indre, on the left bank of the river Indre, and a station on the Paris and Bordeaux Railway, 145 miles S.W. of the former city. The town hall occupies the site of the old castle, erected in the 10th c., and of which only a tower remains. C. manufactures and trades in woollens, cottons, hosiery, paper, hardware, leather, tobacco, &c., and has a considerable number of hands engaged in working lithographic stones. Pop. of commune 23,924; of arrond. 116,623.

CHÂTELLERAULT, a town of France, department of Vienne, 20 miles N.N.E. of Poitiers, on the right bank of the Vienne, and connected with a suburb on the opposite bank by a stone bridge having a castellated gateway, built by Sully, with four massive towers. Cutlery is extensively carried on, lace is manufactured, and there are bleaching-grounds for linen. The river-port gives rise to a large trade in the produce of the district. Pop. of commune 22,522; of arrond. 68,334. The Duke of Hamilton takes the title of Duke of C. from this place, the duchy having been granted to James Hamilton, Regent of Scotland, by Henri II. in 1548.

CHÂTILLON-SUR-SEINE, a town of France, department of Côte-d'Or, on the Seine, 45 miles N.N.W. of Dijon, with which it is connected by railway. It has a church of the 10th c., and large manufactures of cloth, iron, paper, &c., and a trade in timber and lithographic stones. The allied sovereigns held a congress here 5th February to 19th March, 1814, to negotiate terms of peace with Napoleon. Pop. of commune 5127; of arrond. 40,511.

Chateaubriand, François Auguste, Vicomte de, born at St. Malo, in Bretagne, 14th September, 1768, the youngest of ten children in an aristocratic family. He was first destined for the marine service, and educated at the Colleges of Dôle and Rennes; then for the Church, for which he studied at Dinan; but finally entered the army, from which, after being presented at court in 1787, he retired to his father's estate of Combourg. After witnessing the outbreak of the Revolution, C. set sail for America, with a view to discovering the N.W. passage. He saw the Canadas and some Indian tribes, when the news of the King's disaster at Varennes recalled him to France. After marrying Mademoiselle de Lavigne, to whom he did not profess to be attached, he joined the Prussian army before Thionville, where he was left for dead in the trenches. He then came in bad health and great poverty to London. While supporting himself by teaching and translations, he allowed one of his pupils, Miss Ives, to fall in love with him. In 1797 appeared his *Essai sur Révolutions Anciennes et Modernes*, a work written in a sceptical and pessimist spirit, and concluding against revolutions as useless, though made necessary by human passion. The deaths of his mother and sister made C. a Christian: he says, 'J'ai pleuré et j'ai cru.' In 1800 he returned to Paris under a false passport, which called him Lassaigne, and next year described his religious position in *Atala*, which had enormous success all over Europe. It was followed by *René*, the story of a youth who seeks for peace of mind among savage tribes, and the *Génie du Christianisme*, which is written to show that Christianity is the most beautiful, the most sublime, the most favourable to liberty, arts, and letters, of all religions; and that to it is due all modern civilisation, from agriculture and charity to abstract science and literary taste. This book, half melancholy, half enthusiastic, altogether mystical and almost irrational, found a ready audience at a time of so much sorrow and uncertainty. The love of nature, in which C. was preceded only by Rousseau and Bernardin de St. Pierre, contributed to its success. The book obtained for C. two diplomatic appointments, which, however, he resigned on hearing of the judicial murder of the Duc d'Enghien. In 1806-7 he made a pilgrimage through Greece, Palestine, and Spain, of which the fruits were his chief work, *Les Martyrs*, a prose epic of the time of the Diocletian persecutions, in which he wishes to set off the new faith against the corruptions of Paganism and the shortcomings of heathen wisdom; and *Le Dernier des Abencerages*, remarkable for its beautiful word-pictures of the Alhambra, &c. C. published in 1814 a passionate pamphlet, *De Bonaparte et des Bourbons*, which Louis XVIII. said was worth an army to the Restoration. C. enjoyed the title of Minister of State; but, as an ultra-royalist, he savagely attacked the constitutional Decazes in the *Conservateur*. After attending the congress of Verona, where the Spanish invasion question was discussed, and acting as Minister of Foreign Affairs under Villèle, C. became a Liberal writer in the *Journal des Débats*. At the Revolution of 1830, however, he showed Legitimist colours, refusing to take the oath to Louis Philippe, thus forfeiting a seat in the Chamber of Peers and a large pension. He was even prosecuted for sedition. Down to his death, 4th July, 1848, C. was half-republican, half-royalist, always a man of sentiment, not of intelligible principle. He left behind him a monument of sickly egotism in *Mémoires d'outre Tombe*. His old age, though brightened by the society of Mademoiselle Récamier and Béranger, was consumed by doubts about his own reputation. C. will always remain a proof of what literary genius without strong conviction can accomplish. Most of the great French critics and journalists have attempted to analyse and estimate C.

Châtelet-Lomont, Gabrielle Emilie, Marquise du, a celebrated French woman of letters, daughter of the Baron de Breteuil, was born at Paris, 17th December, 1706. Under her father she studied Latin, English, and Italian, and at fifteen undertook a translation of Virgil. At an early age she was married to the Marquis du Châtelet-Lomont, but in 1733 she left her husband and lived with Voltaire for fifteen years. They retired to Cirey, where they alternately studied, quarrelled, and were reconciled, till in 1747 the marchioness was captivated by the assiduities of M. de St. Lambert, a captain in the regiment of the Lorraine Guards, who was destined to be in turn the successful rival both of Voltaire and Rousseau. She died on 10th September, 1749. She was an eager and successful student of mathematics and the physical sciences. Among her works are *Dissertations sur la Nature et la Propagation du Feu* (Par. 1744); *Institutions de Physique* (Par. 1740); and her translation of Newton's *Principia*, not published till 1756, seven years after her death.

Chatham (Old Eng. *Ceteham* or *Cætham*, 'the village of cottages'), a strongly fortified town in the county of Kent, and one of the chief naval arsenals of Britain, on the right bank of the Medway, 30 miles E.S.E. of London by railway. It is a meanly-built town, but is defended by a series of detached forts, which also form a flank defence of the metropolis. Among the principal buildings are Fort Pitt (a combined fort and military hospital), an extensive arsenal, large barracks for the naval and military forces and engineers, and extensive depots and magazines. The Government shipbuilding establishment is situated at Brompton, on the estuary of the Medway, about half a mile below C., covers an area of some 100 acres, and includes building-slips, floating-docks, and sawmills on the largest scale. It is provided with Brunel blockmaking machinery, and also with a metal-mill for preparing copper plates, bolts, &c. An Admiral-Superintendent is in control of the dockyard, and has a salary of £1883; under him there are various officers and clerks, whose salaries range from £1000 to £80. The dockyard, in fact, costs the country, in salaries alone, £31,547. Pop. parl. bor. 59,210; mun. bor. 31,657; and civ. par. 31,901. C. sends one member to Parliament. The town is a place of considerable antiquity, and from remains found on the spot the Romans appear to have had a cemetery here. The dockyard was established in the reign of Elizabeth, and in 1667 a Dutch fleet of seventeen vessels, under Van Ghent, De Ruyter's vice-admiral, sailed up the Medway and set fire to the shipping. New buildings were erected between 1757 and 1805, and since the latter date great extensions of the marine resources of C. have been made.

Chatham Islands, or **Broughton Archipelago,** a group of islands in the S. Pacific, nearly 400 miles E. of the province of Canterbury in New Zealand, were discovered and named by Lieutenant Broughton in 1791. Their total area is 375 sq. miles. The largest is C. island or Warekauri; lesser islands are Pitt or Kangihaude, and Cornwallis or Rangiaura. The soil on the whole is fertile, and favourable to the cultivation of wheat; horses and oxen thrive, but there is no timber of any size. The natives, though a robust and vigorous race resembling the Maoris, are fast dying out. English and German missions are maintained here. Pop. 271.

Chatham, William Pitt, Earl of, one of Britain's greatest statesmen and orators, was born 15th November, 1708. His father, Robert Pitt, of Boconnoc, in Cornwall, was originally a country gentleman, and both father and grandfather (the latter had been Governor of Madras) sat in the House of Commons for Old Sarum. Pitt studied at Eton and Trinity College, Oxford, and after travelling on the Continent, obtained a cornetcy in the Blues. He did not, however, find his true vocation till, on his elder brother Thomas, being returned both for Oakhampton and Old Sarum, resigning the latter, he took the vacant place. In Parliament he espoused the side of Frederick, Prince of Wales, and by his eloquence and bitterness soon obtained the position of leader of the 'Boys,' as the younger Whigs, and opponents of Sir Robert Walpole, were then called. On the fall of Walpole, Pitt, although much disliked by the King, became a subordinate member of the Broad Bottom administration, and held the post of Paymaster-General. In 1756, Pitt, who had become the head of the Opposition to the Newcastle administration that had been formed on the death of Henry Pelham, and who was so popular that he was styled 'the Great Commoner,' was made Secretary of State in November, 1756, and in reality head of the Government. Driven for a time from power, he was recalled, in answer to the demand of the people, in June, 1757, and although the Duke of Newcastle was Premier, Pitt, who had the management of foreign affairs, was the real force of the administration. Under him, and mainly on account of the energy he infused into every department of the state, Britain rose to a position she had never, since the time of Cromwell, held among the nations. Everywhere British arms were victorious; in Canada and India, under Wolfe and Clive, great possessions were snatched from the French, and at Minden and Quiberon the power of France in Europe was shattered. 'We are forced,' said Horace Walpole, 'to ask every morning what victory there is, for fear of missing one.' Pitt, however, found himself compelled to resign office after the accession of George III., then under the advice of Lord Bute, and more immediately because the majority of the Cabinet refused to declare war against Spain. A pension of £3000 a year, however, was granted him, and his wife was created Baroness C. Till 1766 he remained out of office, when he was again called to form a ministry, which he did, going to the House of Lords as Earl of C. This second administration was, however, far from a success, and C., broken in health, and to appearance temporarily insane, resigned office in 1768. Although he never again was a minister, C. to the end of his life took a keen interest in the affairs of his country. He opposed the policy of the Government towards the American colonies, advocating conciliation; and yet it was after he had delivered a powerful address against a motion by the Duke of Richmond for making peace with America, then in alliance with France, that he fell back into the arms of his friends, and had to be carried dying from the House of Lords. His death took place 11th May, 1778. The country honoured him with a public funeral in Westminster Abbey; the sum of £20,000 was voted to pay his debts; and a pension of £4000 a year was settled on his descendants. C. was one of the greatest of British orators, patriots, and statesmen. Besides his actual achievements, which covered his country with glory, his foresight was shown in his proposals for parliamentary reform, for the direct government of India, and in his directing his foreign policy towards the preservation of Prussia, while it has been said of him with truth, that 'Time has approved almost all his greater struggles—his defence of the liberty of the subject against arbitrary imprisonment under "general warrants," of the liberty of the press against Lord Mansfield, of the rights of the constituencies against the House of Commons, of the constitutional rights of America against England itself.' In public life C. was purity itself. As an orator, his passionate eloquence and sarcasm, aided by a commanding presence, made him more feared than any of his contemporaries. His chief faults were intense pride, pomposity, and a tendency to theatrical airs even in private life, though he was a most affectionate husband. See the *C. Papers* (Lond. 1838-40); his Letters to his nephew, Lord Camelford (Lond. 1804); F. Thackeray's *Life of C.* (Lond. 1827); and Macaulay's *Essays*.

Chati, a cat resembling the leopard in appearance, occurs in S. America, feeds on birds and vermin, and is most destructive among poultry, for which it is always on the hunt after sunset. The coat is of a whitish-yellow, marked with black spots on the back, and with black bands round the tail. The C. is very shy, but when caught can be easily tamed.

Chati.

Chat Moss, a peat-bog in Lancashire between Liverpool and Manchester. It is composed entirely of decayed vegetable matter, is about 12 miles square, and varies in depth from 10 to 30 feet. A portion of it was reclaimed about the beginning of the present century by Roscoe of Liverpool; but it is most celebrated in connection with the Liverpool and Manchester Railway, which the engineering skill of George Stephenson successfully carried across the yielding surface in 1829.

Chats'worth, in Derbyshire, a country seat of the Duke of Devonshire, stands on the Derwent, 20 miles N. by W. of Derby. It is a splendid palace, of quadrangular design, having a façade 720 feet long, and being surrounded by grounds 9 miles in circuit, and only inferior to those of Versailles. Its conservatory is the finest in Europe, and the mansion itself contains famous art collections. The estate was originally a grant from William the Conqueror to his natural son William Peveril, and was held in Elizabeth's time by Sir W. Cavendish, who began (1570) the erection of the mansion, in which Mary Queen of Scots was imprisoned for some years. The old pile was included in the present edifice, which was designed by Wren and Talman, and built by the first Duke of Devonshire (1687-1706), and to which the N. wing was added since 1820.

Chatt'els, in English law, include all property, moveable or immoveable, which is not freehold, copyhold, or inheritable. They are either real or personal. Real C., or chattel interests, are interests or minor estates taken out of greater, as leases for terms of years. Personal C. are all property not connected with the freehold.

Chatt'erer the name of a large family of Insessorial birds belonging to the Dentirostral section of that order, and divided into a number of sub-families, including such birds as the Drongo-shrikes, caterpillar-eaters, fruit crows, true chatterers, manakins, &c. The Bohemian C., or common waxwing, is a familiar example of the typical genus. These birds possess short, broad bills, rounded wings, short tarsi, and curved claws.

Chatterer.

Chatt'erton, Thomas, the boy-poet, was born at Bristol, 20th November, 1752. His father, sexton at Redcliffe Church and master of a charity-school, died before C.'s birth. At school he was considered slow, but early manifested a taste for antiquities, which was first excited by a black-letter Bible belonging to his mother. Bound apprentice to an attorney at the age of fourteen, in this situation he endured much misery, solacing himself, however, by writing poetry and studying heraldry. In 1768, on the opening of Bristol New Bridge, he composed the *Description of the Fryars first passing over the Old Bridge, taken from an Antient Manuscript.* Before this, C. had written the celebrated *De Bergham Pedigree*, purporting to trace the descent of a tradesman called Burgham. These and other MSS., such as the *Romaunte of the Cnyghte*, and Thomas Rowley's *Sermon*, he declared were found in 'Canynge's Cofre,' an old chest taken from the muniment-room of Redcliffe Church. After this he sent to Walpole, for his *History of British Painters*, a manuscript entitled *The Ryse of Peyncteyne in England*, and also an account of noted 'carvellers and peyncters' of Bristol. Walpole, at first deceived, afterwards suspected forgery, and the correspondence was broken off. His three years of legal servitude over, C. proceeded to London, and was soon engaged in party-writing for the newspapers and magazines, taking the side of the Opposition. His industry was unceasing, and success at first made him look for a 'glorious prospect.' But this soon died away, for pasquinades, satires, burlesques, political letters, did not bring the means of life. Reduced at length to the extremity of despair and want, he sought the post of surgeon's mate in an African ship. Even this poor chance failed him. These reverses and the pangs of poverty acting on a natural predisposition, drove this lost genius to suicide, 25th August, 1770. His remains were laid in the burying-ground of Shoe Lane Workhouse. In the tragic sadness of his fate, and the precocity of his mental power, C. is without parallel in English literature. His short span of eighteen years was wondrously rich in results. Among his works are *Ella*, a tragedy; *Ode to Ella; Battle of Hastings; The Tournament;* and *Execution of Sir Charles Bawdin.* The 'forged' poems are undoubtedly superior to the others; but such a satire as *Kew Gardens*, compared with the *Ode to Liberty* and the *Bristow Tragedy*, shows strikingly his varied powers. It is a moot point whether his maturity would have fully realised the promise of youth; but that a longer life would have developed his genius can be clearly discerned from the works he has left. It may here be noted that C.'s knowledge of Old, or even Middle English, was of the very slightest; and it seems almost incredible that anybody should have ever supposed the forgeries to be genuine. Neither metres, nor rhymes, nor words, nor spelling, belong to the 15th c., or indeed to any other century. See *The Poetical Works of Thomas C., with an Essay on the Rowley Poems, by the Rev. Walter W. Skeat, M.A., and a Memoir by Edward Bell, M.A.* (Lond. 1875).

Chau'cer, Geoffrey, the first great English poet, was born probably about 1340. His father, John C., was a London vintner. It is not known where C. was educated. In 1359 he accompanied Edward III.'s army into France, was taken prisoner, and was ransomed in 1360. About 1366 he married a certain Philippa, a lady in attendance on the Queen, and shortly afterwards obtained an annual grant of 20 marks as a valet of the King's chamber. He was sent to Genoa, in 1372, to arrange a commercial treaty, and was made comptroller of the wool customs in London in 1374. About this time his income was also increased by the custody of a minor's estate. Between 1377 and 1384 he was employed on important missions in France, Flanders, and Lombardy. In 1382 he became comptroller of the petty customs, and was sent to Parliament as a Knight of Kent in 1386. But the same year saw the downfall of his patron, John of Gaunt, and the consequent dismissal of the poet from all his offices. His fortunes rose with the reviving influence of John of Gaunt in 1389. He was made clerk of the King's works; obtained, in 1394, an annuity of £20, and a pension of 40 marks on the accession of Henry IV. in 1399. He died, probably at his house in Westminster, in 1400.

Traveller, soldier, courtier, diplomatist, member of Parliament, he passed his life among the most various and splendid aspects of the society which he has so vividly and minutely portrayed.

His literary career has been divided by Furnivall into four periods—1. 1367-68, *Pity;* 1369, *Death of Blaunche*, more commonly known as *The Boke of the Duchesse.* 2. 1373, *Parliament of Fowles; Compleynte of Mars; Anelida and Arcite; Troylus; Adam Scrivener;* 1384, *Hous of Fame.* 3. 1386. *Legende of Good Women;* 1388, *Prologue to Canterbury Tales.* 4. 1391, *Astrolabe; Compleynte of Venus;* 1393-99, *Envoy to Skogan; Marriage; Gentleness; Lack of Steadfastness; Fortune; Purse.* The *Canterbury Tales* were begun in 1373 with the second *Nonnes Tale*, and were left unfinished in 1400. In this list we miss the *Court of Love*, the *Flower and the Leaf*, beautiful symbolical poems, and the *Romance of the Rose*, a vivid translation of about a third of the *Roman de la Rose* of Guillaume de Lorris and Jean de Meung. Some scholars have denied these works to be C.'s because they do not agree with a somewhat arbitrary rhyme-test. But there is no other author to whom these poems can be assigned, and it is certain that James I. of Scotland attributed the *Court of Love* to C. C. was at first greatly influenced by the French *trouvères*, but in his *Canterbury Tales* struck out an original form of poetry, substituting the delineation of character and contemporary life for the relation of monotonous and extravagant adventure. He recast and recoloured a number of chivalrous, humorous, and marvellous tales woven in France, Italy, and the East, and gave us in the persons of their imaginary narrators, the Canterbury pilgrims, a representative gallery of society in the 14th c. His characters are not extinct types but sharply defined, living men and women. His verse breathes of spring, and is bright with the splendours of chivalry. His narrative skill is consummate, his tales gliding on with captivating artistic fluency and unobtrusive felicities of phrase. He unites luxuriant invention and piercing satiric shrewdness with delicate pathos, sunny humour, grave love of truth, and refreshing delight in nature.

The English style of C. marks the beginning of the modern period in our literature. Contrasted with earlier English dialects, his language may be called uninflected, and comparatively few of his expressions have become entirely obsolete. See Minto's *English Poets*, and the publications of the *C. Society.*

Chaudes-Aigues ('hot springs') a town of France, department of Cantal, on the Remontalon, 28 miles E.S.E. of Aurillac. Its hot mineral springs (133° to 190° F.) are much used for medicinal purposes, and for discharging grease from the fleeces of sheep. C. has important fairs for the sale of pigs, and a considerable trade in tinwares. Pop. of commune 1674; of canton 6493.

Chaudfontaine ('hot spring'), a village of Belgium, province of Liége, a few miles from the city of Liége, on an island in the Vesdre, and much frequented by visitors in the summer season, on account of its baths and hot springs (104° F.). Pop. 1688.

Chau'dière, a river and lake of Canada. The river, after a course of 90 miles through the province of Quebec, joins the St. Lawrence 7 miles above the city of Quebec. About

2½ miles from its mouth are the Falls of the C.—**Lake C.** is merely an expansion of the river Ottawa. On its S. shore stands the capital of the Dominion of Canada.

Chaudière Falls.

Chaumette′, Pierre Gaspard, born at Nevers, 24th May, 1763, the son of a shoemaker, after a vagabond youth came to Paris in 1789, where he fell under the influence of Camille Desmoulins, and joined the Cordéliers. After haranguing and writing in the most violent journals for three years, he became in 1792 the Procureur of the Commune of Paris, and assumed the fanciful name of Anaxagoras. He established the Revolutionary Tribunal, and his rapid, sonorous eloquence made him influential in all the extreme measures of 1793. He founded the party of Hébertists, who desired to have religious honours paid to the goddess Reason, which was actually done at the *Fête de la Raison*, in which an actress named Maillard took the part of the goddess. With the assistance of Chabot, Clootz, and others, C. induced the Convention to adopt this absurdity. Danton and Robespierre now combined to crush the Hébertists, and C. was executed, 13th April, 1794.

Chau′mont, an ancient town in the department of Haute Marne, France, on the left bank of the Marne, 141 miles S.E. of Paris. The Church of St. John the Baptist is a fine building of the 13th c. C. has manufactures of hosiery, gloves, druggets, &c., wool and cotton spinning-mills, and tanneries. The treaty concluded here against Napoleon by the Allies, 1st March, 1814, formed the basis of the Holy Alliance. Pop. of commune 13,280; of arrond. 79,782.

Chaun′cey, Charles, the second President of Harvard College, was born in England in 1592, and educated at Westminster School and Trinity College, Cambridge. In 1627 he was made vicar of Ware, became a Puritan, and after being imprisoned and fined, emigrated to New England in 1636, and in 1654 was appointed President of Harvard. In 1659 he published twenty-six sermons on 'Justification.' He died 19th February, 1672. C. is the ancestor of all the American Chaunceys, who form a fairly numerous body.—**Chauncey, Charles, D.D.,** great-grandson of the above, was born 1st January, 1705. He was minister in Boston in one parish for sixty years, and is the author of various theological works which are still in repute in America. He died 10th February, 1787. See *C. Memorials*, by Professor Fowler.

Chau′ny, a town of France, department of Aisne, 19 miles N.W. of Laon. A portion of it is built on the right bank of the Oise, and the remainder on an island in the river. C. has manufactures of sacking, hosiery, and chemicals; bleaching-grounds and tanneries; and a trade in grain, timber, and cattle. Pop. of commune 9315; of canton 21,269.

Chausses (Fr. from the Lat. *calceus*, 'a shoe, or covering to the foot'), defence pieces of armour for the legs, worn in the Middle Ages. They were variously made of banded mail, riveted plates, chain-mail, or padded and quilted cloth, with metal studs. The C. were sometimes laced behind the leg.

Chaux de Fonds, La, a flourishing town in the canton of Neuchâtel, Switzerland, near the French frontier, in a valley 3271 feet above the sea. It is the chief seat of the watch-making industry in the Jura, employing 12,000 hands, and producing yearly some £400,000 worth of gold and silver watches. There are also important manufactures of mathematical and musical instruments, beer, bijouterie, and lace. The town has extended very rapidly, and is still increasing. Pop. 25,603.

Chav′ica, the dried unripe fruit of *C. Roxburghii*, one of the Pepper order, and known in commerce as *long pepper*. It contains an acrid resin, a volatile oil, and an alkaloid—*piperine*. C. is used in much the same way as black pepper, which in its properties it resembles. In India dried slices of it are in repute as a stomachic. C. found in the Malay Islands also yields a similar long pepper. C.-betel is betel-pepper. C. *Siraboa*, mixed with betel-nut and a little lime, is chewed. See BETEL.

Chay Root, Choy, or **Sayan,** a name applied to the root of *Oldenlandia umbellata* (one of the *Cinchonaceæ*), sometimes imported from India for the sake of the colouring matter in the bark, which is employed to dye red, purple, and orange-brown. The same name is also sometimes erroneously given to the roots of *Morinda*, *tinctoria*, and *citrifolia*, Indian plants of the same order. In C. R., known as Indian madder, some of the Ceylon tribes used at one time to pay their tribute.

Chead′le, a town and parish in Staffordshire, 14 miles N.N.E. of Stafford, in a hollow moorland region. The finest building is a Roman Catholic church, built in 1846 by the Earl of Shrewsbury, at a cost of £60,000. In the neighbourhood are iron-mines, collieries, copper and brass works, &c., which furnish employment to the inhabitants. The parish is mentioned in Domesday Book under the form *Cedla*. About 4 miles distant are the ruins of the Cistercian Abbey of Croxden, founded in 1176. Pop. reg. sub-dist. 7361; and civ. par. 4883.

Check (Fr. *échec*, 'chess'), a cloth variegated with rectangular spaces like a chessboard, which are variously coloured, but are most frequently alternate black and white.

Check′y, or **Chequée** (Fr. *échiquete*), in heraldry, describes a field divided into three or more continuous rows of small squares, tinctured alternately with a metal or fur, and a colour.

Chedd′ar, a village in Somersetshire, at the entrance of a most remarkable gorge in the Mendip Hills, overhung by walls of cavernous rock, in places rising perpendicularly to the height of several hundred feet, and honeycombed with caves hung with stalactites. The church has a square tower 100 feet high, and a sculptured stone pulpit. The neighbourhood was at one time famous for cheese, but now in any other part of the county C. cheese can be obtained of as good quality and in as great quantity as in C. itself. The C. process of cheese-making has now been widely introduced into the great dairy farms in the S.W. of Scotland. (See CHEESE.) Pop. civ. and ecc. par. 1941.

Chedu′ba, a richly productive island, included in the division of Aracan, British Burma, lies 20 miles from the coast. It yields large quantities of rice, sugar, tobacco, indigo, hemp, &c., and has mud volcanoes and petroleum springs.

Cheese is the compressed curd or casein of milk prepared for use as human food. In making C., the milk employed is gently heated to a temperature of about 112° F., and a sufficient quantity of rennet or of an acid substance is added to cause coagulation of the casein. Rennet, which is usually employed, is prepared from the lining membrane of the fourth stomach of the calf, which organ must be salted and dried for a year before it or its solution is used. The action of the rennet produces a complete coagulation of the casein, and the separation of the curd from a straw-coloured, clear, liquid, whey takes places on 'breaking the curd' by stirring with the hand or any implement. The greater part of the whey can be drained off, and the curd rendered rather dry and crumbly in the vessel, after which it is submitted to a further draining in a linen cloth, and pressed in the C.-press. The curd is then again broken up, and mixed with the proper amount of salt, placed in a clean cloth into the C.-vat or chessart, which has the shape the C. is intended to take, and submitted to a prolonged pressure in the C.-press to expel the last traces of whey. During this pressure the C. is turned occasionally. When perfectly pressed, the cheeses are put away on shelves in a cool apartment to harden and ripen, and in C. of good quality a gradual moulding should ensue. Four kinds of C. are found in commerce :—(1) cream C.; (2) C. made of sweet milk with a proportion of cream added; (3) sweet-milk C.; and (4) skimmed-milk C. The first variety, cream C., is made in Yorkshire and Neufchâtel, keeps only a short time, and, of course, is soft and very fat. The best ordinary C. belongs to the second class, and comprises Stilton, Double Gloucester, Roquefort, Gorgonzola, and Cheddar. Of the third class are Gloucester (single), Wiltshire, American, and Dunlop; and Parmesan and Dutch C. belong to the fourth class, which also includes most of the ordinary country C. made in Scotland. Gouda C. of Holland is made with curd formed by the action of hydrochloric acid on milk, and to this it owes its freedom from mites and its pungency. Parmesan C. owes its peculiar rich flavour to the sweet herbage on which the cows are fed along the banks of the Po. Swiss C. (Schapzieger and Gruyère) is flavoured with fragrant herbs, and made in cheeses of 40 to 60 lbs. It has been the custom in the cheese-producing districts of Switzerland for relations and friends to make a present to a bride and her groom of a large cheese, upon which the dates of the births, marriages, and deaths of the members of the new family are in due course registered. Many such registers are to be seen, and not a few are over 150 years old, having been retained as family heirlooms. The following table exhibits the composition of several varieties:—

	Chester.	Roquefort.	Dutch.	Gruyère.	Parmesan.
Water per 100 parts	30·39	26·53	41·41	32·05	30·31
Nitrogen ,,	5·56	5·07	4·10	5·40	5·48
Fat ,,	25·41	32·31	25·06	28·40	21·68
Ash ,,	4·78	4·45	6·21	4·79	7·09

C. is called on to discharge two functions in the economy of food. It is a most nutritive but somewhat indigestible article when the commoner qualities form an article of diet, as they frequently do among the labouring population. The richer varieties of C. are eaten in very small quantities after meals, and they, when ripe, are found to materially promote the process of digestion. Great improvement has taken place of late years in the manufacture of this article, especially in Scotland, where annual competitions take place among the makers. In 1894, 2,263,287 cwts. of C. were imported into the United Kingdom. This large amount cost the country £5,467,137; a heavy bill to pay, indeed, when the greater part of the money, if not the whole, should have passed into the pockets of the *home*-farmer. But as in the case of eggs and butter, so also in that of C., the farmer in the British Isles either cannot, or will not, drive the foreign products out of the market. His fowls will not lay sufficient eggs, his butter is deficient in flavour and *keeping* power, and his cheese is too costly, or too new. He throws the blame on 'high rent,' the consumers' craze for low prices, and 'nature,' and while he murmurs and grows faint-hearted, his customers apply elsewhere, vainly asking themselves why Holland should have so vast a surplus of eggs, why Danish and French butters are cheaper and better than British, and how the foreign cheese merchants manage to supply the market at the present prices.

Cheese-Hopper, the name given to the larva of a fly (belonging to the order *Diptera* and family *Muscidæ*), owing to its habit of bending the body into a loop, and of suddenly straightening it in order to spring. It exists in cheeses, the perfect fly being of minute size (1½ lines in length), of a black colour with red feelers and forehead. The bacon-beetle (see DERMESTES) and another fly (*Musca corvina*) also deposit their eggs in cheese, and thus cause much waste in dairies.

Cheese-Mite, a species of true mites, belonging to the class *Arachnida* (q.v.), and so named from its being mainly found in cheese and like substances. It possesses an oval-shaped body covered with prominent bristles, eight legs, and a mouth provided with mandibles or jaws. In decaying cheese the C.-M. is sometimes found in immense numbers. Reproduction is effected very quickly. No defined circulatory or respiratory organs exist in the animal, in which also the eyes are of simple character.

Chee'ta, or **Hunting Leopard** (*Shikari cheeta*), a species of carnivorous mammalia, generally regarded as allied to the panthers and leopards, and found in India, Persia, Sumatra, Senegal, the Cape, and other parts of Africa. This animal exceeds the ordinary leopard in size. The limbs are relatively longer than in the leopard, as are also the feet; the claws are blunt, and only partially retractile. The head is small in proportion to the animal's size and height, and a short mane of stiff hairs exists on the neck. The ears are short and rounded, the muzzle being truncated and short. The hair on the front part of the body and lower edges of the jaws is rough and elongated, as is also the fur of the hinder part of the abdomen. The colours are like those of the leopard, the general hue being, however, of a deeper fawn. The fur is marked on the body and limbs by round black spots. The face is striped, and a bold black streak runs from each eye to the angle of the mouth.

The C. is trained in India and Persia to hunt such game as antelopes, deer, &c. It is kept blindfolded until within sight of the quarry, when it is let slip, and stealthily approaches the prey. It then bounds in upon the antelopes, but if unsuccessful in its first onslaught, it makes no attempt to follow, but returns to the hunter. The name *Youze* is also given to the C., which under domestication may become tame and familiar.

Cheirol'epis, a genus of extinct Ganoid fishes, generally assigned to the division *Lepidosteidæ* of that order. The fossil remains of this genus occur in the Devonian or Old Red Sandstone formations. The head was of large size, and the body covered by small ganoid scales of lozenge shape. Each fin had its first ray existing as a strong spine, and the pectoral and ventral fins were well developed and scaly.

Cheir'omancy, or **Chir'omancy** (Gr. *cheir*, 'the hand,' and *manteia*, 'divination'), palmistry, a mode of forecasting the destiny of an individual from the lines of the hand. It was known to the ancients. Traces of it are visible in Aristotle. Artemidorus, however, in his *Dream Book*, was the first to give anything like a connected or systematic view of the subject. In the Middle Ages it was still more developed and associated with astronomy. Cardan, Paracelsus, Porta, and other dubious savans, sought to give it a scientific basis. But with the spread of knowledge it gradually lost its hold on the human mind, and is now professed only by gipsies.

Chei'ron, represented by Homer (Il. xi. 831) as the wisest and most humane of the Centaurs (q.v.); the instructor of Achilles, Jason, and Æsculapius; skilled in hunting, music, medicine, and prophecy, and throughout life and in his death a splendid example of self-sacrifice. The young Achilles, and sometimes the Erotes, or Loves, appear in existing representations riding on his back.

Cheironec'tes, a genus of Marsupial mammals represented by the Yapock or Yapock-opossum of Brazil, and allied to the opossums, from which, however, it is distinguished by its semi-aquatic habits. The hind-feet are webbed, the fore-feet being hand-like in conformation, and webbed only to the first joint of the digits. The fur is of a pale grey colour, banded with sooty-black. The C. possesses cheek-pouches, the food consisting chiefly of insects and crustaceans. The average length is 2 feet.

Cheiroste′mon, a genus of plants of the natural order *Sterculiaceæ*. *C. platanoides* is the hand-plant of Mexico, so named from the anthers and style of the flowers resembling in their arrangement a hand furnished with long claws. It was the *Macpalxochitlquahuitl* of the ancient Mexicans. It is found in forests near the city of Guatemala.

Cheirothe′rium ('hand-beast'), the name formerly given by Kaup to the ideal animal which was supposed to have made certain footprints seen in rocks of Triassic age in Britain and in Germany. The fossil remains of the actual animal were afterwards discovered, and the name *Labyrinthodon* (q.v.) substituted for that of C.

Cheke, Sir John, one of the ardent scholars who forwarded the revival of classical literature in England in the 16th c., was born at Cambridge, 16th June, 1514, and studied at St. John's College, Cambridge, where he became professor, and introduced a new method of pronouncing Greek, which, however, he was ordered to discard by Bishop Gardiner, the chancellor of the university. Among his pupils were William Cecil, afterwards Lord Burleigh, and Roger Ascham. In 1544 he became tutor to Prince Edward, and was made a canon of King's College (now Christ College), Cambridge. When his pupil ascended the throne, C. got various grants of lands and rents, was made Provost of King's College (1548), knighted (1551), and made a secretary of state (1553). Upon Mary's accession he was committed to the Tower on a charge of treason, but soon after obtained his liberty, went abroad, and taught Greek at Strasburg; but in 1556 was seized by the orders of Philip while travelling in Belgium, conveyed to England, and again imprisoned. In an evil moment C. abjured Protestantism to escape the stake, and grief at this apostasy seems to have hastened his death, 13th September, 1557. C. wrote a considerable number of works, partly scholastic, partly theological; but they have now no place in literature. For a list of these see Cooper's *Athenæ Cantabrigiensis*.

Chel′æ, Cheliceræ. The name *chelæ* is given to the largely developed 'nipping-claws' seen in such crustaceans as crabs, lobsters, &c., and also in the scorpions, in which latter forms the *chelæ* are formed by the *maxillary palpi* or appendages of the lower jaws. The *chelicerœ* of the scorpions are formed by the pincer-like extremities of the mandibles or larger jaws. The *chelicerœ* are, in short, the diminutives of the larger *chelæ*.

Chelms′ford (called in Domesday Book *Celmeresforde*), the capital of Essex, on the Chelmer, near its junction with the Cann, and about the heart of the county, 29 miles N.E. of London by railway. It has tanneries, cornmills, coachworks, &c., and a considerable river trade in agricultural produce. The river, which separates here into two branches, surrounding an island called Mesopotamia, is crossed by several bridges. C. possesses various handsome buildings, and a grammar school founded by Edward VI. Pop. parl. div. of county, 58,304; mun. bor. and civ. par. (each) 11,008; reg. sub-dist. 11,301.

Chelo′nia (Gr. *chelōne*, 'a tortoise'), the class of *Reptilia* or reptiles to which the tortoises and turtles belong. It is primarily distinguished by the fact that the true or endoskeleton combines with the outer or exoskeleton to form a bony case in which the body is enclosed. This case consists of a *back* or *carapace*, formed by the expanded spines of the dorsal vertebræ, and by the flattened and amalgamated ribs, generally eight in number on each side. Occasionally (as in the soft tortoises) the ribs may be imperfectly united towards their extremities, and gaps may thus be left in the otherwise solid structure. The sides of the structure are formed by *marginal plates*, which may either be bones developed by the skin (*dermal ossifications*), or be the ossified ends or cartilages of the ribs. The floor of the body or box is formed by nine pieces forming the *plastron*, which Owen thinks is a greatly developed breastbone, but other naturalists regard it as merely composed of dermal or skin ossifications; the C. in this latter view being destitute of a breastbone. The carapace and plastron are both covered by horny plates, which in the hawk's-bill turtle constitute the *tortoise-shell* of commerce. The dorsal vertebræ are thus immovably connected together, those of the neck and tail being alone mobile. The bones of the shoulder and pelvis, supporting the fore and hind limbs respectively, are contained *within* the ribs or carapace, instead of, as in all other vertebrata, existing *outside* the ribs. Clavicles or collar-bones are absent in Chelonians. Four limbs are developed. The bones of the skull are firmly ossified together, the halves or *rami* of the lower jaw being firmly united in front. No teeth exist, the jaws being sheathed in horn, like those of Birds (q.v.). In some (soft tortoises, &c.) fleshy lips may be present. The tongue is thick and fleshy; the heart is three-chambered, and the lungs are large and voluminous. These forms *swallow* air in breathing, like the frogs, the fixed nature of the chest rendering respiratory movements impossible of performance. These forms are cold-blooded and of slow movements; they hybernate in winter, may pass long periods without food, and will exhibit signs of vitality for a lengthened time after decapitation. They are divided into the *Cheloniidæ* or Turtles (q.v.), the *Trionycidæ* (soft tortoises and terrapins), and the *Testudinidæ* (Tortoises) (q.v.).

Fossil representatives of this group occur doubtfully first in the Permian rocks, where their footprints occur (*e.g.*, *Chelichnus Duncani* of Jardine); but in the Oolite rocks turtle remains are found, and the Eocene period is rich in Chelonian fossils. The Tertiary deposits of the Sewalik Hills of Hindustan afford the remains of a gigantic chelonian averaging from 18 to 20 feet long, and to which the appropriate name of *Colossochelys Atlas* has been given.

Chel′sea (originally *Ceoles-ige*, 'the island of ships'), Middlesex, now a suburb of London. In the 16th c. it was the residence of Queen Catharine Parr, Sir Thomas More, the Princess Elizabeth, Sir Hans Sloane, &c. Even in the 17th and 18th centuries it was still a village 2 miles from London, the residence of many of the nobility and gentry; and was famous for its Ranelagh Gardens, the favourite resort of pleasure-seekers from the capital. C. has numerous churches and chapels; that of St. Luke (1824) cost £40,000; another, a fine old brick structure near the river, is full of monuments and brasses to historic personages. It has also a training college for schoolmasters, and another for schoolmistresses; three fine suspension bridges; a Royal Military Asylum for the education of the sons of soldiers; and Botanic Gardens, the gift of Sir Hans Sloane, and one of the earliest botanic gardens in England. Pop. parl. bor., reg. dist., and civ. par. (each) 96,253.

Chelsea Hospital, for invalid and superannuated soldiers, has accommodation for 600 non-commissioned officers and privates. There are thousands of pensioners from the army, and very many of them are in bad health and poor circumstances, yet the above number only can be received into the Hospital, places becoming vacant owing to death being filled up at once from the ranks of those outside. The pension ceases on a man's admission, but a certain allowance for pocket-money (ranging from 6d. to 2s. a day) is made to each according to his rank in the service. Promotion is still continued among the pensioners admitted to the Hospital, who are divided into companies to which are attached retired officers, of all ranks except that of lieutenant. Quarters in the building are also allotted to these officers. An admitted pensioner has board, lodging, clothing, medical attendance, and all necessaries; but his wife, should he be a married man, receives no assistance from the Hospital. The staff consists of Governor, Lieut.-Governor and Secretary, Assistant Secretary, Chaplain, Physician and Surgeon, and Adjutant. The cost of the Hospital for the year 1894-95 was £26,633, and this was defrayed, according to custom, by a parliamentary grant. Gardens, a small park, and exercise grounds, covering altogether about 40 acres, are attached to the building, and a considerable portion is set apart and divided into small plots for the pensioners who are fond of gardening and are strong enough to attend to the work themselves. The building was begun in 1609 by Dr. Sutcliffe, Dean of Exeter, as a theological college, and was styled in its charter, 'King James's College at Chelsea.' Charles II. built on its site the present Royal Hospital, of which the architect was Sir Christopher Wren, and the cost £150,000. Yet in a wealthy and charitable state like England sufficient accommodation cannot be found for the men whose prime of manhood has been spent, and whose health has been tried and broken, in the service of their country. In the ranks the pay is small, and little or nothing can be saved; and, it must be confessed, the pension earned by the private is not sufficient to support him in after-life.

Chel'tenham, a parliamentary borough (comprised of the parish of C. and parts of the parishes of Leckhampton and Charlton Kings) and market-town, Gloucestershire, 8 miles N.E. of Gloucester, on the river Chelt, from which it derives its name. Its prosperity originated in its mineral springs, which were accidentally discovered in 1716. In 1788, George III. having derived much benefit from their use, C. at once became a fashionable resort. It has now magnificent promenades, and numerous handsome squares, crescents, and terraces; while two suburbs have been formed of well-built villas and first-class residences. To each of the spas a pump-room is attached. C. has an endowed grammar-school, a proprietary college, which holds a very high-class place among similar establishments, a ladies' college, and a training-college for male and female teachers. It returns one member to Parliament. Pop. parl. bor. 49,775; mun. bor., reg. sub-dist., and civ. par. (each) 42,914.

Cheltenham College.

Chemistry, which at present holds such an important and prominent position among the useful and exact sciences, and which has done so much for the good of mankind, and for the advancement of science generally, had for its origin the purely selfish desire for wealth.

History.—The alchemists, who were the fathers of the science, laboured to discover the philosopher's stone—a substance which, by contact with other bodies, should convert them into gold; and later they sought for the *elixir vitæ*, to give them perpetual youth, and by that means ensure an unlimited period during which to enjoy their riches. (See ALCHEMY). Such were the chief aims of alchemy—an art (for it cannot be called a science) which was first cultivated in the East, either by the Arabs or Greeks, and gradually extended to Spain and Africa, Germany, Italy, France, and England. To the alchemists we are indebted for the knowledge of a great many substances which their experiments elicited, and in many cases for the discovery of the chief properties of these substances, but it cannot be said that they left us any important theories. Theory began to dawn on chemists in the 17th c., and with its light C. rapidly assumed the proportion of a science, and developed with a rapidity unsurpassed by any other branch of knowledge. Johann Joachim Beccher and Georg Ernst Stahl were the first to introduce into C. a comprehensive and rational theory of the nature and properties of matter, and to refer them to a common principle. This theory originated with Beccher, but was extended and enlarged by Stahl, to whom most of the credit of its introduction was given; so much so, indeed, that it was styled the 'Stahlian' theory, though it is now better remembered as the 'Phlogiston' theory. Its principle was, that all combustible bodies were compounds containing a common constituent which was dissipated during combustion, leaving either a *calx* or an *acid* as residue, according to the nature of the combustible. This common constituent was believed to be a material substance, and to constitute the principle of combustion. It received from Stahl the name of *phlogiston.* Incombustible bodies were at first but little considered, but subsequently they were believed to be the calces or residues of substances which had undergone the process of combustion. Phlogiston, it was believed, could in many cases be made to combine with a calx or acid, and so produce the original substance. Chemists of the time had excessively vague ideas, if any, concerning the nature of phlogiston, but after the discovery of hydrogen they appear to have regarded that body as isolated phlogiston, an idea which must have appeared very plausible, considering the ease with which hydrogen burns, leaving no fixed residue, and the readiness with which many metals can be reformed from their calces when the latter are heated in a stream of it.

During the greater part of the 18th c. this theory reigned supreme, and was advocated and extended by some of the ablest men that have laboured in the cause of chemical science. Pre-eminent among them were Priestley, Cavendish, Black, Scheele, and Bergman,—philosophers to whom the world is largely indebted for their discoveries. It would take up too much space to enumerate all the substances brought to light by their researches; suffice it to say, that Priestley discovered oxygen, Cavendish first prepared hydrogen, and demonstrated the composition of water. Black discovered carbonic acid gas, and explained the difference between caustic and mild alkalies. Scheele first prepared chlorine, tartaric, citric, malic, oxalic, and gallic acids, and many important mineral acids; whilst to Bergman belongs the credit of having first introduced quantitative analysis into chemical science, and by that means prepared the way for the atomic theory.

Well as the phlogiston theory explained the leading properties of most substances known at the time of its introduction, and for nearly three-quarters of a century afterwards, it was doomed to a speedy destruction at the hands of Lavoisier, a man who effected a complete revolution in C., and laid the foundation for our present ideas.

Lavoisier proved that when a metal is calcined, the calx, or residue of combustion, weighs more than the metal originally taken; and that when this calx is heated with charcoal, at the same time that the metal is regenerated, a certain quantity of gas is produced, which possesses all the properties of 'fixed air,' or carbonic acid, discovered by Black, and is, in fact, the same substance. Moreover, he showed that during calcination in a closed vessel a certain quantity of air disappears, and that the weight of the air thus disappearing is exactly equal to the increase in the weight of the metal after calcination. He thus proved that a body in burning, far from losing anything, gains in weight, and that this gain in weight is attributable to the absorption of something from the air. Lavoisier made these observations before the discovery of oxygen, but the existence of that body furnished him with the means whereby to explain his experiments, and to overturn and completely dissipate the whole doctrine of phlogiston. He eventually proved that when combustible substances are burned, they combine with oxygen contained in the air, and yield new substances. When metals are reduced from their calces by heating the latter with charcoal, the oxygen contained in the calx combines with the charcoal to form carbonic acid gas, and thus leaves the metal at liberty. The reduction of a calx by hydrogen is owing to a similar cause, but in that case water, and not carbonic acid, results. The C. of Lavoisier's day was the C. of oxygen. Substances were examined for its presence, and new bodies were obtained by combining it with various known elements or compounds. Lavoisier determined the exact composition of the air, showed that oxygen was the active ingredient, and explained the part it took in the process of Respiration (q.v.). In the course of his researches he had proved that carbonic acid was a compound of carbon and oxygen, sulphuric acid of sulphur and oxygen, phosphoric acid of phosphorus and oxygen, and nitric acid of nitrogen and oxygen. These discoveries induced him to believe that oxygen was a necessary constituent of all acids, and on this account he gave it its present name. That oxygen is not a necessary constituent of acids has since been proved by the discovery of the hydracids, nevertheless it is present in by far the greater number of acids. It is impossible to overestimate the value of the reforms introduced into C. by Lavoisier. The science received an impetus never before experienced in its history, and discoveries and speculations multiplied in all directions. Quantitative analysis became an essential part of C., and numerous investigators laboured in its cause. Amongst the most celebrated of these may be mentioned Klaproth, Vauquelin, Stromeyer, and Berzelius. The researches of these chemists not only added to the knowledge of the composition and properties of known substances, but brought to light several new and interesting elements,—as, for instance, uranium, zirconium, titanium, tellurium, chromium, cadmium, selenium, &c.

At the time these discoveries were taking place, a most important controversy was being carried on by two French chemists, Proust and Berthollet. The latter maintained that the elements combined together in variable proportions, the former that the proportions were fixed and definite. The dispute ended in Berthollet's defeat, and in the establishment of one of the most important laws in chemistry, viz., that of definite proportions. This has brought us to the commencement of the 19th c.—a memorable period for chemists, for it was at this time that Dalton introduced the Atomic Theory (q.v.). Space does not permit us to trace the development of this theory, nor to show how the quantitative experiments of Bergman, Wenzel, Richter, Lavoisier, and others were instrumental in establishing the principles upon which it depends. The atomic theory being once firmly established upon a thorough basis of experimental evidence, chemists next turned their attention to the determination of the atomic weights of the elements, and for the results we are indebted to Dalton, Gay-Lussac, Dulong and Petit, Berzelius, Gerhardt, Staas, and others. At the time that Dalton was carrying on his experiments and enunciating his ideas, another eminent British chemist was startling the world by his striking and brilliant discoveries, and opening up a new field of research and speculation. In the year 1800, Volta had published a description of the Pile (q.v.), and shortly afterwards Nicholson and Carlisle had shown that by its agency water could be decomposed into its constituents, oxygen and hydrogen. Berzelius and Hisinger, following up the idea, had performed a series of experiments on the action of a current of electricity on various salts. It was Sir Humphry Davy, however, who enunciated the laws of voltaic chemistry, and threw an entirely new light on the composition of an important class of bodies. He found that potash, soda, lime, baryta, strontia, magnesia, and lithia were compounds of oxygen with metals. The latter he succeeded in isolating, and demonstrated their chief properties. These discoveries eventually enabled chemists to prove that the groups of compounds called *Alkalies*, *Alkaline earths*, and *Earths proper*, are simply the oxides of metals. Davy also established the fact that hydrochloric acid is a compound of chlorine and hydrogen, and that chlorine is an elementary substance, and not, as had been before believed, a compound of hydrochloric acid (or, as it was then called, *muriatic acid*) with oxygen. These facts quite upset Lavoisier's doctrines respecting the nature of acids, and led eventually to the discovery of the other hydracids, viz., hydriodic, hydrobromic, and hydrocyanic acids, and to the placing of hydrofluoric acid in the same group. Berzelius was another chemist to whom science lies under the greatest obligations. His whole life was devoted to investigation, and his labours have gone far to place C. on its present footing. To him we are indebted for much of the nomenclature of chemical substances at present in use; for his representation of atoms by symbols, and of reactions (or chemical changes) by means of equations. By his analyses he contributed largely to a knowledge of the atomic weights of the elements, and by his electro-chemical theory to a correct understanding of many important facts. His experiments with the blowpipe raised that instrument to an important place amongst chemical apparatus. He first isolated the elements silicon and selenium, showed that sulphur united with certain metals to form substances having a basic character, and with certain non-metals yielding bodies possessed of acid characters, and that these sulpho-bases and sulpho-acids combined, forming sulpho-salts. In fact, he clearly demonstrated the important analogies existing between the two elements sulphur and oxygen. His great merit lies in his having systematised C.

It was at the commencement of the present century that chemists began to direct their attention to the organic world, and to attempt to manufacture in the laboratory substances which previously had only been obtained from the products of animal and vegetable life. From that time to the present day organic C. has largely occupied the attention of chemists, and has led to the discovery of facts of the greatest practical importance. Of the services of this department of chemical science to the arts and manufactures too much could not be said. The brilliant discoveries of Perkin and Hoffman with aniline have supplied the dyer with the most beautiful colours ever produced, whilst not only aniline, but a host of other products, obtainable from Coal Tar (q.v.), are employed in numerous manufactures. Organic C. has supplied the physician and surgeon with medicines and remedies of the greatest value, with chloroform and chloral, carbolic acid, &c.

Among the chemists who have made organic C. their great study, none deserves more credit than Liebig, who first supplied a method for determining carbon and hydrogen in an organic body. In conjunction with Wöhler he discovered the compound carbon radicals, and added to our knowledge by isolating many new and important compounds. His experiments, too, into the physiological C. of plants and animals, have been of inestimable value to the farmer, and indeed have been the means of revolutionising agriculture, and of establishing it on a rational and scientific basis.

Before quitting the history of C., mention must be made of the services done for the science by the *Spectroscope* (q.v.). Fraunhofer was the first to observe in the sun's spectrum a number of black lines, which have since been found to be owing to the presence of certain metals in the state of vapour. This observation in the hands of Bunsen and Kirchoff led to the construction of the *spectroscope*, an instrument by means of which the smallest trace of many elements can be detected. By its aid, too, several new elements have been discovered —viz., cœsium, rubidium, thallium, and gallium. Not only has the spectroscope revealed the nature of the matter of which our earth is composed, but it has also demonstrated that the masses of the sun and of many planets are composed (in part at least) of the same elements.

Principles.—From the preceding sketch, it will have been seen that the object of C. is the investigation of matter with a view to the determination of its composition and properties. But to define C. in exact language is a matter of great difficulty, owing to the fact that the sister science of physics is engaged with almost the same problems: and indeed it is urged that C. is simply a branch of physical science. We must leave the reader to form his own definition from a statement of the leading facts and doctrines of the science.

Composition of Matter.—All investigations into the nature of matter have led to the conclusion that whereas certain substances can be decomposed or split into new bodies, others resist all efforts to decompose them. Substances of the first kind are called compounds, those of the second, elements. Up to the present time science has revealed the existence of sixty-six elementary bodies (if we include the metal gallium, and argon and helium, discovered quite recently). These elements differ from one another in appearance and properties. They are divided into two classes, which are called respectively *metals* and *non-metals*. Of the former, with the exception of quicksilver or mercury, all are solid at ordinary temperatures. Of the latter, six are gaseous (oxygen, hydrogen, chlorine, argon, helium, and nitrogen), one liquid (bromine), and the remainder solid at ordinary temperatures. Compounds are formed of the elements, united in various proportions; but the same compound always contains the same elements, and the same proportions of these. The majority of compounds contain but two, three, or four elements, but sometimes the number is greater.

Differences between Compounds and Mixtures.—A problem of repeated occurrence to the chemist is to decide whether he is dealing with a mixture of substances, or with a true chemical compound. This is not always an easy matter, but there are certain well-marked distinctions between the two, with which the reader should be made acquainted. Compounds, as we have said, are characterised by a definite composition: if solid, they very often crystallise, and the crystals have a definite and characteristic shape; if liquid, and volatile without decomposition, they boil at a definite temperature. Moreover, and most important of all, if we produce a compound from its elements, the union of the latter is attended with a disengagement of heat. A mixture, on the other hand, may contain substances in varying quantities. In a mixture, each of the ingredients retains its own properties, and the properties of the mixture are simply the mean of these. In making a mixture, no rise of temperature occurs; and finally, it is often possible, by purely mechanical means, to separate the ingredients of a mixture, and to obtain each in an isolated condition.

The investigation of compound substances constitutes by far the most important part of C., for it is with compounds that the chemist has chiefly to deal. There are two methods by which an insight can be gained into the composition and constitution of these bodies. The one consists in separating them into their elements or into compounds of a simpler nature than themselves: the other in building them up, it may be directly, it may be by several stages, from their elements, or from compounds the nature of which is already known. The first is the analytical, the second the synthetical method.

Affinity.—At the present time chemists and physicists are undecided in their opinions as to the nature of this force, but that it is intimately connected with heat and electricity cannot be doubted. Faraday, indeed, stated that 'the forces called electricity and chemical affinity are one and the same.' The degree of affinity existing between two bodies is measured by the amount of heat given out during their combination. A rough estimate of the affinity can also be formed by observing the stability of the compound when formed: unstable bodies—or such as are readily decomposed—containing elements with a weak affinity for one another. Chemical attraction or affinity is a force of enormous power, but is only exercised at minute and inappreciable distances. Affinity differs from gravity in its mode of action. The difference in the amount of affinity existing between different bodies is well illustrated by the replacement of metals from their solutions.

Laws of Chemical Combination.—These laws are of the greatest theoretical and practical importance. The first law is that of *definite proportions*, and may be thus stated:—*Two substances in combining, do so in definite proportions. The same compound, no matter what its source or origin may be, always contains the same constituents, and the same proportions of them.* The second law is that of *multiple proportions*, and is as follows:—*If two substances combine in more than one proportion, then, taking in the compounds so formed the same quantity of one of the substances, the quantities of the other vary in a simple manner.*

Atomic Theory.—The laws of combination and the facts of equivalence are beautifully explained by means of the Atomic Theory (q.v.), which asserts that all matter is composed of ultimate particles or atoms, which by no means in our power can be further subdivided. The atoms of which an element is composed are of the same kind, and possess the same weight and properties; but the atoms of different elements differ from one another in these respects. For information respecting the methods by which the atomic weights have been determined, the reader is referred to article Atomic Theory. A curious point in connection with the atoms is, that in the majority of cases a single atom cannot exist in the free state, but immediately combines with others of its own kind. Thus a single atom of hydrogen is only known in combination: as soon as it becomes free it seizes upon a neighbour, and forms a group of two atoms. To designate this group—or indeed the smallest particle of any body, whether simple or compound, capable of existing in the free state—the term *molecule* is employed. The molecule of hydrogen therefore contains two atoms. A drop of water is composed of myriads of particles or molecules, each of which contain one atom of the element oxygen and two atoms of the element hydrogen.

Molecular Weights.—By the molecular weight of a body, simple or compound, is understood the weight of its smallest particle capable of existence in the free state, compared with the weight of the atom of hydrogen. The determination of the molecular weights of compound substances is of great importance, because by simple analysis we cannot determine the actual number of the different atoms present, but only their ratio. The direct determination of molecular weights can only be accomplished in the case of volatile bodies. In other cases these weights can only be deduced either from the steps taken in the synthesis of the bodies, from a consideration of their reactions, or from the different products yielded by their decomposition.

Avogadro and Ampère enunciated the law that *in equal volumes of all gases and vapours, under the same conditions of temperature and pressure, the same number of molecules is contained.*

Chemical Notation.—Berzelius was the first to introduce the present system of symbols and formulæ as a means of briefly stating the composition of chemical substances. The most important points in connection with this subject are as follow:—An atom of an element is represented by means of the first letter or letters of its Latin name. Thus 'Hg' represents an atom of mercury (hydrargyrum), 'Na' an atom of sodium (natrium), 'K' an atom of potassium (kalium), &c. The composition of a molecule of an elementary substance is expressed by writing the symbol or symbols of the atoms of which it is composed side by side, and affixing small figures to the right hand, and a little below each symbol, to indicate how many atoms of the element in question are contained in the molecule. Thus P_4 represents a molecule of phosphorus, and shows that it consists of a group of 4 atoms of the element; $C_{12}H_{22}O_{11}$, a molecule of cane-sugar, containing 12 atoms of carbon, 22 of hydrogen, and 11 of oxygen. To represent several molecules a number is prefixed to the formula of the molecule, with or without a bracket. Thus $2P_4$ represents two molecules of phosphorus, $6(C_{12}H_{22}O_{11})$ six molecules of cane-sugar. A chemical equation represents by means of symbols or formulæ a chemical reaction. Thus—

$$2H_2 + O_2 = 2H_2O$$

represents the reaction which takes place when hydrogen combines with oxygen, and shows that two molecules of hydrogen (each containing two atoms) and one molecule of oxygen (also containing two atoms) give two molecules of water (each of which contains two atoms of hydrogen and one of oxygen). The sign + is equivalent to 'together with' or 'and;' the sign = to 'gives.' Such an expression is called an equation, because the quantity of matter represented on the left hand is equal to the quantity on the right. A chemical equation is *a qualitative and quantitative expression of a chemical reaction.* Qualitative, as it shows by means of symbols the composition of the different molecules, reacting and produced. Quantitative, for several reasons:—(1.) It represents the atomic composition of the different molecules. (2.) It also represents the relative *weights* of the different substances taking part in the reaction. For in the above equation $2H_2$ represents 4 atoms of hydrogen (the weight of each of which is taken as unity), and therefore 4 parts by weight; O_2, 2 atoms of oxygen (each of which weighs 16 times as much as the atom of hydrogen), and therefore 32 parts by weight; $2H_2O$, twice the combined weight of 2 atoms of hydrogen = 2 and 1 atom of oxygen = 16, and therefore 36 parts by weight. It follows that 4 parts by weight of hydrogen and 32 parts by weight of oxygen give 36 parts by weight of water; or, what is the same thing, 1 part by weight of hydrogen and 8 parts by weight of oxygen give 9 parts by weight of water. (3.) An equation also represents, in the case of gases or vapours, the relative volumes of them taking part in the reaction; for by Avogadro's law the same number of molecules is contained in equal volumes of all gases and vapours, providing they be at the same temperature and pressure, and therefore *the indices to the number of molecules are also the indices to the relative volumes.* Providing, therefore, that oxygen and hydrogen be at 100° C., and that the pressure is constant, 2 volumes of the latter and 1 volume of the former will give 2 volumes of steam.

In the following list are given the formulæ of some of the chemical compositions described in this work. The symbols of the elements appear in the article on Atomic Weights.

Acetate of Amyl. $C_5H_{11}C_2H_3O_2$
Aconitine. $C_{30}H_{47}NO_7$
Alcohol, Ethyl. $C_2H_5(OH)$
Alcohol, Methyl. $CH_3(OH)$
Alcohol, Ethene. $C_2H_4(OH)_2$
Aldehyde, Berozoic. $C_6H_5—COH$
Aldehyde, Cinnamic. $C_8H_7—COH$
Aldehyde, Cuminic. $C_9H_{11}—COH$
Alum. $Al_2(SO_4)_3,K_2SO_4, 24H_2O$
Alumina. Al_2O_3
Ammonia (gas). NH_3
Antimonious Acid. Sb_2O_3
Antimonious Chloride. $SbCl_3$
Arabine. $C_6H_{10}O_5$
Atropia. $C_{17}H_{23}NO_3$
Baryta. BaO
Benzoic Acid. $C_7H_6O_2$
Benzol (Benzine). C_6H_6
Boracic Acid. H_3BO_3
Brucine. $C_{23}H_{26}N_2O_4$
Butyric Ether. $C_4H_9O_2(C_2H_5)$
Cadmia. CdS
Caffeine. $C_8H_{10}N_4O_2$
Calamine. $ZnCO_3$
Calamine, Prismatic. $ZnOH_2OSiO_2$
Calcium, Carbonate of. $CaCo_3$
Camphor. $C_{10}H_{16}O$
Capric Acid. $C_{10}H_{19}O(OH)$
Caproic Acid. $C_6H_{11}O(OH)$
Carbolic Acid. $C_6H_5(OH)$
Carbonic Acid. CO_2
Carbonic Oxide. CO
Caustic Baryta. BaH_2O_2
Cellulose. $C_6H_{10}O_5$
Chameleon Mineral. K_2MnO_4
Chlorate of Potash. $KClO_3$
Chloroform. $CHCl_3$
Chrome Alum. $Cr_2(SO_4)_3K_2SO_4 24H_2O$
Chrysene. $C_{18}H_8$
Cinnamic Acid. $C_9H_7O(OH)$ or $C_8H_7(COOH)$
Cuprous Oxide. Cu_2O
Cyanic Acid. $CN(OH)$
Cyanide of Mercury. $Hg(CN)_2$
Cyanide of Potassium. $K(CN)$
Dulcite. $C_6H_{14}O_6$
Epsom Salts. $MgSO_4,7H_2O$
Ethyl Ether. $(C_2H_5)_2O$
Ferric Chloride. Fe_2Cl_6
Ferric Oxide. Fe_2O_3
Ferric Sulphite. FeS_2
Ferricyanogen. $Fe(CN)_6$
Ferrous Carbonate. $FeCO_3$
Ferrous Nitrate. $Fe(NO_3)_2$
Ferrous Sulphate. $FeSO_4,7H_2O$
Ferrous Sulphide. FeS
Free Chlorine. Cl_2
Free Cyanogen. $(CN)_2$
Gallic Acid. $C_7H_6O_5$
Garlic, Oil of. $(C_3H_5)_2S$
Glucosan. $C_6H_{10}O_5$
Glucose. $C_6H_{12}O_6$
Glyceric Acid. $C_3H_6O_4$
Glycerine. $C_3H_5(OH)_3$
Glycogen. $C_6H_{10}O_5$
Hæmatite, Brown. $F_2O_3,3H_2O$
Hæmatite, Red. Fe_2O_3
Hæmatoxyline. $C_{16}H_{14}O_6,3H_2O$
Hippuric Acid. $C_9N_9NO_3$
Hydrated Sulphuric Acid. H_2SO_4
Hydrate of Baryta. H_2BaO_2
Hydrate of Lime. H_2CaO_2
Hydriodic Acid. HI
Hydrobromic Acid. HBr
Hydrochloric Acid. HCl
Hydrocyanic Acid. $H(CN)$
Hydrosulphuric Acid. H_2S
Iodic Acid. HIO_3
Iodic Anhydride. I_2O_5
Iodoform. CHI_3
Isatin. $C_{16}H_{10}N_2O_2$
Lactic Acid. $C_3H_6O_3$
Leucine. $C_6H_{13}NO_2$
Lithia. L_2O or LHO
Magnesium, Chloride of. $MgCl_2$
Magnesium, Nitride of. N_2Mg_3
Manganic Acid. MnO_3
Mercuric Chloride. $HgCl_2$
Mercuric Oxide. HgO
Mercuric Sulphide. HgS
Mercurous Chloride. $HgCl$
Mercurous Oxide. Hg_2O
Methyl. CH_3
Methyl, Formiate of. CH_3,CHO_2
Methyl, Iodide of. CH_3I
Methyl, Oxide of. $(CH_3)_2O$
Methyl, Salicylate of. $CH_3C_7HO_3$
Molybdena. MoS_2
Morphia. $C_{17}H_{19}NO_3$
Naphthaline. $C_{10}H_8$
Natron. $C_3O_8Na_4 + 3H_2O$
Nickel, Arsenical. $NiAs_2$
Nickel-glance. $NiAs_2—NiS_2$
Nitrate of Soda. $NaNo_3$
Nitre. KNO_3
Nitric Acid. HNO_3
Nitric Oxide. NO
Nitrous Acid. N_2O_3
Nitrous Oxide. N_2O
Nitro-Glycerine. $C_3H_5(ONO_2)_3$
Olefiant Gas. C_2H_4
Oleic Acid. $C_{18}H_{34}O_2$
Olein. $C_{57}H_{104}O_6$
Orceine. $C_7H_7NO_3$
Orcin. $C_7H_8O_2$
Osmic Acid. OsO_4
Oxalic Acid. $C_2H_2O_4$
Oxide of Silver. Ag_2O
Palmitic Acid. $C_{16}H_{32}O_2$
Periodic Acid. HIO_4
Permanganate of Potash. $KMnO_4$
Permanganic Acid. Mn_2O_7
Picrotoxin. $C_5H_6O_2$
Piperine. $C_{17}H_{19}NO_3$
Platinum, Cyanide of. $Pt(CN)_4$
Platinic Chloride. $PtCl_4$
Platinous Chloride. $PtCl_2$
Potash, Caustic. KOH
Potassium Chlorate. $KClO_3$
Prussian Blue. $Fe_4 3FeCy_6$
Rubidia. Rb_2O
Sarcine. $C_5H_4N_4O$
Selenic Acid. SeO_3

Selenious Acid. SeO_2
Silica. SiO_2
Silico-fluoric Acid. $Si_2H_2F_6$
Soda, Chloride of. $NaCl$
Soda, Nitrate of. $NaNO_3$
Stannic Acid. H_2SnO_3
Stannic Chloride. $SnCl_4$
Stannic Sulphide. SnS_2
Stearic Acid. $C_{18}H_{36}O_2$
Strontia. SrO
Strontium, Carbonate of. $SrCO_3$
Strontium, Sulphate of. $SrSO_4$
Strychnia. $C_{21}H_{22}N_2O_2$
Styrol. C_8H_8
Succinic Acid. $C_4H_6O_4$
Sulphocyanic Acid. $CNHS$
Sulphovinic Acid. $C_2H_6SO_4$
Tannin. $C_{27}H_{22}O_{17}$
Tartaric Acid. $C_4H_6O_6$
Thorina. ThO
Trimethylamine. $N(CH_3)_3$
Turpentine, Oil of. $C_{10}H_{16}$
Xanthine. $C_5H_4N_4O_2$
Xylene. C_8H_{10}
Xyloidin. $C_6H_9(NO_2)O_5$
Yttria. YO
Zinc-blende. ZnS
Zinc-glance. $ZnSiO_4H_2O$

Constitution.—We have said that the nature of a compound depends upon the number and kind of atoms composing it, and also upon the manner in which the atoms are *arranged* or grouped. The last is an important point, for we very frequently find (more especially in the case of the compounds of carbon) that the molecules of two or more bodies contain the same number and kind of atoms, and yet possess very different properties. Thus acetic aldehyde and oxide of ethylene both have the formula C_2H_4O. The difference between such bodies can only be explained by assuming that the atoms composing their molecules are differently grouped; in other words, that they have a different *constitution.* The investigation of the constitution of compounds forms one of the principal aims of modern C., and has already advanced considerably. Substances which, like aldehyde and oxide of ethylene, have a similar atomic composition but a different constitution, are said to be *isomeric* (see ISOMERISM). Substances the molecular weights of which are multiples of one another, are said to be *polymeric.* Thus acetylene, C_2H_2, and benzol, C_6H_6, are polymers.

Chemists and Druggists, Laws relating to. The Pharmaceutical Society of Great Britain was incorporated by royal charter on 18th February, 1843. The charter provides that the society shall have the right to examine candidates for admission, and to confer on those qualified the title of 'Pharmaceutical Chemist.' To assume the title without licence is punishable by fine; but the practice of a chemist and druggist is open to those who pass successfully the preliminary and minor examinations. The Council of the Society is required to appoint examiners for Scotland, who have the same powers as the examiners in England. No member of the medical profession, or who is practising under the right of a degree of any university, or diploma or licence of a medical body, is entitled to be registered and if any one who is registered become a member of the medical profession, he is disqualified from remaining on the register. See APOTHECARY.

Chem'nitz, the first manufacturing and second trading town of Saxony, on a river of the same name, in a wide valley, at the foot of the Erzgebirge, 36 miles S.W. of Dresden by railway. It has cotton and spinning mills, machine-works, supplying locomotive and other engines to all parts of Europe, over 50 large dye-works, besides manufactures of silk, gloves, lace, musical instruments, embroideries, &c. There is a large export of woollen, cotton, and other manufactured goods. There are various technical schools, several good public buildings, an exchange, a large theatre, and fine promenades formed on the site of the old walls. Pop. 138,954. The first Christian church was built here in 938 by Otto I., and C. became an imperial city under Rudolf of Hapsburg in the 13th c. It was ruined by the Thirty Years' War, and only began to prosper again on the introduction of cotton-weaving in the end of the 17th c.

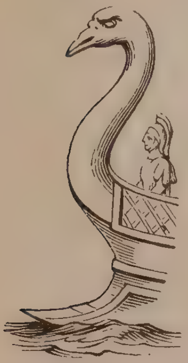
Chem'nitz, Martin, one of the most distinguished theologians of the Lutheran Church in the 16th c., was born at Treuenbrietzen, in Brandenburg, 9th November, 1522, and studied under Melancthon at Wittenberg. In 1547 he was appointed rector of the cathedral school at Königsberg, where he engaged in a controversy with Osiander in defence of the Lutheran doctrine of justification. Returning to Wittenberg in 1553, he lectured on Melancthon's *Loci Communes*—the origin of his own *Loci Theologici*, reckoned the best book of systematic theology produced in that age. In 1554 he settled in Brunswick, where he first became pastor, then superintendent, and died 8th April, 1586. He is most distinguished for his treatises against the Jesuits and the decrees of the Council of Trent; but probably the greatest ecclesiastico-political work of his life was inducing the Churches of Saxony, Franconia, and Swabia, to adopt the *Concordienformel* as their confession of faith.—**Martin C.,** son of the preceding (born 1561, died 1627), became privy councillor and chancellor to the Duke of Holstein-Gottorp.—**Philipp Bogislav von C.,** son of the younger Martin (born 1605, died 1678), entered the service of Sweden, was made royal historiographer, and raised to the order of nobility.

Chemnit'zia, a genus of Gasteropodous mollusca, the shell of which is of slender, elongated shape—the aperture being oval and the operculum horny. This genus is included in the family *Pyramidellidæ*, and its fossil representatives first appear in the Permian rocks, more than 150 fossil species being known.

Chenab' (Chináb), the largest of the rivers from which the Punjab ('five rivers') takes its name. Its source is in the Paralasa range of the Himalayas. After a course of about 600 miles it receives the Jhelam on its right; somewhat lower down, the Ravee on its left; and 110 miles still lower, on the same side, the united stream of the Beas and Sutlej. The entire body of waters before joining the Indus bears the name of the Punjnud. At Waizerabad the railway crosses C. by one of the longest iron bridges in the world, having a length of 1⅓ miles, and consisting of 64 spans of 1426 feet each. This bridge was opened by the Prince of Wales, 22nd January, 1876.

Chén'ier, André Marie de, a French poet and political writer, was born 29th October, 1763, at Constantinople, where his father was consul-general for France. He came to France at an early age, and studied at the Collége de Navarre, in Paris, there evincing poetic talent and acquiring a passion for ancient literature. In 1784 he travelled on account of his health in Switzerland, Italy, and Greece, and in 1787 he visited England as secretary to the embassy of M. Luzerne. Returning to Paris in 1790, while the Revolution was raging, he joined the brilliant 'Society of '89,' and volunteered to assist the infirm Malesherbes in the defence of Louis XVI. C. stood as far apart from despotism as from anarchy, and in prose and verse proclaimed at once his love of liberty and his detestation of violence. He was at last brought before the Revolutionary Tribunal, was condemned, along with forty-five others, and was guillotined, 25th July, 1794. When in prison C. burst forth in a beautiful ode, *La Jeune Captive*, of which the subject was his fellow-prisoner, the celebrated Comtesse de Coigny. His *Elégies* are exquisite in their mingling of classical spirit with an original boldness and vivacity. Only a tithe of his projected poems were finished, still the influence of C. is clearly visible in the early works of Chateaubriand, Barthelémy, Lamartine, and Victor Hugo.—**Marie Joseph de C.,** brother of the former, was born at Constantinople, 28th August, 1764, and became famous as the principal dramatist of the Revolution, and as a member of the Legislative Assembly from 1792 to 1802. He is also the author of the *Chant du Départ* and other songs. His dramas, of which the chief are *Charles IX.* (1790), *Jean Calas* (1792), *Henri VIII.* (1793), and *Timoléon* (1795), are full of republican declamation, and of the wild sentiments of the time. C. died 10th January, 1811.

Cheniscus, the ornamentation, either at the prow or at the stern of an ancient ship, representing the head of a goose. An illustration of the C. may be observed on Trajan's column. See *Art Dictionary.*



Cheniscus.

Chenopodia'ceæ, the Goosefoot or Spinach order, a natural order of Dicotyledonous plants, herbs, or small shrubs very generally distributed over the world, but chiefly found in temperate or ex-tropical countries. There are about 500 species, and among the best-known of the seventy-four genera are *Salicornia*, *Atriplex*, *Beta*, *Chenopodium*, and *Salsola*. From the ashes of several species — *Salsola*, *Salicornia*, &c.—which grow in salt marshes, *barilla*, used for obtaining carbonate of soda in former times, is obtained; but on account of soda being now much more easily obtained from other sources, the demand has of late fallen off. Among the other species are beet and mangold-wurzel (see BETA), spinach, &c. The seeds of several of them contain volatile oil or are nutritive—*e.g.*, Quinoa (q.v.). Some are anthelmintic, antispasmodic, aromatic, carminative, and stimulant. The fruit of the strawberry Blite of the S. of Europe has a sweetish, insipid taste.

Chenopod'ium, a genus of *Chenopodiaceæ* (q.v.), some of the British species of which are weeds, known under the name of *Goosefoot*. *C. ambrosioides*, the Mexican tea, is, owing to the essential oil which it contains, tonic and antispasmodic. *C. anthelminticum* yields 'wormwood oil,' so popular in the United States as a vermifuge. *C. Quinoa*, of the Pacific slopes of the Andes, is remarkable in so far that its seeds are extensively used as food by being ground and eaten as a gruel after the preparation has been seasoned with Chili pepper and other condiments, or by the seeds being roasted and boiled in water, which, after being seasoned, is supped. This last mixture, called *carapulque*, is a favourite Peruvian dish, and though unpalatable to those unaccustomed to it, is said to be very nutritious. The young leaves and shoots of the Good Henry, wild spinach, or Thesavy (*C. Bonus-Henricus*), a common British wayside weed, are, as well as those of *C. intermedium*, *C. Album*, used as substitutes for spinach.

Castle of Chepstow.

Chep'stow (Old Eng. *Ceapstow*, 'a place of trade'), a town of Monmouthshire, on the Wye, 17 miles E. by N. of Newport, has a river and coast trade in coal, iron, millstones, bark, cider, &c. It lies in a rocky gorge, where the river is crossed by a fine bridge, and is exposed to some danger from the tide, which frequently rises to the height of 50 feet, and even higher. About 5 miles off are the ruins of Tintern Abbey. Pop. reg. sub-dist. 11,311; civ. and ecc. par. 3378.

Cheque is a draft or order on a banker. It is subject to a stamp-duty of one penny, adhesive or impressed. A C. must be payable on demand to the bearer. A *crossed C.* has the name of a banker written across the face of it, to whom for security it is payable, or it may be crossed simply '—— & Co.' leaving the holder to insert the name of the banker. In this case it is only paid through that banker. If presented by any other person, it is not paid without inquiry. By statute the crossing is to be held a *material part of the C.* Any one obliterating or altering a C., with intent to defraud, is guilty of felony. A banker is personally liable if he pay a C. to which the signature of the drawer is forged; but if the signature of the payee only be forged, and that of the drawer genuine, the bank or banker is not liable to the drawer. In *Smith* v. *The Union Bank of London*, it was decided that a banker paying a C. to a party other than the bank whose name was written across, was entitled to do so. But this decision caused such dissatisfaction that it has since been settled that a crossed cheque is only payable to the banker whose name it bears.

Cher, one of the most central departments of France, in the basin of the Loire, has an area of 2780 sq. miles, and a population of 359,276. It is in great part an unbroken plain, bounded on the E. by the Loire, and intersected by the C. and Sauldre with their affluents, forming fertile valleys, in which are cultivated cereals, hemp, and vines. There are many fine forests, as those of Vierzon, Soudrain, Bornac, Chœurs, &c., and in the S.E., where rises a low range of hills, there occur extensive marshes. The climate is cold but healthy. Among the chief industries are cattle-rearing and iron-mining, while there are also extensive manufactures of cloth, porcelain, lace, glass, leather, &c., and a large export trade in agricultural produce, iron, and timber. C. is traversed by several canals, and by the Orleans and Lyon Railway. The capital is Bourges. The department was chiefly formed out of the provinces of Haute-Berri and the Bourbonnais.—The *river C.* rises in Creuse, near Crocq, flows N.W. through the department to which it gives name, and waters Loir-et-Cher and Indre-et-Loire, entering the Loire below Tours after a course of over 200 miles.

Cher'bourg, a strongly fortified seaport, and the most important town in the department of Manche, France, near the mouth of the Divette, 16 miles E.S.E. of Cap de la Hague, and 214 W.N.W. of Paris, with which it is connected by railway. It is one of the first arsenals of France, and the chief station of the marines. The town has a church of the 15th c., an hospital founded by Napoleon, a valuable fine-art collection, and a library of 61,000 volumes. The extensive fortifications of C. were begun by Vauban, and were only completed in 1858, at the enormous cost of £8,000,000. To the N. the roadstead is commanded by a detached breakwater, which is nearly parallel to the shore, is 2¾ miles long, encloses an area of 2000 acres, and supports six strong batteries. Round each end of this breakwater or *digue* vessels enter the harbour, and these channels are further protected by a series of island and mainland redoubts. The two main strongholds of C. are the extensive *Roches des Flamands* and *Roches du Homet*, and the town itself is overlooked by two forts, placed on the heights of Roule. The defences of C. make up a total of thirty forts of all kinds. The military port includes an outer harbour, having an area of 18 acres, and a floating dock of 15, and an inner floating dock of 21 acres, together admitting forty vessels of the first rank. There are also extensive shipbuilding slips and graving-docks. At the mouth of the Divette is the commercial harbour, connected with the sea by a channel 2270 feet in length, and protected by a granite mole. Besides the naval industries, there are manufactures of lace, hosiery, chemicals, leather, &c., and an export trade chiefly in cattle, salt, and wine. Pop. of commune 38,554; of arrond. 91,604. C., under the name *Carusburg*, is first authentically known in the 11th c., when a certain Comte Gerbert de C. appears in the ranks of the Normans at Hastings. In 1418 it was taken by the English, in 1450 retaken by Charles VII., and in 1758 again captured by the English, who destroyed its defences. A grand *fête* was given at C. on the opening of the inner floating dock by Napoleon III., at which the Queen of England and court were present by invitation, August, 1858.

Cher'ibon, or **Sheribon,** the capital of a Dutch residency of the same name, in Java, on the N. coast of the island, has a trade in teak-wood, coffee, and indigo. Pop. 13,840.

Cherimoy'er, a delicious Peruvian and Brazilian species of custard-apple, now naturalised in the E. Indies and other tropical countries, and reckoned inferior only to the mangosteen. It belongs to the order *Anonaceæ*.

Cherr'y, a genus of shrubs or trees belonging to the natural order *Rosaceæ*. It might be regarded as a sub-genus of Plum (q.v.). There are many species scattered all over the temperate portions of the world. The Gean and the common C. are both natives of Britain (though according to some the latter is a native of Syria and Western Asia generally, and only naturalised in Europe), and believed to be the progenitor of all the varieties of cultivated cherries. Their wood is highly valued by cabinetmakers and musical instrument makers. From the fruits of the former a spirit called *Kirschwasser* (also *Maraschino*) is distilled in Germany, and the fruits are also extensively used in France, Germany, and Scandinavia for making soups. Other species are found in the middle and S. of Europe, America, Mexico, and Natal. The wood of most of them is valued. Some have astringent bark, also esteemed as a febrifuge, while the leaves and kernels of nearly all contain hydrocyanic (Prussic) acid. There are very many cultivated varieties of C. esteemed for their fruit and the liqueurs prepared from it. In addition to Maraschino and Kirschwasser, the Ratafia of Grenoble is prepared from pounded cherries to which brandy, spices, and sugar are added. A gum not unlike gum-arabic exudes from the bark of many species of the genus.

Cherry Laurel, Common Laurel, Bay Laurel, Laurel Cherry, or **Laurel Bay,** a bush, having evergreen leaves. From the amount of hydrocyanic acid contained in it, nearly every part of the shrub is poisonous. The vapour of the bruised leaves will kill small insects. Hence, though custards, &c., are sometimes flavoured with C. L. water, great care should be exercised in its use.

Cherry Laurel.

Cher'so, an Austrian island in the Adriatic, government of Trieste, 12 miles S.S.W. of Fiume; area 105 sq. miles; pop. 8287. The surface is rugged, and towards the N. there are forests. There is a small town of the same name on the W. coast.

Chersone'sus, a Greek word denoting literally a land-island, *i.e.*, a peninsula. Pausanias applies it even to an island united to the mainland by a bridge. Several places were so named by the ancients:—the *Tauric C.* (the Crimea), the *Thracian C.* (the peninsula of Gallipoli), the *Cimbric C.* (Jutland), and the *Golden C.* (Farther India or Malacca).

Chert'sey (Old Eng. *Ceortes-ig*, 'Ceort's Island,' so called because situated on a spit of land between the Thames and a brook), a town in Surrey, 21 miles S.W. of London by railway, on the right bank of the Thames, which is here crossed by a handsome bridge. It has several almshouses, one founded by Cowley the poet, who died here, and a school founded in 1725 by Sir William Perkins for clothing and educating fifty children. The principal trade is in malt, flour, tiles, and bricks, and vegetables for the London market. C. is a very old place. Bede (*Hist. Eccl.* lib. iv. cap. 6) says that Earconwald, Bishop of the E. Saxons in London, built a monastery here (*circa* A.D. 666), but the town plays no part in history. Pop. parl. div. of county 61,970; reg. dist. 32,772; reg. sub-dist. 13,113; and civ. par. 11,298.

Cher'ub (pl. *Cherubs*, Heb. *Cherubim*), in the theology of the Hebrews was a creature of composite form, variously described in the sacred books. It is represented as having the human form (Ezek. i. 5), hands (Gen. iii. 24), two wings and one face (Exod. xxv. 20), four wings, four faces—of a man, a lion, an ox, and an eagle—four hands, the soles of the feet like a calf's, and the whole body full of eyes (Ezek. i.). The four beasts of the Apocalypse (iv. 6-8) had six wings, and each a different form—of a lion, a calf (the face of), a man, and an eagle. The attributes thus assigned to cherubs indicate the power of looking and moving swiftly in any direction without turning. As to the idea attached to the cherubs, everything points to this, that their proper task was to guard the unapproachable. The parallel to them is found in the winged bulls and lions of Nineveh (from which, it has been conjectured, they were borrowed, as recent discoveries show a strikingly close connection between Hebrew and Babylonian theology), the sphinx of Egypt, the chimæra, and griffin. Now the part ascribed to the griffin (Gr. *grups*, the same word as the Heb. C.) is that of guardian of treasure, and that this was just the office of the C. is manifest from Gen. iii. 24, and Ezek. xxviii. 13-16: hence their post on the top of the Ark (q.v.), and over it in Solomon's temple (1 Kings viii. 6-7), and their multitude of eyes (Ezek. i. and Rev. iv. 6). See Kuenen's *Religion of Israel*.

Cherubi'ni, Maria Luigi Carlo Zenobio Salvatore, the last of the great Italian composers, was born 8th September, 1760, at Florence. He was educated in Italy, but went to Paris as a young man, and remained there, where he was unboundedly popular, for the rest of his life. Of his very numerous compositions, which include twenty-eight operas, eighteen masses, and numerous smaller works, a few overtures are still heard, and at least two operas, 'Medea' and 'Les Deux Journées.' C. was Director of the Paris Conservatoire, where Auber and Boieldieu were his pupils. He died in Paris, 15th March, 1842. See an excellent work, called *Life of C.*, by Edward Bellasis (Lond. 1894).

Cherus'ci, a German tribe, separated from the Suevi by the Silva Bacenis, or Harz Forest, which formed the southern boundary. Under their chief Arminius (Hermann), they totally routed the Romans, commanded by Varus, in the Teutoburg forest, A.D. 9. Germanicus failed in his attempt to wipe out this stain on the Roman arms, but weakened by internal dissensions, the C. were subdued by the Chatti. About the beginning of the 4th c. they appear among the Frankish confederacy against Constantine, and, still later, Claudian alludes to them in his panegyric on the fourth consulship of Honorius.

Cher'vil, an umbelliferous plant, cultivated for the purpose of using it as an ingredient in soups. It is a native of the continent of Europe, but naturalised in Britain. The pleasantly aromatic odour of its leaves distinguish it from a poisonous weed, the leaves of which have a disagreeable odour. The great C., anise C., sweet C., sweet Cicely or myrrh, the needle C., Venus' comb or shepherd's needle, the parsnip C., and the wild C., are well-known species. All the species of *Chærophyllum* are also called C.

Ches'apeake Bay, a deep indentation on the Atlantic coast of the United States, nearly 200 miles in length, with a breadth of from 10 to 30 miles, and an average depth of 9 fathoms. At its mouth are the two capes Henry and Charles, facing each other. Its coast-line is very irregular, and forms numerous lesser bays. The eastern side has a flat and swampy shore; the western is a little higher. Besides a number of smaller streams, it receives the Potomac, Susquehannah, Rappahannock, York, and James rivers, all navigable; and by means of canals it is connected with other great water systems in the United States.

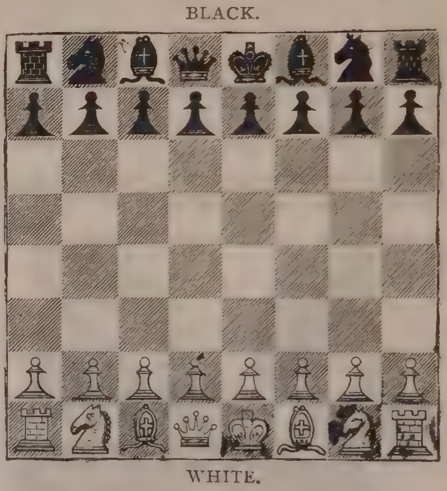
Ches'elden, William, surgeon and anatomist, was born 19th October, 1688, at Barrow-on-the-Hill, Leicestershire. He began to lecture on anatomy at twenty-two, and was elected a Fellow of the Royal Society in 1711, and a corresponding member of the Academy of Sciences at Paris in 1729, being the first foreigner honoured with that distinction. As surgeon to the St. Thomas's and St. George's Hospitals and to Westminster Infirmary, he acquired a brilliant reputation as an operator. He died 10th April, 1752. His chief works are *Anatomy of the Human Body* (1713); *Treatise on the High Operation for the Stone* (1723); and *Osteography, or Anatomy of the Bones* (1733).

Chesh'ire, a western and maritime county of England, lies between the rivers Mersey and Dee, and has an area of 655,036 acres. Pop. ancient county 730,058; adm. county 536,644; reg. county 707,978. It forms, towards the Irish Sea, a flat peninsula, the Wirral, between the estuaries of the great rivers, and inland a plain separating the mountains of Wales from those of Derbyshire. Near the centre it is intersected by an elevated ridge, running from the mouth of the Weaver in the N., to Beeston Castle rock (366 feet high) in the S.W., and in the W. also the county is slightly hilly, besides being bounded in great part by the Mersey on the E. and N., and by the Dee on the W. C. is watered by the Weaver and other navigable affluents of the Mersey. It has a moist climate and a soil fertile and loamy. There is excellent pasturage, and the agriculturists mainly devote their attention to dairy-farming, and especially to cheese-making. Of the 539,639 acres under cultivation in 1894, 83,065 were under corn crops; 38,044 under green crops; 61,390 under clover, grasses, etc.; 355,000 under permanent pasture; 1792 under small fruit; and 615 under nursery-grounds. Mountain and Heath covered 7121 acres, and Woods and Plantations 25,017. As much as 20,000 tons of cheese are produced yearly. C. is almost entirely formed of new red sandstone, containing an inexhaustible quantity of rock-salt, which is extensively mined near Northwich. When illumined by torchlight, the mines, some of them of vast extent, form a splendid spectacle. The other mineral products are coal, copper, lead, cobalt, and limestone. Chester is the capital, and among the other towns are Birkenhead, Stockport, Macclesfield, Staley Bridge, and Crewe. C. is connected with all parts of the kingdom by railway, and is traversed by the Grand Trunk and Bridgewater Canals. C. contains 8 parl. divisions, each of which returns one member: Altrincham, pop. 63,392; Crewe, pop. 64,434; Eddisbury, pop. 55,249; Hyde, pop. 57,468; Knutsford, pop. 55,073; Macclesfield, pop. 53,147; Northwich, pop. 69,893; and Wirral, pop. 73,119.

The original British inhabitants were the *Cornavii* or *Cornabii*. Under the Romans the district formed part of the province *Flavia Cæsariensis*. It first became permanently English in 828, when Ecgberht of Wessex compelled the submission of the N. Welsh, and then received the name *Ceastrescyre* ('shire of Chester'), of which the present form is a corruption. It was an earldom in the reign of Canute, was made a county palatine by William the Conqueror, having eight barons and a Parliament of its own. Henry VIII. abolished (1539) its separate Parliament, and compelled it to send representatives to the national assembly, but its independent jurisdiction did not finally cease till 1831.

Ches'nut, or **Chestnut,** a genus of Dicotyledonous trees or large shrubs, belonging to the order *Cupuliferæ*. The common sweet or Spanish C. is believed to have been originally introduced into Sardinia from Sardis in Asia Minor, and from thence to have spread all over the S. of Europe, where it forms in places large forests. In Britain the C. is widely distributed, and attains a good size, but there is evidence for believing that it was introduced by the Romans. It is now one of our trees most valued for its beauty, the excellence of its timber, and its fruit, which when roasted is very nutritive and not unpalatable. Among the species of C. may be mentioned the American C., the silvery C. of Java, the Tungurrut, the fruits of which are eaten boiled or roasted. (See also CHINQUAPIN.) The term C. is also given to various trees and shrubs which have no connection with the genus C.—*e.g.*, the horse-C., the Moreton Bay C., the Tahiti C., the water-C., the wild C. of the Cape of Good Hope, the yellow C. or C.-oak; the latter name is also sometimes applied to the timber of *Quercus sessiflora*, of which the woodwork of the roof of Westminster Abbey and various other old buildings is composed, and not, as long believed, of C.

Chess. The origin of this game is lost in antiquity. There seems to be little doubt that a game radically the same as the modern C. was played in the East some thousands of years ago. From Arabia it passed into Spain. In England it seems to have been known before the Norman conquest; but the game as now played may probably rather be said to have grown than to have been invented at any precise period. An elementary knowledge of C. is so generally diffused, and can be so much more effectually given *viva voce* than in a book, that, in the following observations, we will assume the reader to know the power of the various pieces and the object of the game. Any one who has not this knowledge, may acquire it in a few minutes from one who has. He may then enter on the study of this wonderful game, in which perfection lies beyond the reach of the human intellect; yet it is not the intellect alone which is concerned in C.-playing. Its results are largely affected by temperament, and by some of the moral qualities.



The names of the pieces are King, K.'s Bishop, K.'s Knight, K.'s Castle or Rook; Queen, Q.'s Bishop, Q.'s Knight, Q.'s Castle. Each piece has its respective Pawn.

Chess Board.

We give a few hints to beginners. The novice who may enter the lists with one a little more advanced than himself will probably find himself defeated in a few moves by what is called *scholar's mate*. Thus white and black move as follows:—White, king's pawn two; Black, king's pawn two; W. king's bishop to queen's bishop's fourth; B. king's bishop to queen's bishop's fourth; W. queen to king's rook's fifth; B. king's knight to king's bishop's third; W. queen takes king's bishop's pawn, and gives checkmate.

Now this mode of attack by queen and bishop is easily defeated, and, when defeated, it puts him who made it to great disadvantage by obliging his queen to retreat, and so causing loss of moves. Supposing W.'s two first moves to have been as before, let B. move his queen's pawn one square, so as to support the king. W. then, as formerly, plays his queen to the king's rook's fifth; B. king's knight's pawn one; thus giving check to the W. queen, who must retreat with very little choice of move. The novice should keep in view that it is not the force which he possesses on which his power for attack or defence depends, but that this depends on his *available* force. This being so, his first endeavour should be to play out his pieces early, to play them in support of one another, and to *castle* in good time. By the latter move, you probably place your king in a better position, and bring the powerful piece, the castle, into play. It is well to endeavour to have the attack; besides the strategical advantage of being the assailant, the position is more inspiriting than that of being on the defence. At the same time, a premature attack, that is, with a large part of your force at home, can hardly succeed. Play as much as you can with those who are more skilful than yourself. Never accept any indulgence when you have made a blunder, nor give any; otherwise, when the situation becomes critical, disputes are sure to arise; consequently, never take nor give back a move. In pursuing your own object, do not forget that your adversary is pursuing his at the same time; do not therefore play until you have, if possible, fathomed the motive of your adversary in making his last move.

The following are the leading laws of the game:—1. If you touch a piece you must play it; but, so long as you retain your hold, you can make any move consistent with its power. 2. If you touch a piece that cannot move, your adversary may compel you to move your king, if it be possible to do so. 3. If you make a false move, your adversary may make you retract it, and move your king, or he may oblige you to make any lawful move he chooses with the piece falsely moved. 4. On the king being checked, notice must be given, or the player whose king is attacked is not bound to notice the check. 5. When, towards the end of the game, one player has just sufficient force to win, he may be called on to win within fifty moves on each side. If he fail to do so, the game is held to be drawn. It sometimes happens that one player has the greater skill when there are many pieces on the board, and that the other again has more skill, when the board is nearly cleared, in manœuvring the pawns into queens, or otherwise. In this case the latter may, to the disgust of his adversary, choose to change queens and minor pieces early in the game. Now every player is entitled to play his own style of game, and to take every lawful advantage. Under many sorts of conditions have games been played; some of the great players have carried on so many as a dozen games at the same time and that without seeing any one of the tables. One game lasted over five years which was played between a resident in Australia and an inhabitant of Newark, U.S. The moves were made by letter, one competitor sending viâ Europe and the Suez Canal, while the other made use of the Pacific and San Francisco route. The most costly set of chessmen is in the possession of George Vanderbilt. They are made of silvered bronze and represent English and French historical characters of A.D. 1194; each figure appearing in the suitable costume of the period. The *white men* are English, the *black* French. The set belonged to Napoleon I. and was constantly used by him at St. Helena. The most ancient set is to be seen at the India Museum; it was discovered among the ruins of Brahmunadab, in Sindh, a city destroyed by earthquake in the 8th c.

Chest, the part of the trunk known as the thorax, composed of the dorsal vertebræ, the sternum, the ribs, and the costal cartilages. For anatomical description see SKELETON and THORAX.

Chest, Military, is the term used to denote the money and negotiable securities at the command of the commissariat department to meet the expenses of an army in motion.

Chest at Chatham, a fund established during the reign of Queen Elizabeth for the support of maimed and superannuated seamen. It dates from 1590, when all seafaring men in Her Majesty's service consented to a stoppage of from 2d. to 6d. a month out of their pay for this purpose, and as the money was kept in a chest, hence the name of the fund. When the managing office was removed to Greenwich in 1803, it retained the name, and became the *C. at Greenwich*. The monthly payment from the wages of the seamen was abolished in the reign of William IV. From the C. disabled sailors may receive a sum of money in hand, if they can still earn a living; if not, they may receive a pension for one year, for several years, or for life, as the case may be.

Ches'ter, an ancient city and bishop's see, a municipal and parliamentary borough, and the capital of Cheshire, on a rocky height on the right bank of the Dee (here crossed by a splendid stone bridge with a span of 200 feet), 16 miles S.E. of Liverpool. It is a great railway centre, and has one of the finest stations in the kingdom. By the Ellesmere Canal it is also connected with the Mersey. C. is surrounded by a wall 7 or 8 feet thick, now used as a promenade, and affording a wide prospect over a pleasant land. There were once seven towers in the walls, of which only two, Phœnix Tower and Water Tower, now remain. The two principal streets, which cross each other at right angles, are cut into the red sandstone rock to a depth of 10 feet, and the footways are within piazzas called the 'rows,' in front of the shops on the second stories, which are carried back about 16 feet. These 'rows' represent the original level. Flights of steps, at suitable distances, connect the rows with the street below, while beneath are ranges of shops of an inferior description on a level with the street. Numerous ancient houses with timber-framed gables, some of them curiously carved, give the city a peculiarly picturesque character. The cathedral, a massive Gothic structure of red sandstone, is of great antiquity. It grew out of the Abbey Church of St. Werburgh, founded early in the 10th c., but has recently been repaired in a style that has marred its former venerable appearance. The *diocese* of C., it may be noted, was not created till after the dissolution of monasteries by Henry VIII. Other churches are St. Bridget's, St. John the Baptist's, St. Michael's, and St. Peter's. C. has a grammar-school (King's School), founded by Henry VIII., and under the dean and chapter of the cathedral. St. John's Church is said to have been founded by Æthelred in 698. There is in the neighbourhood a fine public cemetery, and in 1867 a public park was opened, the gift of the late Marquess of Westminster.

On Friday, 31st May, 1895, the old Dee Mill, where the historic Miller of the Dee lived and worked, was almost entirely destroyed by fire. The mill stood on old Dee Bridge and occupied the site of a mill which was set up in the eleventh century by Hugh Lupus, Earl of Chester and nephew of the Conqueror. The mill, so says tradition, was doomed to be burned three times, and, curiously enough, the untoward fate has been more than fulfilled, seeing that the mill, which has just suffered, is the fourth on the site, each one of its predecessors having been burned down. The city has manufactures of paint, shot, and lead pipes; iron foundries, and a shipbuilding yard. The chief exports are cheese, lead, copper plates, cast-iron, and coal. C. returns one member to Parliament. The parl. bor. includes the old city and bor. of Chester, and parts of the townships of Hoole, Newton, Great Boughton, and Saltney. Pop. parl. bor. 42,297; county bor. and civ. par. (each) 37,105; and diocese 730,683.

C. was the *Devana Castra* of the Romans, so called from being half-encircled by the *Deva* or Dee,—the *Caerleon vawr*, 'City of the Great Legion,' of the Cymri. In 828-830 Egbert wrested it from the N. Welsh. The Danes captured it in 894, but it was recovered in 904. After the Norman Conquest the Earls of Chester held their courts there. Charles I., it is said, witnessed from the Phœnix Tower the defeat of his troops by the Parliamentary forces on Rowton Heath.

Ches'terfield, Philip Dormer Stanhope, Earl of, an English statesman, man of the world, and author, was born in London, 22nd September, 1694. In early life he travelled, was appointed gentleman of the bedchamber to the Prince of Wales (1715), and sat in the House of Commons as member for St. Germains, in Cornwall, for upwards of ten years. In 1726 his father died, and he entered the House of Lords, where he was noted for his eloquence, and the keenness of his opposition to Sir Robert Walpole, who was then in power. C. was a member of the Broad-Bottom Administration, formed in 1744, and was even made a chief secretary of state; but ill-health and deafness compelled him to retire from public life. C. wrote a good deal for some of the periodicals of the times, and was intimate with Bolingbroke, Swift, Pope, &c., and more celebrated for his wit and refined manners than for his statesmanship. His treatment of Johnson, however, provoked from the great lexicographer an outburst of honest, though surly and even exaggerated indignation, which is now chiefly interesting as marking the revolt of literature against the slavery of patronage. C. died 24th March, 1773. His most notable work is his *Letters to his Son* (1774), which may be considered even yet the best English compendium of the so-called 'ethics' of fashionable life.

Chesterfield, a town of Derbyshire, 21 miles N. of Derby, and 156½ from London by railway. It has a fine church (All Saints), and a grammar-school of the 16th c. There are manufactures of lace, merino, silk, cotton, earthenware, and hardware; and the neighbourhood is rich in coal, iron, lead, clay, &c. The trade of the place greatly increased after 1776, when Brindley constructed the *C. Canal*, joining the Trent near Stockwith. C. was the residence of the great engineers, the Stephensons, in their later days. In October, 1877, the Marquess of Hartington (now Duke of Devonshire) laid the foundation of a Stephenson Memorial Hall, which was designed to serve all the purposes of a scientific and literary institute, embracing a public hall, a free library, and lecture-rooms for science and art classes. Pop. parl. div. of county 61,294; mun. bor. 22,009; reg. sub-dist. 48,532; and civ. par. 13,242.

Chesterfield Inlet penetrates from the N.W. corner of Hudson's Bay 250 miles inwards. Its greatest breadth does not exceed 25 miles, and it is thickly studied with islets.

Chevalier' (Fr. 'horseman or knight'), in heraldry, signifies a horseman armed at all points. The term is used generally also in the sense of a knight.

Cheval'ier, Michel, one of the greatest of French political economists and free-traders, was born at Limoges, 13th January, 1806. After studying at the Polytechnic School and the School of Mines, he became an engineer in the department of the Nord. He was, however, soon attracted by the speculations first of St. Simon and subsequently of Enfantin, and for some writings in the *Globe* journal, which were considered an outrage against Christianity and morals, he was imprisoned for six months. Retracting what he had written, he was sent by Thiers on a special mission to the United States, to inquire into the systems of water and railway communication there. The brilliant letters which he wrote to the *Journal des Débats* when on the journey, and which were republished under the title *Lettres sur l'Amérique du Nord* (2 vols. 1836), dispelled many French delusions regarding America, and may be said to have made C.'s fortune. Various posts and dignities were bestowed upon him on his return to France, and in 1840 he was appointed Professor of Political Economy in the Collège de France. He was for a short time (1845-46) a member of the Chamber of Deputies. Writing vigorously against his former friends the Socialists, C. lost his various appointments on the Republic being proclaimed, but after the *coup d'état* they were restored to him, and he became known chiefly as one of the ablest French advocates of free trade. In 1860 he assisted Cobden in negotiating the important commercial treaty between England and France. In England, which he visited frequently, C. was much respected. His last visit was paid in 1875, when he received a warm reception in the commercial centres. He died 28th November, 1879. Among his works, his *Cours d'Économie Politique* (1842-50), *De la Baisse Probable de l'Or* (1859), translated into English by Cobden, and *Le Mexique Ancien et Moderne* (1863), are especially admired.

Chevaux'-de-Frise (Fr. *cheval*, 'a horse;' *de Frise*, 'of Friesland'), in defensive fortifications, large and strong pieces—centres or barrels—of timber, traversed with wooden spikes, pointed at each end, and shod with iron, which are used as an obstacle to impede the progress of an advancing enemy.

Che'viot Hills, a range of hills partly in Northumberland and partly in Roxburgh, and thus on the confines of England and Scotland. The highest points are Cheviot Hill in Northumberland, 2684 feet high, and Carter Fell, 2020 feet. The C. H. are in general smooth, and covered with a close sward. Numerous small streams, the Kale, Liddel, Tyne, Till, and Coquet, rise in the green recesses of this pastoral region, which Border ballads and tales have invested with an imperishable romance.

Cheviot Sheep.—A breed which occupies chiefly the Cheviot Mountains, but which has extended itself to the Lothians and to the Ochils. It is easily fed, and yields a large carcass of mutton. Cheviots are well woolled all over the body and the legs. They have white faces, open countenances, and bright, full, sparkling eyes; the lenses are large and very contractile, and the head is stylishly set upon the shoulders, which are rather light; the back is long and straight, and the quarters full. See SHEEP.

Chevreul', Michel Eugène, a distinguished French chemist, was born 31st August, 1786, at Angers (Maine-et-Loire). He was appointed in succession Professor of the Sciences at the Charlemagne College (1813), Director of the dyeing department in the Gobelins manufactory (1824), Professor of Applied Chemistry in the Museum of Natural History (1830), and Director of the Museum for the two quinquennial periods 1864 and 1869. Besides several works on chemistry, &c., numerous memoirs on colours and various chemical subjects are to be found in the *Annales de Chimie* and the *Mémoires* of the Academy of Sciences.

Chev'ron (Fr. 'a rafter'), in heraldry, one of the nine honourable ordinaries, which resembles the supports of a roof formed by two rafters leaning against one another. It is otherwise defined as the lower half of a Saltire (q.v.) brought to a point on the upper side. The C. is supposed to betoken the accomplishment by the bearer of something important, such as the founding of a family. A shield divided by a line in the form of a C. is said to be *per C.*, or *party per C.* The diminutive of the C.—half its size, or sometimes rather less—is called a *chevronel*.

In *architecture*, the term *C.* is used to denote the zigzag moulding characteristic of Norman architecture, and also found in the pointed arch of the transition period between the Norman and the Early English styles.

Chevrons, stripes worn on the arm by non-commissioned officers in the army. A lance-corporal or bombardier wears one, a corporal two, a sergeant three, and a staff-sergeant four.

Chev'y Chase, a celebrated ballad in English folklore. It appears in two forms, an ancient and more modern, both of which are given by Bishop Percy in his *Reliques*. The earlier and more rudely constructed, whose original title was *The Hunting a' the Cheviat*, may have been written in the reign of Henry VI. (1422-1461); the latter probably dates from the time of Elizabeth. The combat described in the ballad of C. C. is really imaginary, but was probably suggested by the historic battle of Otterbourne, fought between the rival Border nobles Percy (Hotspur) and Douglas in 1388, which is also the subject of a fine ballad. Both forms of C. C. are of English origin, but there is such knightly magnanimity in the narrative, that it became equally popular N. and S. of the Border. High and low alike rejoiced in the valiant strain. ‘I never heard,’ says Sir Philip Sydney, ‘the old song of Percy and Douglas, that I found not my heart moved more than with a trumpet; and yet is sung but by some blind crowder, with no rougher voice than rude style.’ The later and more familiar version has been extravagantly criticised by Addison in papers 70 and 74 of the *Spectator*.

Cheyne, George, a Scotch physician and mathematician, born of good family in Aberdeenshire in 1671. He practised at London from 1700 almost till his death, which took place at Bath, 12th April, 1743. C. strongly recommended milk and vegetable diet, having found such very beneficial in reducing his own corpulency. His work on *Fluxions* (1703) procured him admission to the Royal Society. Some of his other works are *A New Theory of Fevers* (1702), *Observations on Gout* (1722), *An Essay on Health and Long Life* (1725), and an *Essay on Regimen* (1739).

Chiabre′ra, Gabriell′o, born at Savona, 8th June, 1552, was the first Italian lyric poet of his time. Educated at Rome by an uncle, he afterwards took service with Cardinal Cornaro, but owing to an affray in which he avenged his quarrel with his own hand, he was obliged to leave the capital and retire into privacy. Honours were heaped upon him by Pope Urban VIII., by the Dukes of Savoy, Mantua, &c. C. died at Savona, 14th October, 1637. His lyrics are considered the best in the style of Pindar and Anacreon that have been produced in Italy in modern times. He also wrote several epic, dramatic, bucolic, and epistolary poems. His *Rime* (1731) and *Pœsie Liriche* (1781), together with his epics, *Delle Guerre de' Goti* (Ven. 1582) and *Amadeida* (Gen. 1620), are contained in the collection of his *Opere* (Ven. 1768).

Chia′na, the name of two small rivers of Tuscany,—one (the anc. *Clanis*) a tributary of the Arno, the other an affluent of the Paglia,—which water the wide expanse of the Val di Chiana, and have been the means of converting it into one of the most fertile districts of Italy, although prior to the time of Ferdinand III. their unrestricted inundations had rendered it a malarious and marshy wilderness.

Chiaramonté (Gulfi), a town in the province of Siracusa, Sicily, 33 miles W.S.W. of Syracuse, has a trade in corn and wine. Pop. 10,014.

Chia′ri, a town of N. Italy, province of Brescia, on the river Oglio, 14 miles W. of Brescia by railway. It was a walled town till the beginning of the present c., and has a church dating from 1431—80, and important silk manufactures. Here, on 1st September, 1701, Prince Eugene defeated the Franco-Spanish army commanded by Marshal Villeroi. Pop. 10,507.

Chiaroscu′ro (Ital. *chiaro*, Lat. *clarus*, ‘bright, clear;’ Ital. *oscuro*, Lat. *obscurus*, ‘obscure, dark’) is the Italian term for what is generally spoken of as ‘light and shade’ in painting. It may be described as the art of disposing the lights and shadows of a picture so as to realise the highest picturesque effect. The simplest and crudest form of C. is the violent contrast of light and shade; but the refinements of this quality of painting embrace the light in light, the dark in dark, and all those variations in the use of colours which produce the effects of reflected light, or light tempered by shadow. The first painter who reduced C. to a system was Leonardo da Vinci, and, though the quality is a main constituent of every successful work of art, it has been most effectively used, and may be most profitably studied, in the works of Correggio, Rembrandt, Titian, and Rubens.

Chiava′ri, a seaport of N. Italy, province of Genova, at the mouth of the Sturla, 21 miles E.S.E. of Genoa. Of its churches, the finest is the *Madonna del' Orto*. C. has manufactures of lace and silk, and important anchovy fisheries; in the neighbourhood are extensive slate quarries. Pop. 12,066.

Chiavenn′a (Ger. *Kläfen*), a town of N. Italy, province of Sondrio, 38 miles N.N.W. of Bergamo. It is situated on the Splügen road, and is the point of junction for the roads to Milan by Lake Como, to the Engadine, and the Swiss canton of the Grisons. C. has manufactures of silk and cotton. Pop. 4394.

Chica, a red substance obtained by boiling the leaves of *Bignonia Chica*, a native of the banks of the Orinoco and other parts of S. America. It is used by the Indians for painting their bodies, and in the arts for giving an orange-red colour to cotton fabrics. The name *C.* is also applied to *Sterculia Chicha*, the seeds of which are eaten by the Brazilians. C. is also another name for Pito, Poso, or maize-beer—a fermented liquor made from Indian corn by many tribes of the S. American Indians by fermenting the *chewed* maize. A very superior quality is made by pouring the liquor into an earthen jar containing several pounds of beef, and burying the whole underground for several years. When a child is born such a jar is buried, and only disinterred for the contents to be drunk at the same child's marriage. Vinegar and a spirituous liquor can be also made from it.

Chicacole′ (Sríkákulam), the chief town of Ganjam district, in the province of Madras, British India, 415 miles S.W. of Calcutta, and not far from the coast. It is noted for its beautiful muslins. In 1791 a terrible famine raged here and killed off the inhabitants, and in 1876 the place was visited by a great flood, which partly destroyed the bridge. The name of ‘happy rose-garden’ was at one time given to the place. Pop. 18,241.

Chica′go (pron. *Shekawgo*), in Illinois, one of the chief cities of the Union, is situated on the S.W. shore of Lake Michigan at the mouth of a river of the same name. The name is Indian, meaning ‘wild onion.’ C. stands on the great E. and W. route, and is the centre of an immense traffic. It is perhaps the most wonderful city in the world for its rapid growth and great energy. Living men remember when its site was a swamp, and could have been bought for a trifle. Fort Dearborn was erected in 1803 at the mouth of the river, and the place was a mere frontier post till 1831, when a settlement was made. The town was organised in 1833, and received a charter 4th March, 1837. The population in 1835 was 1000; 1837, 4470; 1845, 12,080; 1860, 110,973; 1880, 503,185; and in 1890, 1,099,850. The C. river, having two branches, separates the city into three parts, the business portion being on the S. side. The Illinois and Michigan Canal connects the C. river with the Illinois, which enters the Mississippi, thus uniting the navigation of the great lakes with the Gulf of Mexico. The river is bridged and tunnelled, and has some 28 miles of wharfage, and there is a tunnel for 2 miles under the lake, by which the city is supplied with 57,000,000 gallons of water daily. A terrible fire broke out 7th October, 1871, and lasted three days, destroying 17,450 houses, and consuming $196,000,000 of property. A fund amounting to $3,500,000 was subscribed in aid of the sufferers from all parts of the world, and the city was completely rebuilt in about two years. Total debt of city, less sinking fund, is over $13,000,000. The finest buildings are the court-house, observatory, the colleges, the Douglas monument, and some of the largest hotels in America. C. is the greatest depot for grain in the world. The business of pork-packing is the largest in the world. There are besides extensive manufactures of machinery, carriages, &c. C. is also the greatest railway centre in the Union, about thirty lines meeting there. In the public schools there are 2842 teachers and an enrolment of 134,327 white pupils and 1224 coloured. There are thirty daily papers and about two hundred magazines and periodicals. On 1st May, 1893, President Cleveland inaugurated there ‘The World's Fair,’ an international exhibition on a colossal scale, to which exhibits were contributed from almost every part of the world. About 360 millions of dollars are invested in the manufacturing establishments of the place, where 210,366 is the average number of employés, earning about 124 millions of dollars, and turning out 12 millions of dollars' worth of agricultural implements, nearly 3 millions worth of baking and yeast powders, 7¼ millions worth of shoes, 32½ millions of men's clothing, 30¼ of men's furnishing goods, 24½ of iron and steel goods, 17¾ of lumber, 194¼ of meat slaughtered and packed, 8 of distilled liquors, &c.

Chichen′, a town in Yucatan, Central America, about 30 miles W. by S. of Valladolid, and chiefly interesting for the ruins of an ancient city, attesting in its builders a considerable degree of civilisation. It is impossible to conjecture the purpose for which many of the structures were erected. There is a spacious parallelogram formed by rows of small pillars, and a truncated pyramidal mound, 75 feet high, each side of the base measuring about 200 feet, and crowned with a ruined building, of which the sides measure 43 feet by 49.

Chichen.

Chi′chester, a municipal borough, and bishop's see, in Sussex, 62 miles S.W. of London by road, and 79 by railway. It consists of two principal streets, with smaller streets at right angles to them, having an elaborately carved octagonal cross at their intersection. The city is surrounded by an ancient wall, a mile and a half in circuit, now lined with elms, and forming a pleasant promenade. The cathedral, an imposing structure, exhibiting almost every variety of Gothic, was built in the 12th and 13th centuries, and has undergone 'restoration' since 1830. It is rich in 'portraits' of English kings and bishops, and contains many interesting monuments; among others, one to Collins the poet, who was a native of the place, and another to Chillingworth. C. has extensive corn and cattle markets, but almost no manufactures. The harbour, 2 miles to the S.W., is connected with the city by a canal. Pop. parl. div. of county 54,360; mun. bor. 7830; reg. sub-dist. 7887; and diocese 549,472. C. is considered the *Regnum* of the Romans—the headquarters of Vespasian, who built the walls; and the coins and temple fragments found here favour the conjecture. But it derives its name from Cissa, a king of the S. Saxons, and appears in the *Chronicle* as *Cissa-ceaster*. Its oldest charter dates from the reign of Stephen.

Chicken-Pox, an infectious disease almost always confined to children. It seldom lasts more than a week, and is never fatal. There is first an eruption of pimples, which become vesicles on the second day (hence called crystal-pox). On the fourth day these vesicles become scabs, and fall off about the end of a week from the commencement of the disease. A slight aperient medicine is really all the treatment required. C.-P. generally occurs only once in a lifetime, and is essentially a disease distinct from *Small-Pox* (q.v.).

Chicken Snake, a harmless colubrine, occurring in N. America above 37° N. lat. It grows to 5 feet in length, is frequently discovered in houses and dairies, and receives the name of house, or milk, snake in consequence. White tinged with red is the colour of its body; the belly is of silver grey; dingy black spots appear here and there along the vertebral line. It feeds on frogs, birds, and the smaller vermin.

Chick-Pea, a genus of plants of the natural order *Leguminosæ* (sub-order *Papilionaceæ*). About twelve or fifteen species are known, natives of Southern or Eastern Europe, W. Africa, and Abyssinia. The C.-P., or Egyptian pea (*Cece* of the Italians, *Garbanzos* of the Spaniards, the *Gram* of India), is a native of the S. of Europe and of India. The leaves are covered with glandular hairs excreting oxalic acid —or, according to some, a mixture of oxalic, malic, and acetic acids—which hangs in drops which afterwards crystallise. The seeds are ground into meal and made into cakes, which form a large portion of the food of the people of the countries in which the C.-P. is a native, and are also parched and boiled. In Paris they are greatly used in soups. The acid crystals are collected by the natives in India, and considered an infallible cure in cases of indigestion. The herbage is well adapted for feeding cattle.

Chicken Snake.

Chickweed, or **Chickenweed**, a genus of plants of the natural order *Caryophyllaceæ*, but generally applied to *S. media*, one of the Stitchworts (q.v.). It is a troublesome weed, gathered to make poultices or to feed birds. The term *C.* is also sometimes given to *Roccella tinctoria*.

Chicla′na de la Frontera, a town of Spain, province of Cadiz, about 12 miles S.E. of Cadiz. It is built on a hill, and has a fine appearance. C. has a good hospital, manufactures of linen, earthenware, &c., and mineral baths of great repute in the W. of Andalusia. Pop. 12,348.

Chic′opee, a town of Massachusetts, U.S., at the confluence of the rivers C. and Connecticut, 85 miles W.S.W. of Boston by railway. It has several churches and newspapers, and large manufactures of cotton, woollens, paper, arms, &c. Pop. 14,050. C. was formerly called Cabotville.

Chi′cory, or **Succ′ory**, a genus of plants belonging to the order *Compositæ*, sub-order *Cichoraceæ*, comprising few species. The common C. is a plant with bright blue flowers, common on waysides and similar localities in some parts of England and most parts of Europe. The leaves are used for feeding cattle, and the blanched leaves as a salad. The roots when roasted form a substitute for coffee, and, indeed, in the opinion of many, if mixed with the latter improve its flavour. They also deepen the colour of the coffee. This adulteration is itself adulterated with roasted beans, parsnips, carrots, acorns, logwood, and mahogany dust, &c., and even, it is said, with the dried and ground bones of horses and bulls, &c. The Endive (q.v.) also belongs to this genus.

Chicory.

Chief (Fr. *chef*, 'head'), in heraldry, one of the nine honourable ordinaries, is the uppermost third, or less than a third, of the field of a shield, bounded by a horizontal line.

The C. may be borne with any other of the nine ordinaries except the Fesse (q.v.); it may also be charged with other heraldic figures or devices, which are then said to be *on a C. In C.* means borne on the uppermost part of the shield, even though the horizontal bounding-line is not drawn.

Chiem-See, the largest lake in upper Bavaria, 42 miles S.E. of Munich, is 10 miles long, 7 broad, and lies 1500 feet above the sea. It receives the Achen and Prien, and is drained by the Alz, an affluent of the Inn. It is rich in trout, salmon, pike, and carp, and is adorned with three fine islands. Herrenwörth, Frauenwörth, and Krautinsel. The Bairisch-Salzburg Railway runs along its southern shore. There are steamers on the lake.

Chie'ri (the *Carea* of the Romans), an old town in the province of Torino, N. Italy, 9 miles S.E. of Turin, has manufactures of fustians, cottons, linens, silks, &c. It is rich in churches, cloisters, educational and benevolent institutions. Its finest buildings are the Church of St. Dominico (1260), and that of Santa Maria della Scala (1405), a large Gothic edifice. Pop. 13,260. C. is frequently mentioned in Italian history.

Chie'ti, the capital of a province of the same name, Central Italy, 78 miles E.N.E. of Rome. It is the seat of an archbishop, and has a cathedral, several churches and convents, a college, a theatre, and remains of antiquity. Its industries in woollen and silk fabrics are unimportant, but its vicinity is extremely productive, and gives rise to a considerable trade. Pop. 22,432. C. partly occupies the site of the *Teate Marrucinorum*, of which traces are still seen. In 1524 St. Gaetano established the Theatine order here. The province of C. has an area of 1138 sq. miles, and a pop. estimated at 349,777.

Chignec'to Bay, the westerly of the two terminal branches of Fundy Bay, N. America, separated from Northumberland Strait, in the Gulf of St. Lawrence, by an isthmus, bearing the same name, 14 miles in breadth.

Chig'oe, or **Jigg'er,** a species of flea, found in the W. Indies and S. America, and noted for its habit of selecting the skin of the foot or under the toe-nails as a residence. If the eggs are allowed to be developed in the skin, the irritation produces a troublesome ulcer, amidst which the young larvæ appear. The remedy consists in extracting the C., and in applying tobacco-juice lotion to the affected part,—an operation in performing which the W. Indian negroes are said to be very expert.

Chihua'hua, capital of the Mexican state of the same name, lies on a tableland 4500 feet above the sea, and close to the river Chubiscar. It is a well-built town, with regular streets, a large cathedral, several convents, and an aqueduct 3 miles in length. It was founded in 1700, but has been falling into decay since the overthrow of Spanish authority. Pop. 13,128. S. of the town lie the famous silver mines of St. Eulalia.—The *State of C.*, separated from Texas, U.S., by the Rio Grande del Norte, has numerous mines, but the soil being dry, only the river-bottoms are cultivated, and a strip along the slope of the Sierra Madre. Near the base of this are extensive ruins, known as Casas Grandes. Area 87,802 sq. miles; population estimated at 298,073, mostly Indians.

Chil'blains, blains or boils caused by a chill or cold. The proper treatment consists in keeping the affected parts warm and dry, and applying iodine ointment to them. In strumous children, cod-liver oil and iron should be given.

Chil'dermas, or **Holy Innocents' Day** (28th December), is held as a festival by the Church of Rome, to commemorate the massacre of the Innocents by Herod. It is said to have been customary to whip the children upon this day, to enforce Herod's crime on their memory. It was thought unlucky to marry or commence any work on this day.

Chi-li, or **Pe-chi-li,** a province of the Chinese empire, bounded on the N. by the Great Wall, has an area of 59,000 sq. miles, and a pop. estimated at 17,900,000. It is watered throughout its length by the Pei-ho and its numerous affluents. The Hoang-ho also passes through its southern border. Pekin, the capital of the empire, lies near the Pei-ho in the northern part of the province.

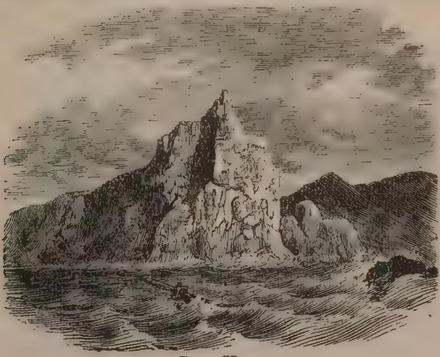
Chil'i, or **Chile,** a republic on the W. coast of S. America, bounded W. and S. by the Pacific Ocean, E. by the Andes, and N. by Bolivia: lat. 17° 28'-56° 20' S.; long. 66° 30'-75° 40' W. It has a coast-line of 2780 miles, and includes several islands, of which the largest is Chilöe (q.v.), although Queen Adelaide Island, Great Wellington Island, and Desolation Land are very nearly as extensive. The divisions, areas, and populations, according to the latest returns, are as follow:—

Provinces.	Area in Sq.Miles.	Population.	Capital.
Chilöe . . .	3,995	81,506	Ancud.
Llanquihue . .	7,823	78,640	Puerto-Montt.
Valdivia . . .	8,315	63,728	Valdivia.
Arauco . .	4,248	90,428	Lebu.
Magallanes . .	75,292	3,230	Punta Arenas.
Concepcion .	3,535	237,844	Concepcion.
Nuble . . .	3,556	164,779	Chillan.
Linares . .	3,488	117,920	Linares.
Maule . . .	2,930	129,081	Cauquenes.
Colchagna . .	3,795	162,448	San Fernando.
Santiago . .	5,223	400,047	Santiago.
Valparaiso . .	1,637	227,846	Valparaiso.
Aconcagua . .	5,840	159,872	San Felipe.
Antofagasta .	60,968	37,220	Antofagasta.
Tacna . . .	8,685	30,917	Tacna.
Tarapaca . .	19,300	47,730	Iquique.
Atacama . .	43,180	70,421	Copiapo.
Coquimbo . .	12,905	198,432	Serena.
O'Higgins . .	2,524	93,537	Rancagua.
Bio-Bio . .	4,158	130,702	Angeles.
Malleco . .	2,856	74,429	Angol.
Curicó . .	2,913	106,553	Curicó.
Talca . . .	3,678	162,406	Talca.
Cantin . . .	3,126	45,618	Temuco.
Grand Total .	293,970	2,915,332	—

Antofagasta was ceded by Bolivia to Chili in 1884, and Tacna (for ten years) and Tarapaca (altogether) were handed over by Peru. Tacna is still retained in consequence of the disturbances in Peru.

Physical Aspect, &c.—The country, stretching N. and S. in a long narrow strip, is cut off from the rest of the continent by the Andes, which here form a single magnificent ridge. S. of 41° the breadth is something under 30 miles, but to the N. of that latitude an average of 100 is maintained up to 27°, where for about 5° the country extends from the coast to a distance of at least 240 miles. After this, the breadth abruptly decreases to 160 miles, and then gradually to 70 miles. The ridge of the Andes consists of numerous offsets of the great range, and of intervening valleys of great fertility and beauty, which open upon the sea. In the N. is the barren and rainless waste of Atacama, while over the rich central region the snow-covered peak of Aconcagua (q.v.), the giant of the Chilian Andes, towers to a height of 22,422 feet. There are sixteen active volcanoes, such as Chillan and Villarica, both of which are 16,000 feet high; and the coast-line has been greatly extended of late years by the gradual upheaval which the country is undergoing. Among the rivers are the Loa, Copiapo, Guasco, Choapa, Rapel, Maule, Cauten, Biobio (q.v.), and innumerable smaller streams. A country like C., which extends through 40° of latitude, must necessarily present a great variety of climate, which in the N. is hot and dry, but in the central part of the country is delightfully tempered by prevailing sea-breezes; while at the S. there are storms of wind and rain nearly all the year round. On the whole, C. is singularly healthy, although the temperature often rises to 95° in the shade. January and February are the hottest months, and the rainy season, by which Atacama is almost unaffected, lasts from April till August intermittently.

Natural Products, &c.—The base and slopes of the Andes are clad with forests of fine timber trees, and wild apple and pear trees grow in abundance. Agriculture is rapidly improving, the principal crops under cultivation being maize, wheat, barley, and other European grains. The only hemp grown on the W. side of S. America is in C., which is also the original home of the potato. In the dry region of the N. there is a luxuriant yield of grapes, olives, figs, pomegranates, oranges, peaches, melons, &c. C. is plentifully stocked with cattle and goats, while its principal animals of prey are the puma or American lion, and the condor, a splendid Andian species of the vulture.



Cape Horn.

Geology and Mineralogy.—The upper portion of the Chilian mountains consists mainly of schistose rocks, the lower offsets of granitic, covered with tuff and lava in the vicinity of the volcanoes. Everywhere are seen hornblende, mica-schists, clay slates, and basaltic and felspathic porphyrites of deep red and brown tints, while limestone rocks occur in numerous places. Quartz is usually found in conjunction with veins of the metals, which exist in great abundance, and constitute the chief wealth of the country. The principal minerals are gold, silver, copper, lead, iron, tin, coal, and precious stones, such as agate, jasper, rock-crystal, &c. Atacama with its vast mineral resources has been brought within the reach of mining enterprise since the recent introduction of railways.

Means of Traffic, Commerce, &c.—C. is now placed in direct communication with Europe by means of a telegraph line from Buenos Ayres, which crosses the Andes by the Paso de la Cumbre, 12,178 feet high. The various railway lines throughout the country have a total length of 1735 miles. The railway across the Andes from Santa Rosa to Mendoza in the Argentine Republic approaches completion, over 100 miles of the road being now open; one-sixth of the distance, however, still separates the Chilian section from the Argentine. The cost of construction has already reached £9,500,000. There are about 7,000 miles of State telegraph lines. C. has considerable foreign commerce, chiefly with Britain, and the principal articles of export are copper and silver ore, wheat, nitre (nearly half the value of all the others), manganese ore, barley, wool, gold and silver bar, beans, guano, tallow, and hides. In 1893 the exports by land and sea amounted to £11,450,000, and the imports to £10,800,000. In 1892 the number of vessels that entered and cleared the ports of the republic was 16,740, representing 17,924,591 tons. C. has manufactures of linens, brandy, earthen and copper wares, &c. A great international exhibition was held at Santiago in the end of 1875.

People, Government, &c.—In the N. and central provinces the inhabitants are mostly whites or Chileños, of Spanish origin, distinguished by their enterprise and industry. The S. is almost wholly occupied by Indians. According to the constitution of 1833 the government is a republic, and the legislature consists of two houses: the Senate (elected for six years) and Chamber of Deputies (elected for three years). The public debt, which is chiefly contracted on account of railways, amounted in 1894 to £18,309,534. The estimated revenue for the same year is placed at £1,647,302, and the expenditure at rather more than two-thirds of that amount. The army cannot (by law) exceed 6000 men of all ranks and branches; but there is a National Guard in addition to the regular forces, and the body in 1894 consisted of 51,090 men. The fleet includes three armour-clads, 4 half-protected cruisers, several gunboats, and one torpedo flotilla. The prevailing religion is the Roman Catholic, but other churches are protected by a law of 1865. The law recognises civil marriage only.

History.—The country was overrun by Diego Almagro after the conquest of Peru in 1535, and later was made a general-captaincy, with an extended dominion stretching to Cape Horn. In 1810 began the revolt against Spain, which continued till 1818, when the decisive battle of Maypo gave C. her independence. The republic has since, in spite of repeated internal dissensions, firmly established its position as the most stable and enlightened of the S. American governments. In the spring of 1879 a war broke out on the boundary question between C. and the allied republics of Peru and Bolivia; and two years' bitter hostilities resulted in the triumph of C. and the almost total destruction of the land and sea forces of her antagonists.

Chillianwall'a (Chiliánwála), a village of the Punjab, 5 miles from the left bank of the Jhelam, and 85 miles N.W. of Lahor. Here, on 13th January, 1849, Lord Gough defeated the Sikhs, after an obstinate engagement. An obelisk has also been erected at C. to the memory of those who were slain in the two wars with the Sikhs. It is said that C. is the spot where the battle of Alexander and Porus took place after the passage of the river Jhelam.

Chill'icothe, the capital of Ross county, Ohio, U.S., on the Scioto river, 96 miles N.E. of Cincinnati by railway. It has large manufactures of machinery, and is the trading centre for the rich farming country bordering on the river. Formerly capital of the State, C. is finely built and wealthy. Pop. 11,288.

Chill'ingworth, William, a famous divine, called 'the immortal C.,' born in October, 1602, at Oxford, and had Laud for his godfather. While studying at the university of his native city he became a Roman Catholic, and went to Douay, but afterwards returned to the English Church, mainly through the persuasions of Laud, and in 1637 published his chief work, *The Religion of Protestants a Safe Way to Salvation,* in reply to the treatise of a Jesuit called Knott. He accompanied the King's troops during the civil war, was taken prisoner at the siege of Arundel, and died 30th January, 1644. C. was an able controversialist, but his clear, close reasoning is weakened by an immoderate dread of fallacy. He denounced persecution, and maintained that Scripture, and not Church authority, was the basis of Protestant faith. *The Religion of Protestants* is remarkably bold and tolerant, the first clear-ringing defence in the English tongue of the liberty of private judgment. In later times C. was a favourite with latitudinarians like Locke and Tillotson. See *Masters in English Theology* (Lond. 1877).

Chillon, a famous fortress, in the Canton of Vaud, Switzerland, at the E. end of the lake of Geneva, 6½ miles S.E. of Vevay. It stands on an isolated rock, at a distance of 62 feet from the shore, with which it is connected by a drawbridge. It is mentioned in documents of the 12th c., but the date of its foundation is not exactly known. Pietro of Savoy (Charlemagne the Little) converted it into a fortress in 1248. Bonnivard, prior of St. Victor, Geneva, was imprisoned here from 1530 to 1536. Byron's *Prisoner of C.* has invested the castle with an undying interest. It is now an arsenal.

Chilöe, an island forming a province of Chili, is situated in the Gulf of Ancud, is 120 miles long from N. to S., about 60 broad, and has an area of 3995 sq. miles, and a pop. of 81,506. It is a huge mass of volcanic rock, rising in no part higher than 2600 feet, and possesses a rich soil, which is almost entirely clad with forests, chiefly of a bastard cedar. The coast-land is cultivated, and yields wheat, barley, potatoes, and fruits. There is a considerable export of grain and timber. Ancud and Castro are the principal towns, the former being the capital, and having an excellent harbour.—The *Archipelago of C.* includes sixty other small islands, only half of which have inhabitants. The principal of these islets are Lemuy, Calbuco, Llaicha and Quinchao.

Chil'tern Hills, a chalky ridge across England, from Wilts, through Berks, Oxford, and Bucks, to the borders of Suffolk. The range is in great part from 15 to 20 miles in breadth, and its greatest height is Wendover, with 905 feet of an altitude.

Chiltern Hundreds.—The office of 'Steward of the C. H.' was established under the crown for the purpose originally of suppressing the bands of depredators who infested the forests of the Chiltern Hills. It began, however, to serve its singular modern political purpose about 1750. Besides this, there are also the stewardship of the Manor of Poynings, East Hendred, and Northstead, and the Escheatorship of Munster. A member of the House of Commons is unable to resign his seat unless through his acceptance of a place under the crown, but the now nominal appointment to any one of the above continues to be regarded as such an office, and thus affords a means of resigning. The office is almost invariably granted when applied for; no salary attaches to it; and it is usually resigned immediately after acceptance. As three such offices exist, there is no fear of the retirement of a member from the House being unnecessarily delayed.

Chimæ'ra, a fire-breathing monster of Greek mythology. Homer represents it as of divine origin, and as having the front of a lion, the tail of a dragon, and the body of a goat. It was killed by Bellerophon. In works of art it is represented as a lion with a goat's head springing from its back. The myth of its breathing fire is sought to be explained by a reference to the volcano of C. in Lycia, mentioned by Pliny and Mela. The name has since been given to any irrational product of a disordered fancy.

Chimæra, a genus of Elasmobranchiate fishes, forming the type of the sub-order *Holocephali*. These forms, represented by the *C. monstrosa* or 'King of the Herrings,' and by the *Callorhynchus Australis* of the S. Seas, possess a persistent notochord in place of the spine. The jaws are bony, and the scales are of the placoid kind. The mouth exists at the extremity of the head, and a single gill aperture only exists. The ventral fins are situated posteriorly, and the tail is heterocercal. Fossil species allied to the C. (genera *Elasmodus*, *Ischiodus*, &c.), occur in Mesozoic and Tertiary rocks.

Chiman'go, a species of Raptorial birds, belonging to the *Polyborinæ* or *Caracaras* (q.v.), found in S. America, and, according to Darwin, commonly associated in its habits of feeding on garbage with the Carrancha of Brazil. It possesses all the distinctive characters of the *Polyborinæ*, and by Darwin is said to be 'generally the last bird that leaves the skeleton' of its prey. He adds that it 'may often be seen within the ribs of a (skeleton) cow or horse like a bird in a cage.'

Chimbora'zo, the loftiest summit in the Andes of Quito, is 20,608 feet above the sea, and was once believed to be the highest mountain in the world. It is an extinct volcano, and has a trachyte peak, covered with perpetual snow. Humboldt (23rd June, 1802), ascended C. to within 2138 feet of its top, and Boussingalt and Hall (15th and 16th December, 1831) to within 1729 feet. The assertion of the French traveller Remy that he reached the summit (3rd November, 1856) in a mist 'without knowing it' is not generally credited.

On the 26th December, 1879, Edward Whymper commenced the ascent of C., and in his book, *Travels amongst the Great Andes*, he narrates how he reached the top on 4th January following, when he discovered that the true height of the mountain is 20,608, and not 21,425, as stated by Humboldt.

Chimere', the black satin robe worn by a bishop, on which the lawn sleeves, or the sleeves of a rochet, are sewn. In the time of Henry VIII. and Edward VI. it was scarlet, and was probably the sleeveless habit of a D.D. Objections were taken to this colour by Dr. Hooker, and the colour was changed to black.

Chimes, a set of bells in a church (or other) tower, also music performed upon such bells. See BELLS.

Chim'ney (Fr. *cheminée*, Ital. *camminata*, from Lat. *caminata*, der. of *caminus*, used by Vitruvius for a chimney). In the dwelling-houses of the ancients, the smoke and heated gases from the fireplace were, in general, left to find their way out of a room by openings in the roof or walls, and it is very doubtful whether either the Greeks or the Romans used any more satisfactory method than this. Modern chimneys were not known in this country until about the 12th c., and it is not until nearly four hundred years later that they appear to have been thought essential to every fireplace in a house.

The business of a C. is twofold—first, to carry off the smoke, and prevent its disagreeable presence in the room; and, second, to create a draught through the fuel, so as to consume it the more quickly and effectually. This latter function of the C. depends on the fact that hot air is bulk for bulk lighter than cold, so that when any column of heated air is allowed to communicate freely with the atmosphere at top and bottom, the cooler air continually pushes the hot air upwards, and thus keeps up a circulation.

If a C. be well designed in the first place, by having an opening as nearly as possible over the fire, a somewhat contracted neck, and a tolerably straight flue, it should never give any trouble by smoking. But if these points have been neglected, it is often very difficult so to alter the defectively formed C. as to prevent smoking. This nuisance is caused by down draughts, which most frequently result from the position of the top of the C. being such as to expose it to side currents and eddies of air. The most simple means of neutralising the effect of these is the fitting of revolving cowls upon the C.-pot, these cowls being so arranged that their openings always point away from the direction from which the wind is blowing. It is only in some few cases that the alteration of the flue or fireplace becomes absolutely necessary.

Chimborazo.

The chimneys of large factories are sometimes of extraordinary height, and their construction presents difficulties of no mean order.

The chimneys of steamers are commonly made, for convenience and lightness, of wrought iron, as also are those of locomotives. For factory chimneys, however, this material is not nearly so well adapted as the brick or masonry almost invariably used in their construction.

Chim'panzee, one of the highest or Anthropoid apes, included in the *Catarhine* section of the order Quadrumana (q.v.). The C. is the *Troglodytes niger* of naturalists; the Gorilla (q.v.) being the *Troglodytes gorilla*. This ape occurs chiefly in Western Africa, and inhabits much the same territory as the last-mentioned animal. The hair is nearly black in colour—hence the specific name *Niger;* but age is said to tint it with grey. The hair of the chest and abdomen is thinner than that of the limbs; and the hairs of the arm and forearm meet in opposition at the elbow to form a tuft, as in the gorilla. The nostrils are flat and oblique, and the muzzle projects. The C. approaches the human type of structure most nearly in the character of the skull, in its dentition, and in the relative size of the arms. It attains a height somewhat greater than that of the orang, which rarely exceeds 4½ feet in height. The arms in this species measure half as much again as the height of the body. The hand is equal to, or may be a little larger, than the foot; and as the sole of the latter can be placed flat on the ground, the C. can stand erect and run. Like the gorilla and orang, it often rests itself by leaning forward on the knuckles of the hand. It appears to be gregarious in habits, and its food consists chiefly of vegetable matter.

1, Hand; 2, Foot; 3, Skull.
Chimpanzee.

China Bark, a common name for Cinchona Bark (q.v.), especially in Germany.

China Grass. See BŒHMERIA, CORCHORUS, and SIDA. C. G. cloth is now used to some extent in Europe, being valued for its transparency and glossy appearance.

Chinande'ga, a town of Nicaragua, Central America, on a small river of the same name, 10 miles inland from the Pacific, is scattered over a wide area, and has a trade in cotton, sugar, maize, hides, &c.

China Root, the tuber of *Smilax China*, a kind of Sarsaparilla (q.v.), a native of China, Japan, and E. Indies. C. R. is possessed of diaphoretic properties.

Chin'cha Islands, three in number, belonging to Peru, and situated about 12 miles from the coast, in Pisco Bay, lat. 13° to 14° S. They have since 1840 been famous in Europe for their great guano deposits, which, since 1836, have formed the principal source of Peruvian wealth; but which are now becoming rapidly exhausted. They are named respectively N., Middle, and S. Islands, have an aggregate area of about 400 acres, are rocky and precipitous on the landward side, destitute of water, and without a trace of vegetation. From time immemorial they have been the resort of large flocks of penguins and other sea-fowl, the droppings from which, covering the surfaces and filling the crevices of the rocks, have formed immensely valuable stores of guano. The first cargo of guano was shipped to England in 1840.

Chinchill'a, a genus of Rodent (q.v.) quadrupeds, usually included in the family of the *Cavidæ* (Guinea-pigs, &c.), and found in mountainous districts of Peru and Chili. The average length of the C. is 14 or 15 inches including the tail, which makes up one-third of the measurement. The hind limbs are much larger than the fore, and the tail is clothed towards its tip with long hairs. The fur is of a light-grey on the upper, and whitish-grey on the under parts, and is of very fine texture. The food consists of roots, which it digs out by means of its powerful paws. When feeding, it sits on its hind limbs, and conveys the food to its mouth with the fore paws. There are five toes on the front, and four on the hind feet. The ears are large and prominent. The fur is manufactured into muffs, mantles, cloak-trimmings, and other articles.

Chinchilla.

Chinchilla, a walled town in the province of Albacete, Spain, 10 miles S.E. of Albacete; has manufactures of woollens, linens, leather, glass, &c., and an old church in which there are several fine pictures. Pop. 3368.

Chin-Chin, a gummy varnish used in China and Japan, and believed to be derived from *Plocaria tenax*.

Chinchon', a town in the province of Madrid, Spain, 25 miles E.S.E. of the metropolis, overlooks the Tagus, and has slight industries of linen, leather, and earthenware. Pop. 4961.

Chindwar'a (Chhindwará), chief town of an executive district of the same name, Nerbudda division, Central Province, British India, is situated at an elevation of 2100 feet, has a clear, healthy climate, and attracts many invalids. Pop. town 8973, dist. 407,494. The area of the district is 3915 sq. miles, and the chief crops are wheat, oil-seeds, sugar-cane, cotton, fibres, tobacco, and vegetables. The chief manufacture is cotton-weaving.

Chinese Empire, the oldest, most populous, and, after the Russian and British empires, the greatest in territorial extent in the world, may be said to occupy the whole of the eastern division of the Asiatic continent S. of Asiatic Russia and E. of British Burma. Besides *China Proper*, it includes Manchuria, Mongolia, Eastern Turkestan, Jungaria, and Tibet (q.v.). The suzerainty of the Chinese emperor was until recently acknowledged by the tributary kingdoms of Corea, Burma—which in 1875 resorted to its former custom of paying tribute to the imperial treasury, and thus reassumed the duties and obligations of a Chinese feudatory—Siam, and the minor states of the Indo-Chinese peninsula. Now, however, the whole of Burma Proper has been taken over by Great Britain, Siam has become more or less dependent upon France and altogether independent of China; Cambodia, Cochin-China, and the other smaller states in the peninsula, have fallen under the protection of France, and in 1895 the independence of Corea has been secured by the Japanese conquerors. Tibet and the *extra-mural* states of the empire—that is, those lying to the N. of the Great Wall of China, viz., Manchuria and Mongolia, as well as the states which pay tribute, but over which China exercises no direct administrative control—are each treated separately, and attention is here directed to the central and sovereign state of the empire, China Proper.

China, *Tsin*, or *Shih-pā-sang*, 'the eighteen provinces,' was called *Chin* by the inhabitants of India, from whom the Spanish and Portuguese adventurers of the 16th c. (the first Europeans to open up the Indian seas to commerce) obtained some knowledge of the country, the Indian name of which they altered into the Latinised form of *China*. The Tartar tribes in the N. gave to the country the name of Katai or Cathay, by which it was vaguely known in Europe during the Middle Ages. It is also called the 'Middle Kingdom,' a name which is appropriately applied to the central and principal state of an extensive empire. China Proper is divided into eighteen provinces, exclusive of the frontier province of Shing-king (q.v.) between the province of Chi-li and the Corea, and of the islands of Hainan and Formosa. In configuration it is singularly compact; it is of nearly uniform length and breadth; its coast-line is regular, with no deep indentations, and with only two notable peninsulas, Quang-tung or Lien-chow peninsula between the Gulf of Tonquin and the China Sea, and the Shan-tung peninsula between the Gulf of Pe-chi-li and the Yellow Sea. But though there are few deep indentations, there are numerous inlets, and the excellent harbours on these and on the mouths of the rivers are almost countless. The almost numberless islets that stud the E. coast lie as a rule close to the shore, while of the two great islands, Hainan, in the extreme S., is separated only by a narrow strait from Quang-tung peninsula, of which it doubtless at one time formed a part, while Formosa, in the E. Sea, is separated from the mainland by Fu-kien Channel, about 100 miles broad.

Boundaries, Area, Population.—China Proper is bounded on the N. by Manchuria, tapering off into the peninsula of Corea, Mongolia, and the dependent parts of Chinese Tartary; on the W. by Tibet and Burma; on the S. by Cochin-China or Anam and the China Sea; and on the E. by the Gulf of Pe-chi-li and Yellow and Eastern Seas—arms of the N. Pacific Ocean.

The following is a list of the provinces, with their areas and populations, given approximately; nothing can be definitely known by Europeans, for even if the authorities had the power to carry out a correct census, they would, as anyone acquainted with the Chinese character can well understand, most certainly decline to give Europeans accurate information on the subject.

Provinces.	Area in Sq. Miles.	Population.
Chikiang or Chehkiang	38,000	11,500,000
Fukien	39,000	23,000,000
Honan	66,900	22,200,000
Hunan	74,300	21,000,000
Hupeh or Hupe	70,500	33,400,000
Kansu	125,500	9,300,000
Kiangsi	72,200	24,500,000
Kiangsu	44,500	21,000,000
Nganhoi or Nganhwei	48,500	20,500,000
Pechili	59,000	17,900,000
Quangtung or Kwantung	74,500	27,000,000
Quangsi or Kwangsi	78,000	5,200,000
Queichu or Kweichow	64,600	7,700,000
Shansi	56,200	12,300,000
Shantung	53,800	36,300,000
Shensi	67,400	8,500,000
Szechuen	166,800	68,000,000
Yunnan	108,000	12,000,000
Island of Hainan	14,000	3,000,000
*Island of Formosa	15,000	3,500,000
Total	1,336,700	387,800,000
Dependent States—		
Jungaria	148,000	600.000
Manchuria	362,300	7,000,000
Mongolia	1,288,000	2,200,000
Tibet	651,500	6,250,000
Turkestan (Eastern)	432,000	600,000
Total	2,881,800	16,650,000
Grand Total	4,218,500	404,450,000

* Ceded to Japan in 1895.

Mountains, Rivers, Surface.—The physical geography of no country of equal extent is less complex than that of China. The gradually lowering spurs of the vast mountain system of the Himalaya enter the country from Tibet on the W., and traverse it in two main ridges, the general trend of which is from W. to E., but which throws out a number of lateral branches. Of these two main ridges, the *Nan-ling* ('Southern Range') extends in broken chains over the provinces of Yunnan and Quei-chu, exhibiting rugged mountains and fertile and abundantly watered valleys. From the eastern border of Quei-chu the Nan-ling extends E. and N.E., forming the frontier line between the provinces of Quang-tung and Kiang-si on the S. and those of Hu-nan and Hu-pe on the N., and finally bending E. and forming the southern boundary of the basin of the lower Yang-tse. Another branch of the Nan-ling stretches E.S.E. from the southern border of the province of Hu-nan, forming the northern limit of the wide valley of the Si-kiang river, which ultimately becomes the Chu-kiang or Canton river. The *Pe-ling* ('Northern Range') enters the province of Sze-chuen from the W. In this province the mountains are irregular, and numerous peaks, especially in the sub-range known as the Snowy Mountains, rise above the line of perpetual snow. From Sze-chuen the main chain traverses the province of Kan-su, where there are several subsidiary ranges, and where the valleys are numerous but small in extent. The chain crosses Shen-si into Shan-si, through the S. part of which it is continued into Hu-nan. The range seems again to cross upon the eastern bank of the Hoang-ho, and occupies the greater part of the province of Shan-si. The generally eastward trend of these mountain ranges determines the courses of the great rivers. The principal are the Si-kiang or Chu-kiang, flowing eastward S. of the Nan-ling range, through the southern provinces to Canton; the Yang-tse, flowing E. through the great central valley of the country between the Nan-ling and the Pe-ling mountains; and the Hoang-ho, flowing, in its lower course, through the valley to the N. of the main branch of the Pe-ling range. The other important streams of the country are either tributaries of these great rivers, or, like them, they flow eastward into the China, Eastern, or Yellow Sea, or into the Gulf of Pe-chi-li. The surface of the country presents every variety, from Alpine regions, where loftier peaks than those of Switzerland tower higher above the line of perpetual snow, to far-extending tracts, flat, alluvial, and fertile as the Netherlands, but infinitely more extensive. From the western frontier of China (about 100° E. long.) eastward to the middle of the country, or to about the meridian of 112° E., the surface is mountainous. In the N., especially in the province of Shan-si, the mountainous region extends 100 miles farther E., or to about the meridian of 114° E. In this western half of the entire area, immemorial forests clothe the mountains, and immense beds of coal occur. E. of this mountain region, the middle of the country is occupied by the great alluvial plain of the Yang-tse and Hoang-ho, extending northward from lat. 30° to 40° N. The Great Plain of the basin of the lower Yang-tse is about 700 miles in length, and varies in breadth from 150 to 500 miles. Its area (210,000 sq. miles), though greater than that of France, forms only a sixth part of China, yet it contains nearly one-half of the entire population, and is the most densely inhabited portion of the earth's surface. In the six fertile provinces that lie either wholly or in great part within it, 180,000,000 persons are supported. The remainder of the country is hilly or undulating. The lakes of China are numerous, the chief being the Tong-ting Lake in the N. of Hu-nan, about 250 miles in circumference, Lake Po-yang in Kiang-si, 180 miles in circumference, and the Tai-hu, or Great Lake, near Shanghai, 150 miles in circumference, and from 10 to 15 feet deep. All the lakes and rivers are abundantly stored with fish, and multitudes of families living on their banks, or in junks or floating houses on their waters, are maintained by the fisheries.

Geology and Mineralogy.—The mountain system of China, the outline of which has already been given, consists for the most part of granitic and metamorphic rocks, and to this bold and broken formation the rugged and picturesque character of so much of the scenery of China is due. In the valley of the Yang-tse cretaceous rocks and Tertiary beds occur. All classes of rocks containing metalliferous veins are largely present in this country. The whole of Northern China, embracing the greater portions of the provinces of Shan-tung and Pe-chi-li, and the whole of the provinces of Shan-si, Shen-si, and Kan-su, may be described as one vast and inexhaustible coal-field, while smaller fields occur in almost every other province. These strata are associated with varieties of iron ore, among which there are great fields of black oxide, the finest ore in the world. Fine limestone occurs in all directions, and gold—especially abundant in Yun-nan, in the S.W.—silver, tin, and copper are found in all the 'hill' provinces. In the province of Shan-tung there are four great coal-fields; and coke, which is manufactured in immense quantities, is used for smelting silver, and for other processes requiring great heat: iron, gold, and galena abound in numerous localities. Tertiary deposits cover the plain of Pe-chi-li, and among the hills limestone, granite, and metamorphic rocks prevail. There are numerous coal-mines, very inefficiently worked, and gold, silver, iron, and tin exist in many localities. In Shan-si, in which the mineral resources are great and varied, coal—bituminous, anthracite, and lignite—and silver, copper, and iron are plentiful. In Shen-si, Kan-su, and Ho-nan, all the minerals and metals named, together with quicksilver, exist in large quantities. Gold is common in the majority of the streams, and jade, agates, amber, iron pyrites, sulphur, and petroleum are obtained in many places. Gold and the other valuable metals are also pretty generally distributed on the alluvial flats and slopes of the western mountains trending N. and S., as well as in the southern province of Quang-tung. As a mineral product of China, porcelain is of the first importance in beauty and utility. The porcelain manufactories of the country are few in number, but are upon a large scale. The largest is named King-tu-ching, in Kiang-si, near Lake Po-yang, where there is an inexhaustible supply of the peculiar clay and silica from which the best porcelain is made, together with extensive coal-mines, whence fuel is obtained for the furnaces. The curious loam-terraces in the northern provinces, everywhere excavated into houses and villages, mark, according to Pumpelly and Williamson, the sites of former lakes and the channels of streams, and especially of the great river-system of the Hoang-ho or Yellow River, the course of which has suffered deflection from natural causes within our own time, and which appears to have been subject to similar vicissitudes prior to as well as during the historic period.

Canton, from the Temple of the Five Genii.

Climate, Soil, and Agriculture.—Extending in lat. from 18° 10′ to 44° 50′ N., and from long. about 97° 30′ to about 126° 10′ E., it is only natural to expect that the climate of China should vary in the different quarters of the country. The climate of the coast districts is widely different from that of the remote interior, and even among the coast districts themselves the climate varies, the meteorological conditions being quite different at Canton in the S. and at Pekin in the N. A peculiarity of the climate in general is the low average of the temperature, taken in connection with the fact that a part of China is within the tropics, and that the latitude even of Pekin, in the extreme N., is a degree to the S. of that of Naples. The mean annual temperature of Canton and Macao, which are within the tropics, is no higher than what is usually registered in places on the 30th parallel; while the mean annual temperature of Pekin is ten degrees lower than that of Naples. In winter severe cold is experienced in the northern provinces, though in midsummer the heat is oppressive. The average rainfall is 70 inches in the extreme S. There the N.E. monsoon commences in September and continues till February. The S.W. monsoon, which brings with it the annual rains from the heated ocean to the S., commences in March or April. The hottest months are July, August, and September. In these months the heat is oppressive and exhausting, and it is at this season, when the air is in a condition of extreme rarefaction, that the dreaded typhoons occur. China is a perfect hotbed for virulent and endemic diseases. This is accounted for by the extreme heat and humidity of the climate in summer, the absence of proper sanitary arrangements in the crowded houses on the swarming rivers, and the thronged villages and towns. Famine, arising from the frequent droughts and inundations, too frequently accompanies disease, and fearful destruction is often caused among the people who live afloat by the typhoons that annually visit the southern coasts. The estuary of Canton river is especially subject to these hurricanes, which are understood to spring from that quarter of the Pacific Ocean of which the Philippine Islands are the centre. Though most frequent in the S., they ravage the harbours all along the E. coast as far N. as Shanghai. In the northern and inland provinces of China the climate is pleasant, and in many localities delightful. The *soil* of the country is as various as its climate. There are tracts of champaign country like France and Belgium, swampy districts like Holland, and barren mountain regions. The richest soil is formed by the detritus of the innumerable rivers, and is found occupying immense tracts in the basins of Hoang-ho and Yang-tse, and composing the substance of their deltas.—*Agriculture*, the chief industrial pursuit of the Chinese, is considered a choice occupation, not only by the people but by the nobles and learned men, while even the Emperor himself condescends to plough a furrow on the occasion of the great annual festival of husbandry. All the land is vested in the Emperor as universal landholder. There are four great tracts in which the soil is fertile, and the agriculture specially efficient :—(1) The maritime provinces S. of the Nan-ling, in which the climate and productions are tropical, and the land cultivated like a garden up to the slopes of the forest-clad mountains. (2) The N. and E. slopes of the Nan-ling, in which the tea-shrub and the camphor and varnish-tree (*Dryandra cordata*) are indigenous. (3) The great plain of the Yang-tse, with mild climate and its immense cotton and woollen culture, its vast paddy-fields and tracts of sugar-cane; and (4) The grain-farming land between the Hoang-ho and the mountains in the N.

Vegetable Productions and Animals.—The vegetable productions of China embrace all the fruits, vegetables, and grain grown in temperate as well as in tropical climes: in the tropical provinces of the S., mangoes, grapes, pine-apples, pomegranates, the lichi, the varieties of orange. The tea-shrub is universally cultivated in the warm and sheltered districts; and rice, the staple food of the Chinese, is raised in immense quantities both upon wet, or rather muddy fields, and on dry soils, where its cultivation is carried on like that of ordinary grain. In the N. maize, barley, and wheat are extensively grown. Floriculture is universal. Water-lilies float on every sheet of still water. Artificial islands, constructed on the lakes, are all so many floating gardens; and the care with which the gardeners' azaleas, viburnums, and the host of brilliant flowers are carefully reared in the gardens and nurseries of China justify the application to that country of the name 'Flowery Land.' The tobacco plant and the poppy are also cultivated, and opium is an important article of manufacture. *Animals.*—The zoology of a country so densely peopled and so generally cultivated is not rich in the larger wild animals. The Bengal tiger, however, occurs in Yun-nan, and the bear infests the woods and rocky ravines of the mountains. Wild cats are common in the forests of the S., and are caught and fattened in cages for the table. Muck and moose deer are found, and the buffalo is used to a limited extent in agriculture. Human labour, however, is so cheap in China, that beasts of burden are not so numerous as in most other countries. The sturgeon, sole, flat fish, rock-cod, and the golden carp are very abundant. Locusts visit the southern districts in numbers inconceivable. The air is at times darkened with their flight as with a thundercloud, and the ground is sometimes seen covered with these animals—which are from 3 to 5 inches long—two or three deep.

Great Wall of China.

Industries and Arts.—The cultivation of rice, tea, cotton, hemp, sugar, and grain, and the manufacture of silk, opium, paper, porcelain, and lacquerware, are the principal industries. Curious carvings in ivory and mother-of-pearl are among the most interesting of the minor industrial products. The art-productions in drawing and painting betray an entire want of knowledge of perspective and of light and shade. The musical instruments of the Chinese embrace primitive and crude types of most of the European instruments, but no improvements have been made upon them for ages. The native music is shrill, harsh, and aimless to a European ear, though to the Chinese European singing and music is *disgusting* (an expression implying an incentive to nausea and sickness); many of the Chinese national songs are plaintive airs in the minor key, like the old national melodies of Scotland, Ireland, and Wales. The artistic genius of the country, however, is best displayed in its admirable pottery enamelled-work, engraving on wood and stone, its carvings and antique vessels in bronze, its filigree-work in gold and silver, and its fine lacquerware. The vigour of the inventive and artistic genius of the country in earlier ages, while intellectual life was a living and growing principle among the Chinese, and before the slavish and indiscriminate conservation which their religion inculcates had put a stop to progress, and unalterably stereotyped all ancient forms, however crude, as unsurpassed and unsurpassable, is attested by the fact that China anticipated Europe in many of the most important discoveries of modern times. It is certain that the art of printing was practised in China in the 10th c. Gunpowder was known and used (in the manufacture of fireworks) from a very remote period. The property of loadstone to communicate polarity to iron was understood during the 1st c. of our era, and a Chinese Encyclopædia of the date A.D. 121 describes loadstone as 'a stone with which direction can be given to the needle.' In a work written a hundred years later, the use of the compass is explained. To the Chinese also is due the discovery of the methods of manufacturing silk, paper, and porcelain, which they have carried to higher perfection than any nation in the world.

National Works, Monuments, &c.—The most renowned of the great national works of China is the Great Wall, which, from long. about 98° 30′, is carried eastwards over twenty degrees of long. along the N. frontier of China, over mountains and through valleys, and on bridges across rivers, to the Gulf of Leao-tong,—a distance of 1400 miles. It was built 210 years before the Christian era, as a protection against the inroads of nomadic Tartar tribes. Constructed mainly of earth and rubbish, it is bound in on each side by a coating of brick, and fortified at intervals by towers, which still in many instances have an imposing appearance. The Great Wall is from 15 to 30 feet high, rests on a basis of stone 2 feet thick, is 25 feet thick at the base, and from 15 to 20 feet at the top or platform. The towers are 40 feet square at the base, taper towards the top, and are about 37 feet high. The wall has long been entirely useless as a defence; it has consequently been neglected, and about one half of it has fallen to ruin, and is now little better than a shapeless mound of rubbish. The Grand or Imperial Canal extends from the town of Hang-chow (lat. 30°), in the province of Chi-kiang, N.W. through the maritime provinces of Kiang-su and Shan-tung to the town of Ling-ching (lat. 37°) on the river En-ho,—length about 700 miles. From Ling-chin the river En-ho is available as a continuation to Tien-tsin at its mouth. This great canal was constructed not merely to afford means of communication, but also to drain the plains that lie around the lower courses of the Yang-tse and Hoang-ho. With this view its breadth is unusually great. It is led across numerous rivers, including the two great rivers of China;

and owing to the continual action and reaction of the waters of these streams, there are very few reaches of the canal which are without a distinctly noticeable current. At several points it is cut through rocks; it traverses lakes, and drains numerous swamps. The number of the flood-gates that regulate it, the bridges that span it, and of the cities and provinces between which it forms (with its many branches and the innumerable rivers with which it is connected) a vast, easy, and cheap system of communication, constitute it one of the greatest national works in the world. The part of the canal extending southward from the former bed of the Hoang-ho (q.v.) was constructed during the 7th, or early in the 8th c. The remainder, extending N. through Shan-tung and Pe-chi-li, was the work of Kublai Khan (in the 13th c.) and his successors. Prior to 1853, when the lower course of the Hoang-ho was deflected from E.S.E. to N.E., the rice-fleet, bearing about 430,000 tons annually, passed northward by the canal from the southern part of the great plain of the Yang-tse to the neighbourhood of Pekin, and thus avoided the delay, and the liability to storms and the attacks of pirates, to which the sea-voyage along the winding coast exposed it. The deflection of the great river, however, and the consequent withdrawal of the water-supply from an important reach of the canal, have rendered it impassable for junks. Another great national work, the Mei-ling Pass, across the Nan-ling or southern mountain range, at the height of 8000 feet above sea-level, is a feat of labour and engineering which will compare with any of the Alpine passes. Across this pass nearly all the tea shipped at Canton, prior to the opening of the treaty-ports in the E. and N., was carried on the backs of porters, 200,000 of whom are said to have been engaged in its transport. After the opening of the treaty-ports, which were found to be nearer the great tea-districts than the port of Canton, the traffic over the Mei-ling Pass dwindled away. The empire is also traversed in all directions by great roads, usually from 70 to 80 feet broad in the plains, lined with trees, and carried across rivers by great bridges, which are often built of marble and adorned with innumerable fantastic figures of lions, tigers, dogs, and monkeys. Good cart-roads, also, connect all towns and villages of any importance. The monuments and gigantic idols and carved images of China are a special feature of the country. There are numberless statues in wood and clay of famous emperors and eminent men, mostly of colossal size and gilded. The statue of Confucius, which may be seen standing alone in all the numberless temples dedicated to the memory of the great sage, is never gilded, but is remarkable for its placid expression of features and sombre drapery. Before the tombs of the emperors of the Ming dynasty, in the neighbourhood of Pekin and Nankin, are ranged processions of gigantic figures—men, horses, camels, elephants—in stone.

Trade and Commerce.—The trade of China proper, consisting of an interchange of commodities between its inland provinces and the Russian, Tartar, and Indo-Chinese states on its borders, is very active and extensive, but no official statement of its extent is available to foreign officials. Of the foreign trade or commerce of the country, however, the British consuls at the different ports are in a position to furnish annual returns. Of the ports of China, twenty-four have been thrown open to foreign commerce. The whole of the foreign trade of China—with the exception of one-seventh, which is carried on with the United States and other foreign nations—consists of commerce with Great Britain and its Indian Empire, and with the British possessions of Hong-Kong and the Straits Settlements. The import trade from Great Britain, exclusive of Hong-Kong, passes through Shanghai, Hankow, and Tientsin; while most of the exports to Great Britain are despatched from Shanghai, Foo-Chow, Hankow, and Canton. During the last fifty-four years Great Britain has entered into treaties with the Chinese government, and under these certain ports, called treaty ports, have been thrown open to British commerce. These now number twenty-four, four of which are in the province of Quan-tung, three in Formosa, and three in Kiangsu.

The following tables furnish some information concerning the trade of China:—

Country.	1893.	
	Total imports from—	Total exports to—
	£	£
Great Britain	5,631,215	2,333,942
Hong Kong	16,178,193	9,658,052
India	3,347,912	547,085
U.S. of America	1,088,714	2,345,109
Europe (excluding Russia)	1,043,182	3,171,016
Russia	174,766	1,876,783
Japan	1,570,414	1,867,595

Of the imports to Great Britain more than half in value consists of tea. The following table points out the quantity imported each year from 1889-93 and its value:—

Year.	Value in £.	Quantity in lbs.
1889	3,503,011	88,558,037
1890	2,813,060	73,743,124
1891	2,403,478	62,283,778
1892	2,055,943	57,050,708
1893	1,990,107	56,208,058

Besides tea, the following are the chief exports and the value of the amount of each commodity exported in 1893:—

Raw and manufactured silk	£7,602,805
Sugar	463,743
Paper	351,361
Chinaware, &c.	235,767
Clothing	365,919
Straw-braid	485,816
Hides	150,549

£6,338,279 represented the value of opium imported in the same year, while £9,027,594 was that of cotton goods; £1,152,219 of oil; £1,064,047 of seaweed and products of the sea; £419,212 of coal; and £1,419,684 of metals.

Government.—The present Emperor of China, Tsai-tien, succeeded to the throne in 1875, as explained hereafter at the end of the portion devoted to *History*, on the death of Tung-che, who was nominated to the thrône by his father, Hien-fung (died 22nd August, 1861). In the Chinese constitution (which is written in the Ta-tsing-whei-tien, or *Collected Regulations of the Great Pure Dynasty*), the Emperor, or Whang-ti, is supreme legislator, administrator, commander-in-chief, criminal judge, owner of the soil, and arch-priest. He is called Tien-tse, or Son of Heaven, and theoretically rules over Tien-hin, or all under the skies. The only qualifications of the prerogative are that the Whang-ti must govern according to the classics, and that he is disqualified by incapacity or wickedness, the people having a right to rebel in cases of 'prolonged famine, pestilence, or hordes of robbers.' They have no voice in the election of magistrates, the making of laws, the imposition of taxes. The Whang-ti is visited every morning by the Keun-ki-chu, or Cabinet Council, and on invitation by the Ne-kö, Inner Council, or Great Secretariat. The Li-fan-yuen, or Colonial Office, has charge of Mongolia and Tibet. It includes a Chamber of Compassion for 'fan,' or foreigners, a term which does not extend to outer barbarians, such as English. The Han-lin, Great College of Learned Men, literally Pencil Forest Hall, includes the various Ta-hyo-si, or ministers of state, who see that the constitution and the maxims of Confucius are obeyed, and who collectively control the six Boards of Offices, Revenue, Ceremonies, Military Affairs, Punishment, and Works. This last includes the Chambers of Architecture, Government Stores, Hydraulics, and Mausoleums. The Han-lin is properly a senate to test literary attainments, on which office depends. The Board of Ceremonies is subdivided into the Chamber of Etiquette (which regulates marriage, funerals, public rejoicings, &c.), the Chamber for Regulating Sacrifices, the Chamber for Mutual

Intercourse (which provides a reception for illustrious strangers), a Chamber for Arranging Festivities or Imperial Banquets, and the Board of Music. Quite apart from the executive, but represented at the meetings of all the boards, and having a general power of direct remonstrance or petition to the throne, is the Tu-chah-yuen, or Board of Censors, whose business is to watch the proceedings of mandarins. In each province is a Swuin-fu, or governor, who has the sole power of addressing the throne or council, has the power of life and death, and is the military commander. His office is generally forfeited by the occurrence of a rebellion. Beneath him in each province are the Pie-chung-si, or superintendent of provincial taxes, which he receives from the magistrates and accounts for to the governor; the Ngan-cha-si, or provincial criminal judge, who receives and reports on persons sentenced by the district magistrates to death or banishment; and the Hioh-tai, or educational examiner, who corresponds with the Han-lin, and conducts along with the prefect the primary examinations for the literary degree in the departmental cities. Several departments, grouped together within a province, are placed under a Tau-tai, or intendant of circuit, who has charge of the customs, corresponds with foreign consuls, and hears appeals from the court of the prefect. One species of Tau-tai, the Ping-pae-tau, has a military command, and draws money from the treasury for troops which have often no real existence; another, the Yeu-yun-tau, is sometimes called the salt commissioner. The single department, or 'fu,' is presided over by a Chi-fu, who hears appeals from the lower courts. The 'fu' is divided into several 'liens,' about the size of English counties, in which the Chi-lien or chief mandarin is the sheriff, police superintendent, coroner, receiver of taxes, and literary examiner. Under him are the assistant district-magistrate, inspectors, masters of prisons, writers, tax-gatherers, constables, &c. It may be useful in connection with these names to add the meanings of some terminations constantly used in Chinese:—*Shau*, a hill; *Chung* or *Cheng*, a city; *Chwang*, a large village; *Tsun* or *Tun*, a village; *Kwan*, a fortified pass; *Mun* or *Men*, a gate; *Kow*, a port; *Kiai*, a market street; *Ho*, a river or canal; *Kiang*, a great river; *Hu*, a lake; *Yamun*, a mandarin's office; *Wang*, a prince. Little is accurately known as to the public revenue of China. It would be unsafe to infer anything from the amount of the custom-duties. In 1874 China for the first time contracted foreign debt, viz., £627,675, issued at 95, bearing 8 per cent., and secured on the custom-duties. In July, 1878, another custom-secured loan of £1,604,276 at 8 per cent. was raised, followed by £1,505,000 in 1884, £2,250,000 in 1886, £250,000 in 1887, £3,000,000 in 1893, and £2,000,000 in 1895. The capacity of absorbing European capital was considered to be fairly great in the case of Turkey and the S. American Republics, but it is likely to be reckoned of little account whenever the voracity of China may be compared with the modest applications by the former countries. It may be explained that the Chinese tael = 10 mace = 100 caudareens = 1000 cash = 3s. 11¼d. sterling. It is part of the duty of the mandarins to read periodically to the people from the *Book of Sacred Instructions.* Besides this, the penal laws are printed and circulated among the people (nearly all of whom can read and write), so that no one may plead ignorance of the law for which he is punished. There is in criminal justice a vicarious principle; parents being occasionally punished for the crimes of children, and districts for those of individuals. The Government reserve a power of punishing cases of 'improper conduct' not defined in the penal code. The enormous patronage of the court and the extensive system of espionage contribute to the stability of the empire. See Archdeacon Gray's *History of C.*

Defence.—The army may be divided under two headings; (1) the active or standing army, and (2) the territorial or feudal militia. The former consists of the so-called Eight Banners and the National or Chinese army. The regiments of Eight Banners are drawn from the Manchus, Tartars, Mongols, and Chinese upon whom the present dynasty can rely; these garrison all the great cities, but are shut off by walls and forts from the population. The National corps are not quartered in barracks, but live, as do the militia, in their own houses, and pursue some civil occupation. The Imperial army has been estimated at 850,000 men—678 companies of Manchu and Tartar troops, 211 companies of Mongols and Chinese infantry, and 120,000 men of the militia. Only a comparatively small portion is armed with weapons used in modern warfare, the main body being equipped with bows and arrows, cross-bills, and other such ancient implements. The Tartar cavalry is poorly mounted on undersized and ill-trained horses.

The navy received much attention from the Chinese authorities after the Franco-Chinese War of 1884. Before the war with Japan commenced, which has recently terminated in so disastrous a manner for China, the navy consisted of 2 second class battle-ships, 9 harbour vessels, 50 cruisers, and 41 torpedo craft. The N. squadron was the active fleet, the remainder being raised by, and attached to, certain maritime provinces. Under the able training and administration of Captain Lang of the British navy, the N. squadron became a very fairly efficient, if not actually formidable, marine force; but the jealousy of the Chinamen brought about that officer's resignation in 1891, and the state of efficiency was no longer maintained after he left the service.

Chinese Flower Boat.

In place of boldly advancing upon the Japanese, and attempting to sever their communications between Corea and Japan, the fleet remained in Chinese waters, and, when it came to fighting, although the sailors showed great pluck and an absolute indifference to danger, the Chinese officers turned out to be either traitors, or so grossly ignorant of their duties, that the force under their command played as insignificant a part in the struggle as did the fleet of Turkey in the last Russo-Turkish war.

China possesses at least five arsenals and dockyards, of which the most important is that at Port Arthur, but it is impossible to state how far they are now provided with munitions of war, or with appliances for naval construction. With regard to the navy, such as it is, which still remains in the possession of the Chinese, it is equally impossible to give any definite information.

Religion.—Like the Babylonians, the ancient Chinese erected large square altars and high terraces of earth, stone, and brick. The sacred altars in Peking, on which imperial sacrifices are offered every winter solstice to Shan-ti, are square earthen terraces about 60 yards in circuit, and from 4 to 6 feet in height. There was before Confucius a singular numerical philosophy, which is said to have been received by Ta-yu, B.C. 2200, as a reward for his success in subduing the inundations of the rivers. It contains nine categories—(1) Five elemental energies; (2) five human actions; (3) eight departments of government; (4) five registers of time; (5) the Emperor's perfection in virtue, or himself attaining the summit of virtue; (6) the three virtues; (7) investigation of doubts by the tortoise and diviner's grass; (8) five natural indications; (9) five kinds of happiness and six of misery. This numerical scheme is also seen in the Pa-kwa, or eight diagrams of Fo-hi, a system of whole and broken strokes arranged octangularly, the basis of the 'Book of Changes,' and used on the Chinese mariner's compass. The number eight curiously survives in the number of meats allowed at the imperial dinner, which are bears' paws, deers' tail, ducks' tongues, torpedoes' roe, camels' hump, monkeys' lips, carps' tails, and beef-marrow. Combinations of the five primitive elements are constantly used as the basis of calculation in fortune-telling with the joss-stick, which is largely practised according to printed rules and for fixed charges, chiefly by unsuccessful candidates at the public examinations. This gambling spirit appears everywhere. Tradespeople have bamboo-tubes full of sticks, with numbers burnt into the concealed end, from which the customer draws his price; some even use dice. In the temples, two plane-convex bits of bamboo are tossed by the worshipper, and the omen is good or bad according as they fall; no commercial transaction, no expedition of any kind, however insignificant, ever takes place without an appeal to the 'toss.' It is in his commentaries on the *Ye-king*, the Book of Changes, that the famous Chu-tsze explains the principle of Tae-keih, represented by a circle, on one semi-diameter of which a semicircle is described, and on the other semi-diameter, but in the lower half of the great circle, another semicircle is described. The curved divisions thus obtained represent the *yang* and *yin*, the masculine and feminine, the celestial and terrestrial, the sun and moon. This materialistic theory, resembling the Egyptian fable of the mundane egg and the Brahmanic legends of creation, was applied vigorously to all nature, the whole vegetable and inorganic world being endowed with sex, and numbers themselves having a gender.

There are many minor religions in China, such as Mohammedanism, which is diminishing, but still extensively spread; the Vegetarians of Ningpo, who profess the 'Religion of the White Lily' and the 'No-Hypocrisy Religion,' and distinguish themselves by holding the breath until the face becomes livid and the body stiff; the simple creed of the Pepohoans of Formosa, that the world has existed and will exist for ever, together with its present occupants, who are punished in their next stage of existence for their misdeeds in the present; then the Feng-shui, or Wind-water, *i.e.*, Incomprehensible system, which determines the proper sites of tombs, houses, or cities from the configuration of rivers, trees, and hills. This singular superstition assumes that all evil comes from the S., and that evil travels in straight lines. Hence curved lines are introduced as much as possible; a pagoda or a heap of stones will divert the lines, and protect a considerable district from famine and plague, and most of the temple doors have wooden screens inside, which intercept the evil spirits from proceeding to the altar. Perhaps the strongest among the practical religious feelings of the Chinese is that of predestination. It is well illustrated in a popular almanac of the present day, in which a woodcut represents a fly, a spider, a bird, a sportsman, and a tiger. Each of these animals successively kills his prey, and then they all fall into a well. The chief faith of China has for the last ten centuries undoubtedly been Confucianism, which is not a religion in the sense of having any account of the invisible world, but is a system of self-culture with two great objects—the proper government of one's own family and of the state. It exhorts men to love virtue for itself, without hope of reward or fear of punishment, and it is extremely obnoxious to the Christian missionaries, as laying down the principle that 'man's nature is originally good.' It resembles Christianity, on the other hand, in the importance it attaches in theory to purity of secret thoughts. Practically, however, what distinguishes Confucianism is the sanctity it throws round the existing social relations of dependence and subordination, both public and private. It establishes a power of life and death in the head of the family (*Penal Code*, s. 293), and a despotism (assumed to be benevolent) in the head of the state. The conservative method of Confucius is revealed in the *Li-king*, or Book of Rites, which contains 3000 ceremonial usages, and is administered by one of the public departments. Confucius said: 'I do not know life: how can I understand death?' Hence the state-worship by sacrifices, before referred to, is strictly positivist. Chinese religion, in so far as consciously Confucian, is not, indeed, atheistic, but agnostic. Buddhism, the creed of the Tartar dynasty, began to appear in China about 217 B.C.; and in 120 B.C. a Chinese general, after defeating the barbarians to the N. of Gobi, brought back a golden statue of Buddha as a trophy. In A.D. 65 it was officially recognised by the Emperor Ming-ti as a third state religion. Soon after, the life of Buddha, *Lalita Vistara*, was translated into Chinese under imperial auspices, and three centuries after this began the great stream of Chinese Buddhist pilgrims—Fahian (A.D. 390), Hœi-seng, Song-yun (A.D. 518), Hiouen-thsang (A.D. 648), Khi-nie (A.D. 964), whose travels, along with the *Itineraries* of the fifty-six monks (A.D. 730), are all extant, and some of them translated into European languages. The story of Hiouen-thsang, translated by Stanislas Julien, is a graphic romance and an invaluable history. He returned in honour to China with a great number of Sanskrit works on Buddhism, which he afterwards translated in 1335 volumes. There are now in the Pekin temple wooden blocks for printing upwards of 6000 Buddhist volumes. In Chinese, Brahma became Fan-lon-mo, and Buddha became Fo-to, which was vulgarly shortened to Fo. Buddhism is a creed of ideal purity; its Pentalogue enjoins not only moral duties, but abstinence from marriage and wine. But even these fundamental precepts are disregarded by the mendicant priests of China, whom the best authority has called 'a lying, shameless, wicked class.' They extort money from the poor not merely by begging on false pretences, but by impostures in the temples. Thus, at the shrine of Kuan-yin, goddess of mercy, at Hong-Kong, the goddess prescribes certain drugs, which are sold by an apothecary who has an understanding with the priests; and the priests themselves sell worthless bits of paper as counterfeits for money, which are then burned at the altar—a proof of the Chinese reverence for the 'written word' in whatever form it may appear; even a pawnticket or a newspaper is regarded as something sacred. The centre of Buddhism is the island of Put in the Chusan Archipelago, where since A.D. 550 sixty temples have been governed by an abbot or Tae-hoshang. These are supported by the rent of Church lands, the contributions of pilgrims, and the labour of the priests. Here and there are monasteries of devout and clean men. The great Hall of Saints, Lo Han T'ang, contains 500 gilded images of Buddhist saints, one of whom is supposed to be that good Catholic, Marco Polo, the traveller. The Buddhist pagodas are circular towers, 200 feet in height, containing seven stories, reached by a spiral staircase, each floor having an outside terrace, surrounded by a massive stone balustrading resting on ornamental brackets. They are chiefly found in S. China, and are not known outside China. They were probably built as beacons and watch-towers, and as places of strength in which to guard the relics of Gautama. The tonsure, celibacy, fasting, prayers for the dead at fixed money rates, the baptism in water, the rosaries and chaplets, and the Franciscan dress of the Shamans or Buddhist priests, suggested to Père Gerbillon that they must have been subject to Christian influences from Syria and Armenia. The third great faith is Taouism, which was first taught by Taou or Laou-tsze, a contemporary of Confucius, in the 6th c. B.C. He taught contempt of worldly riches and honour, and thought true happiness was to be found in starving all troublesome wants and living apart in slothful tranquillity. His followers believed that life might be indefinitely prolonged by an elixir, and therefore became alchemists. The mysteries of the Taouist, 'Three Pure Ones,' were announced to man through the 'great barefooted angel,' and are written in the Scripture, Taou-te-king, a copy of which is possessed by the Royal Society. Under the Sung and Tang dynasties this sect became very influential, the title of Tien-sze, or celestial teachers, being given to its professors. Three Taouists, named Chang, excited the rebellion of Yellow-Caps, which put an end to the Han dynasty. But the religion is now represented chiefly by professional jugglers, who traffic in all the grossest superstitions of the people. To the Confucian student the theoretical asceticism of the Buddhist and indifference of the Taouist are both equally culpable; but practically there is very little bigotry shown between the members of the different persuasions.

The three faiths agree, however, in detesting Christianity. This is shown in a poem published in 1874 in the tea-market at Hankow, which, after sarcastically referring to the 'stillness and cleanliness' of Buddhism, and the 'abstruseness and hollow mockery' of Taouism, attacks the gospel *with its secret confusion of sexes.* This spirit is partly political or patriotic, but the spiritual and moral difficulties in the way of the missionaries are enormous. Thus, the Chinese work seven days in the week; there is no restriction on the sale of spirituous liquors, and no drunkenness except from opium; there is no charity, except in the customary support of parents and other relatives and friends; and the result is, that nearly everybody works, although wages are barely sufficient for comfortable subsistence. Accordingly the social evils to be attacked in China are different from those most prominent at home. See Edkin's *Religion in China.*

History.—The fabulous part of Chinese history begins with the Three Emperors, Fo-hi, who invented numbers, music, &c.; Shin-nung, the divine husbandman; and Hoang-ti (B.C. 2637), who divided the land into groups of nine equal squares, of which the centre was owned by the state, and who introduced the cycle of sixty years. Then follow the Five Sovereigns, of whom Chun is connected with the tradition of the Deluge (the overflowing of the Yellow River), and also the first choice by a reigning emperor of his successor, which is still the rule. The following is a list of the dynasties which have since then ruled over China down to the present time:—

The Hia	B.C.	2197—1776
The Chang	,,	1776—1122
The Chow	,,	1122— 255
The Tsin	,,	255— 202
The Han	,,	202— 220 (A.D.)
The Sankoue	A.D.	220— 265
The later Tsin	,,	265— 420
The Song	,,	420— 479
The Tsi	,,	479— 502
The Leang	,,	502— 556
The Chin	,,	556— 580
The Soui	,,	580— 618
The Tang	,,	618— 907
The later Leang, Tang, Tsin, Han, Chow	,,	907— 960
The Sung *	,,	960—1279
The Mongol †	,,	1260—1368
The Ming	,,	1368—1644
The Manchu	,,	1644 (still in power)

* The Kin (in N. China), A.D. 1115—1234.

† Although Kublai Khan began to rule in 1260 he did not obtain possession of the whole of the empire till 1279, when Tiping, the last of the Sungs, was drowned at sea.

After two periods, occupied by the dynasties of *Hia* and *Chang*, a martial king, Wou-Wang, B.C. 1122, revolts and founds the dynasty of Chow, which endured till 255 B.C. It was about the middle of Chow that a partial consolidation of the independent states or dukedoms in Northern China took place. The first true Emperor, Tsin-Chi-Hoang-ti, built the Great Wall, and burned nearly the whole of the classic literature. During the Han period (B.C. 202—A.D. 220), the Tartar becomes troublesome on the N.W. frontier. After an interval of Sankuoe, or 'Three Kingdoms,' the Prince of Wei established the supremacy of the Tsin dynasty on the Salic principle (afterwards disregarded), that 'queens should not reign, nor assist in public matters.' From A.D. 416-585 the cities Nanking and Hünnan appear as the capitals of separate kingdoms, which are afterwards united, and the dynasty of Tang (A.D. 618-907) appears. Among these monarchs Taitsong (A.D. 627-650) is pre-eminent for his wisdom and justice. A chaos of half a century, called the 'Later Five Successions,' follows, in which the features of a feudal land system appear to survive in the tax of 10 per cent., to which the Emperor is still entitled out of all lands. To this period belong the accounts of the early Arabian travellers, who describe the taxes on salt and tea, the use of the bamboo, and the excessive issue of paper money. Under the feeble and vacillating Sung dynasty (A.D. 960-1279) a great impetus was given to the production and multiplication by printing of books, and the manufacture of porcelain was begun at King-teh-chin; but the attitude of the Eastern Tartars grew constantly more threatening, and in A.D. 1115 the Kin dynasty began to rule over N. China while the Sung rulers reigned over S. China. At length China had to call for help to the Mongol chief Peyen (Hundred-eyes), with the usual result of introducing a foreign dynasty, that of Yuen, whose first monarch was Kublai Khan, or Chitsou. He, a Buddhist, tried to suppress Taouism, surrounded Peking with the Grand Canal, and founded the medical college, where the doctrine of the pulse, the diseases of children, and the therapeutics of counter-irritation have ever since been expounded. The narrative of Marco Polo belongs to this time, which is also marked by the establishment of Mohammedanism as the religion of a considerable part of the people. The Mongols rapidly degenerated, and in 1368 Hong-Wou, a Chinese bonze, founded the Ming dynasty, and removed the capital to Nanking. Under this line, which enriched the world with many magnificent metal vases and tripods, gave Macao to the Portuguese, and saw the first of the Jesuit missions (Fathers Ruggino and Ricci, worthily followed by Fathers Schaal and Verviest), a war gradually sprang up between China and the Bogdoi Khans or Manchu princes; and in 1644, after promising freedom from taxation, Chuntche, or Chitsou, founded at Peking the Manchu Tartar, or Taitsing, dynasty, which still rules. To them belong the present uncouth pigtail and costume of China. Their empire was not assured until the long and brilliant reign of Kang-hi (A.D. 1661-1722), who had friendly negotiations with the Pope and with Peter the Great, and who inflicted a decisive defeat upon the Kalmucks. In 1662 he expelled the Dutch from Formosa, and in 1692 he published a decree permitting the exercise of Christianity, which was forfeited by a foolish claim of jurisdiction on the part of the Pope. The Supreme Emperor, Keen-Lung (1735-96, when he abdicated, and died in 1799), received in 1793 Lord Macartney, the first British ambassador to China, who was followed by Lord Amherst in 1816. Keen-Lung (who persuaded the banished tribe of Tourgouths to return from Russian rule in 1772) deserves the highest credit for relieving the East India Company (established with a concession of the right to trade at Canton since 1637) from some of the grievous customs and port duties; but Macartney failed in opening the ports of Ningpo and Tientsin. Amherst's mission, intended as a protest against the avowed Chinese policy of 'treating the barbarians as beasts and not as citizens,' was equally unsuccessful. Taou-Kwang, 'the Glory of Reason' (1821-50), murdered the Mohammedan Tartar Prince Jehanghir, and made a successful campaign on the Kashgar frontier. In 1834 the charter

Chinese Playing Cards.

of the East India Company, which had hitherto regulated trade at Canton, came to an end, and Lord Napier went out as commissioner. The Chinese wished to have a *taepan*, or commercial superintendent without representative character, in order to assist them in dealing with the illicit trade in opium, which had now begun, and against which the Chinese commissioner Lin distinguished himself by his energy and duplicity. This question led to the war of 1840, in which Amoy, Ningpo, and Shanghai were taken, and after which, in 1841, the Treaty of Nanking (Sir Henry Pottinger representing the British) was signed, abolishing the Hong monopoly, opening five ports with a moderate tariff, and ceding the island of Hong-Kong. Another military expedition was rendered necessary by outrages committed in 1847. But the Chinese Government was now seriously shaken by the great Taeping rebellion, led by Hung-tsiuen, the son of a small farmer who lived on the N. river about 30 miles from Canton, against Hien-fung, the Manchu Emperor who succeeded in 1850. Disappointment at failing to pass, or, as he said, indignation at the unfairness of his rejection, at the Civil Service examination, had made him an enemy of the government he had sought to serve. Naturally shrewd and bold, he without demur cast every blame upon the *system* and the Manchu Government which made use of the *system* of so-called competitive examination. Whether he was simply an intriguer or a fanatic is doubtful, but in any case he made the most of the silly superstitions of his neighbours, who gave out that Heaven had appointed him to rule over C. His political object was to restore the Ming dynasty, and therefore he established himself at Nanking, the ancient Ming capital. The course of this great insurrection has been traced by several writers; and its inner spirit will best be seen in the autobiography of Hung or Chung-wang, the Heavenly Chief, published at Shanghai in 1865. The Taeping publications were translated by Medhurst in the *North China Herald*. Meantime, in spite of the prudent action of Sir J. Bowring, Governor of Hong-Kong, the treatment of the English merchants at the ports, especially by Commissioner Yeh, became again intolerable. At last (1856) the *Arrow*, a small British colonial vessel, was violently seized. This led to the first mission of Lord Elgin, described by Oliphant, and the expedition of the allied French and English forces, which resulted in the important commercial Treaty of Tientsin (26th June, 1858), fixing the right of British subjects to travel with passports, throwing open five additional ports, and adjusting a general rate of transit dues. The treaty was not carried out, and this made necessary Lord Elgin's second mission of 1860, described by Loch. There was more fighting, which began with the repulse of Admiral Hope at the Taku forts, but was afterwards better managed by Sir Hope Grant. The palace of Yuen-ming-yuen was burned to the ground as an appropriate punishment of the treachery of certain mandarins. After this, British officers served in suppressing the Taeping rebellion (which lasted till 1864), and British civilians held important posts in the departments. After the failure of the expeditions of Gordon and Sherard Osborn, and the massacre of 30,000 rebels at Foo-chow, the Palmerstonian policy of permitting British subjects to serve in China was abandoned. In 1873 the Chinese brought to a successful close a war which had lasted for seventeen years with the Panthays, a Mohammedan race in the district of Yünnan. At last Talifu, the capital of the Sultan Soleiman, and Momien, were taken with great slaughter by an army of 200,000 under Li-ssa-ta-ye, the general who nearly destroyed Sladen's exploring party from Burma in 1868. In June, 1873, the young Emperor Tsai-shun gave the first public reception to the ministers of the Great Powers. This Emperor, who died 12th January, 1875, was known as Tungche, in accordance with the singular custom that the true imperial name, being sacred, may not be profaned by use. He was cut off suddenly, and when quite a young man, and made no provision as to the succession. The two dowager Empresses, however, arranged the matter between them, so that the infant son of Prince Chun, brother of the late Emperor's father, was nominated to the throne and in due course became Emperor under the name of Tsai-tien, 22nd January, 1875. In 1874 the murder of fifty Japanese sailors led to the expedition under general Saigo to the island of Formosa. The result was a treaty on 31st October, 1874, acknowledging China's sovereign rights in Formosa, but giving to Japan a sum of 500,000 taels, partly in compensation to the families of the murdered sailors, and partly in payment for roads and buildings constructed by the Japanese. In January, 1875, the foulest of all Chinese murders was perpetrated on Margary, of the consular service, at Manwyne. Margary belonged to the party of Browne and Anderson, sent out by Lord Salisbury to discover a through trade route from Burma by the entrepôt Bhamo to Yünnan. Sir T. Wade, British Minister at Pekin, by threatening to break off diplomatic relations, got the Emperor to send Li-han-chang as a commissioner to investigate the matter. The English Government had already sent Grosvenor, Davenport, and Baker for the same purpose. Sir T. Wade also took this opportunity of securing a general inquiry into the taxation of foreign trade; an edict enjoining that all foreigners with passports should be unmolested, or, if wrong-doers, to be given over to the consulate; an undertaking that all foreign treaties should be published in the *Peking Gazette*, the proper rank being given to the foreign ministers, and that there should be regular intercourse between the foreign legations, and not merely the Tsung-li-yamen, a commission of cabinet ministers organised in 1859, but all the departments as well. In the negotiations Prince Kung distinctly laid down the principle that his Government 'have never sanctioned trade carried on within the limits of a subject state.' In September, 1883, a complication arose with France respecting Tonquin, which resulted in a desultory war, finally settled by a treaty of peace, ratified 31st August, 1885. In March, 1887, the young Emperor (aged 16), nominally assumed the government, but in February, 1889, he actually became supreme on the retirement of the Dowager Empress, widow of the late emperor's father.

During the present emperor's reign several attempts have been made to overcome the policy of the obstructive party in China. In June, 1876, a short railroad, constructed without permission of the Court, was opened between Shanghai and Wosung, but in the following year the Government purchased it and forthwith destroyed it. Since then a small mineral railway has been constructed between the Petang river, the Kaiping mines, and Shanhaikwan. A line has been ordered by the Emperor to connect Pekin and Hankow, but nothing had been done before the war with Japan commenced. Short railway communication exists in Formosa, and will probably become largely extended under the management of the Japanese holders of the island. Telegraphs connect most of the Treaty Ports, the capital, Manchuria, the chief towns of the provinces, and the Siberian lines, so that there is now overland communication between Europe and China.

On the murder of an ex-Premier of Corea, a Japanese *protégé*, difficulties arose between the two empires, and in June, 1894, hostilities broke out, which resulted in the total defeat of China, and the signing of a treaty by which the latter undertook to pay an indemnity, hand over Formosa to Japan, and admit the autonomy of Corea.

Language and Literature.—In Chinese no word is allowed more than one consonant and one vowel—the vowels including diphthongs and nasal vowels. The possible number of words is therefore very small, and it is said there are only 450 significant sounds. But each word is made to vary its meaning according to accent and intonation; so that the total number of words in this sense is 43,496. This being the structure of the spoken sounds, a graphic representation of sounds was impossible, and therefore hieroglyphic writing, enlarged by the introduction of determinative signs, was used. Twenty-nine-thirtieths of the language consists of combined signs, one part indicating the general sound, the other indicating the special meaning. Hence the omission of a stroke or a dot entirely alters the idea. But these signs only supply the idea; the number, gender, case, person, tense, mood, any special determination or qualification of the idea, must be expressed by an additional word. Inflection is unknown, and the syntactical relations of the words in a sentence are therefore expressed by position. The earliest Chinese alphabet consisted in the use of a knotted cord; then came Fu-hi's octangular figures; then the 'tadpole' character, consisting of waving lines and blotted heads, seen in old inscriptions and supposed to survive in the 608 simple hieroglyphic signs for the more familiar natural objects; then the 'seal' character, still used in titles of books, inscriptions, &c. The Li and Kiai characters, now generally used, are not older than the beginning of the Christian era; and the more stiff and modern Sung character is also sometimes used in printing, the wooden types being cut out from the copy pasted on to the block. Some abstract ideas are expressed by the combination of hieroglyphs; and by processes resembling those of metonymy and synechdoche in poetry, the meaning of one hieroglyph is gradually extended by association. But from the constant use of abbreviations, and of the 'grass hand,' to which fancy lends some ornament, the old hieroglyphs themselves need interpretation. The paper used is made of the second skin of the bark of bamboo, soaked in water with lime till the woody parts are separated from the pulp. The rice-straw paper is not largely used. As in Japan, brushes, not pens or pencils, are used. Writing and printing are in perpendicular columns. While the book language remains the same, there are 200 or 300 spoken dialects, which are often unintelligible beyond their native province. The *Kwan-hwa* or Mandarin dialect is, however, used by two-thirds of the Chinese. The Canton and Amoy dialects occupy towards Mandarin the position of Latin towards French. On the Amur, and in the military garrisons all over China, in Pekin for the formal ceremonies of court, and also generally for documentary purposes, use is made of the Manchu language, the alphabet of which, representing one thousand syllables, is said to have come from the Syriac through the Nestorian communities of W. Asia, who gave it to the Mongols. Chinese largely enters into Japanese, and one-fifth of Mongol words are Chinese. The language undoubtedly presents great difficulty to strangers, not merely from the novelty of some combinations, but also from the distinction of even and inflected tones, the latter consisting of the 'rising, departing, and entering tones.' The tones are further sub-divided by reference to the heavy or light initial of the syllable. Both the jargon, called Pidgin-English, and the Low Malay, act as common modes of communication between Chinese and foreigners, and also between the members of the different Chinese clans, all of which speak dialects totally different and unlike one another. In Wylie's *Notes on Chinese Literature*, five pages are devoted to the enumeration of thirty well-known and voluminous catalogues of ancient and modern works. The educational books on such subjects as zoology, ethnology, botany, &c., are full of childish nonsense. The missionaries, from Father Ricci (who translated *Euclid's Elements* into Chinese) to those of the present day, have given the Chinese opportunities of progress in mathematics and astronomy; but although there is at present at the imperial college a distinguished mathematician, Le-sheu-lau, the author of *Tae-su-hea*, or Treatise on Algebra, nothing of importance seems to have been done. Similarly, while the medical missionaries, such as Lockhart, Dudgeon, and Maxwell, have done much to extend medical knowledge, and there is now an English professor of anatomy (as of other subjects) at Pekin, it is doubtful whether the Chinese have advanced far since Kublai Khan founded his medical college. A strong prejudice exists against Christian works. The continuity of Chinese historical literature was broken by the burning of books, commanded about 250 B.C. by the first Tsin Emperor; but this has not prevented a large manufacture of native histories from the beginning down to the close of the Ming dynasty in A.D. 1644. Of this, the only interesting portion is the *Sai-kuo-chn*, or History of the Three States. The history of the Manchu Tartar line, named *Tong-hua-lo*, is not yet published. Among biographies, the taste for which was set by the *Yun-lu*, or discourses of Confucius, may be mentioned the *Sing-pu*, in 120 volumes. The dramatic literature is large, and is well represented by the *Heir in Old Age*, translated by Davis from the Collection of One Hundred Plays; and in the *Chalk Circle*, translated by Julien. Several specimens of the Chinese novel have also been translated; *The Two Cousins*, by Rémusat; *The Lasting Resentment of Miss Keaon Lwau Wang*, by Thom; *The Fortunate Union*; and *The Two Young Bluestockings*, by Julien. The earliest monument of Chinese poetry is the *Shi-King*, the first Canonical Work, or Book of Sacred Songs. It describes the manners of different states, and the great deeds of heroes and sages, and also contains hymns for state ceremonies. Much of this is in lines of four words, the monotony of the prevailing monosyllable being varied by its occasional repetition, so as to produce a foot. Rhymed quatrains and a cæsural pause are also used, and much of the poetry is marked by a parallelism or antithetical balance of expression. The golden age of Chinese poetry was in the 8th Christian century.

To conclude, we may safely say that C., in so far as its internal arrangements and government are concerned, is without a counterpart in the history of the world. Everything in C. is done methodically and under strict rules. The tyranny of the Emperor and his court is undoubtedly the most severe and most dangerous ever assumed by man over his fellow creatures. It is characterised by all the fiendish cruelty and indifference to human suffering which have marked the rule of the savage in America and Africa, where there has never been any pretence at all of administering laws in accordance with the principles of justice and equity. In C. nothing illegal is done, or, at all events, supposed to be done, and in C. the laws are framed for the protection of the 'well-disposed,' and the punishment of the 'malefactor'; yet the 'spirit of the law' is always evaded when the interests of the rulers require it, and the programmes of the government of the provinces simply represent so many catalogues of hideously unjust and abominable crimes on the part of those appointed by the Emperor to 'administer justice.' Not that these administrators themselves are in a better position than that occupied by the masses whom they systematically ill-treat, misgovern, and 'squeeze.' Their own fate and that of all their families rest upon the capricious inclination of the Emperor, whose court is ever a very hotbed of intrigue.

Although secret societies abound throughout the Empire, whose object is often to embarrass, and break the power of, the Government, the extent of the territory, the difference of language, the impossibility of establishing or maintaining connection, all these play into the hands of the rulers and enable them to trample out in detail the various sparks of rebellion which are always being ignited in some district of the Empire. The Chinese masses are for the most part absolutely ignorant of, and probably indifferent to, what may be going on in the provinces other than their own. It is indeed most likely that, with the exception of those persons in the provinces actually touched upon by the Japanese or by sea-going traders, the masses are entirely unaware of the war which has been waged between their empire and Japan. They are patient and hard-working to a degree utterly beyond the comprehension of the European. Will they ever combine? Will they ever rise against their tyrants? It would appear impossible for them to do so, so long as the jealous policy of Western nations intervenes and saves the arch-tyrant from destruction.

Chinch Bug, a small hemipterous insect, which occurs in the U.S. of America, and at times is specially destructive in cornfields. Its body is black and hairy, and the covers of its wings are white, tipped with black. The colour of the

Chinch Bug.

beak, legs, &c., is yellowish-red. The females leave their eggs in the ground, and before the end of June the young are at work on the wheat; these are bright red and have no wings. The length of the body of the adult C. B. is a little under $\frac{1}{7}$ of an inch.

Chinese Green Indigo, or *Lo Kao* of the Chinese, a green dye now much used in Europe, prepared from two species of buckthorn, viz., *Rhamnus chlorophorus (globosus)* and *Rhamnus utilis*.

Chi′nese or **Chi′na Sea,** an inlet of the Pacific Ocean, enclosed on the N. by the mainland of China and Formosa, S. by Borneo, W. by Cochin China, Siam, and the Malay Peninsula, and E. by the Philippines. It contains the Gulfs of Siam and Tonquin, is some 2100 miles long from the island of Formosa to Singapore, and has a maximum breadth of 900 miles.

Chi′nese Tall′ow, a white sebaceous substance covering the seeds of *Stillingia sebifera* (natural order *Euphorbiaceæ*), made into candles, &c. It is now acclimatised in Algeria.

Chi′nese Wax, a substance produced by an insect which feeds on the Chinese ash.

Chingleput or **Chengalpat** ('the brick town'), the chief town of the district of the same name, Madras, British India, 36 miles S.W. of Madras by rail. It is meanly built, and has a large tank, which in the dry season gives off malaria. C. is in general, however, a healthy place. Pop. 6180. The French took the place in 1751, and retained it till the following year, when it was captured by Clive. There is a wonderful old fort here, no longer used for military purposes, but occupying a site which must have rendered it impregnable in bygone days. It was from the ruler of C. that the British obtained permission to build Madras. The *district* of C., which lies on the Bay of Bengal, and is rather flat, has an area of 2842 sq. miles, and a pop. of 1,136,928, of whom 1,091,376 are Hindus, 26,236 are Mohammedans, 18,971 are Christians, 325 are Jains, and 11 are Parsees. The soil is generally poor; the chief crops are rice, indigo, pulses, chillies, and tobacco. Cyclones are frequent along the coast, and much damage and loss of property and life have been annually caused by these atmospheric disturbances; whole villages, flocks, and herds, being swept away and destroyed.

Chini′, a village of the Punjab, in the Himalayas, on the right bank of the Sutlej, about 80 miles N.W. of Simla, at an elevation of 8770 feet above the level of the sea. The climate is pleasant and salubrious, and eighteen varieties of the grape are said to be cultivated successfully in the district, these are dried, and, as raisins, form the principal food of the inhabitants. The villagers train large dogs to keep off the bears from the vineyards.

Chin-Kiang-Fu ('River-Guard City'), a city of China, on the Yang-tse, where it is joined by the Grand Canal, 150 miles from the sea. It was a great commercial centre till about 1853, when the Grand Canal was partly destroyed by the Taeping rebels, in consequence of which it has lost its importance. The pop. is said to have dwindled from 500,000 to some 500. The port was opened to foreign trade in 1858 by the Tien-tsin treaty, and in 1864 the English formed a settlement here. The pop. is now estimated at 140,000, the imports at £7087, and the exports at £82,492.

Chi′non (the *Castrum Caino* of the Middle Ages), a town in the department of Indre-et-Loire, France, on the right bank of the Vienne, 26 miles W.S.W. of Tours. It was once fortified. From the tower, in which Jacques Molay, the last grand-master of the Knights Templars, was imprisoned, a fine view of the neighbouring country is obtained. C. has manufactures of druggets, serges, earthenware, and saltpetre, and a trade in grain, wine, brandy, honey, and prunes. In the castle of C. Jeanne d'Arc was first presented to Charles VII. C. is also the birthplace of Rabelais. Pop., of commune 6119; of arrond. 82,535.

Chin′quapin, a name applied in the Eastern States of N. America to *Quercus prinoides*, as well as to *Castanea pumila*, and in the N. Pacific region to *Castanopsis chrysophylla* of California and Oregon.

Chinquapin.

Chinsu′ra, a town on the right bank of the Hoogly, 20 miles N. of Calcutta. It is built in the Dutch style, having been a Dutch settlement till 1825, when it was ceded to Britain in exchange for possessions in Sumatra. The Hoogly College is situated here. C. is famed for its cheroots. C. is now included within the Hoogly (Hughli) municipality, and the combined pop. is estimated at 33,060, of whom 26,936 are Hindus, 5903 are Mohammedans, 198 are Christians, and 3 are Jains.

Chintz (Hind. *chhint*, 'spotted cotton cloth;' *chhintâ*, 'spot,' *chhintnă*, 'to sprinkle'), a highly-glazed cotton fabric, the ground of which is usually light, while the pattern, brought out in flowers, foliage, birds, &c., often in four or five gaudy colours, has a spotty appearance. Owing to the glazed facing of the cloth, dust does not readily adhere to it, and therefore it is much used for bed hangings, furniture coverings, &c.

Chiococc′a, a genus of plants of the natural order *Cinchonaceæ*, chiefly belonging to the tropical and sub-tropical regions, and consisting of small shrubs. The roots of all of them are violently emetic and cathartic, and in Brazil are used as remedies for snake bites, though, according to Martius, it is a doubtful remedy, owing to the action of the drug being almost as dangerous as the snake-poison itself. The species chiefly used are *C. anguifuga* and *C. densifolia*. At one time it was used in Europe as a diuretic and purgative, but owing to its violent action precluding its use unless in extreme cases, it is now rarely seen in legitimate medical practice.

Chioggia, or **Chiozza,** a seaport, N. Italy, province of Venezia, 15 miles S.S.W. of Venice, built on piles on an island of the same name, and connected with the isthmus of Brondolo by a bridge of forty-three arches. The harbour is protected by two forts. C. has manufactures of cordage and lace, some shipbuilding establishments, a good coasting trade, and an active fishery. Pop. 28,525.

Chipp′enham (Old Eng. *Cyppenhamme*, a 'marketplace'), a town in Wiltshire, on the left bank of the Bristol Avon, here crossed by a handsome old stone bridge of twenty-one arches, and a station on the Great Western line, 13 miles N.E. of Bath. It has some silk and woollen manufactures; tanning and malting are carried on extensively, and there is a large flourmill. C. has a monthly market for cattle, and its cheesemarket is one of the most important in the empire. Its parish church was restored (1878) at a cost of £6000. It returned one member to Parliament up to 1885. Pop. parl. div. of county 44,358; mun. bor. 4618; reg. sub-dist. 8500; and civ. par. 5392. C. is the place where the Danish army wintered in 878, when Alfred was in hiding in Athelney.

Chiq'uichiqui Palm, a palm of the N. of Brazil, which yields the Piassaba Fibre (q.v.). It is an inhabitant of swampy or flooded lands on the banks of the Rio Negro and other Venezuelan and Brazilian rivers. The leaves are used in thatching. The fibre, which is twisted into cordage, is obtained from the fibres which hang from the leaf-stalks and cover the stem. It is now exported to Britain from Pará.

Chiquimu'la, the name of an isthmus on the eastern confines of Guatemala, Central America. Its breadth from the Caribbean Sea to the Pacific is 150 miles, no part of which exceeds an elevation of 2000 feet.

Chira'ta, or **Chirett'a,** the *Ophelia Chirata,* a plant used in medicine, belonging to the natural order *Gentianaceæ.* It is about three feet long, has the thickness of a goosequill, and the opposite branches flower in panicles. C. is pulled up by the root and dried. It is an excellent bitter tonic, without astringency.

Chiriqui', the name of a river in Costa Rica, Central America, which flows in a northerly direction, and is received by a deep spacious lagoon of the same name, which is separated from the Caribbean Sea by an archipelago, also called C. A mountain peak in the same state is likewise known by this appellation.

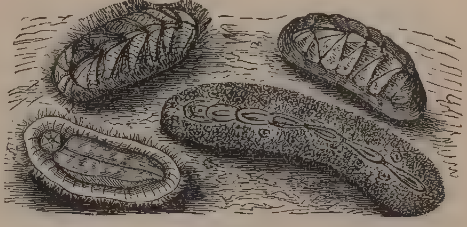
Chirr'a, or **Cherra Pun'ji,** the principal village of the petty state of Cherra, situated in the Khasi Hills, Assam, British India, about 30 miles S. of Shillong, at an elevation of 4588 feet above the sea. It was the headquarters of the chief British official till 1864, when Shillong became used for that purpose. Stone is extensively quarried, and oranges and potatoes are grown for export to Calcutta. Besides these betel-nuts, honey, bamboo (mats and baskets), coal and lime are products of this small state. C. P. is said to be the rainiest spot in the world. The Welsh Calvinistic mission was established here in 1841, and since then has obtained considerable success amongst the native population, which numbers less than 9000.

Chir'u, a species of antelopes (q.v.) found in Tibet and on the Himalayan plateaux. It averages about 2½ feet in height and 5 feet in length, and possesses long annulated horns. A curious soft protuberance exists above each nostril. The C. is gregarious in its habits, and exceedingly wary and shy.

Chis'wick, a thriving village of Middlesex, on the left bank of the Thames, 7½ miles S.W. of St. Paul's (London). The church of St. Nicholas has monuments to Hogarth, Holland the actor, Lord Macartney, the Duchesses of Cleveland and Somerset, the Countess of Falconberg (Cromwell's third daughter), Sharp the engraver, Ugo Foscolo, and many other eminent persons. C. has breweries, coal wharves, and many handsome villas. Here also are the nursery gardens of the Horticultural Society of London, and close by it is Chiswick House, a residence of the Duke of Devonshire. Pop. reg. sub-dist. and civ. par. (each) 21,963.

Chitine'. The solid parts of insects and other articulate animals, corresponding to the skeleton of the vertebrata, are mainly composed of this substance, which derives its name from *chiton* (Gr. 'mantle'). It may be obtained by boiling the wing-cases of beetles (best those of the cockchafer) with water, alcohol, ether, acetic acid, and solution of caustic potash in succession. Thus obtained, C. is a white horny substance, retaining the form of the texture from which it has been obtained. C. appears to belong to the group of bodies called *Glucosides* (q.v.); when boiled with dilute acids, it takes up the elements of water and splits into glucose or grape-sugar and other products.

Chi'ton, a genus of Gasteropodous mollusca, forming the type of the family *Chitonidæ.* These animals are distinguished from all other gasteropods by the possession of a *multivalve* shell, or one consisting of eight transverse plates which overlap each other. By means of the broad ventral foot, the chitons adhere to stones and rocks at low-water mark, after the fashion of the more familiar limpets. The gills form a series of lamellar or plate-like organs, situated posteriorly, and between the foot and the 'mantle' which lines the shell. *C. squamosus* is a familiar species, and *C. magnificus* is also well known. Chitons of large size are met with on tropical shores.

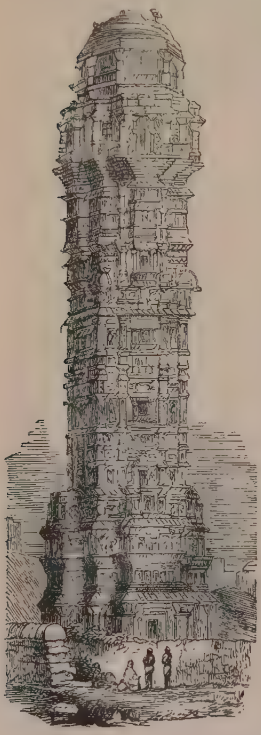


Chiton.

Chitral, a town and district on the southern slopes of the Hindu Kush, through which the Baroghil and Dorah passes lead to Pamir, the outpost of the Russian advance to India. The northern extremity of the Baroghil pass is indeed within 100 miles of Russian territory. The border tribes which inhabit the mountains of C. are hardy, brave, and capable of discipline, but fanatical. Their country extends from Quetta to nearly 100 miles north of Gilgit, and, according to Lord Roberts, 'upon their attitude the successful defence of India must greatly depend.' Owing to the aggressions of a chief, Umra Khan, the Viceroy of India issued an ultimatum to the effect that unless he retired from C., 'a protected state under the suzerainty of Kashmir,' before 1st April, 1895, the Government of India would use force to compel him. Umra Khan did not retire, and an expedition was thereupon despatched against him, with the result that his troops were defeated and he himself was taken prisoner. The sagacity and skill of the leaders of this expedition, and the indomitable steadiness and bravery of the officers and troops under their command met with the recognition and approval of the English Government and people which they deserved. C. has been occupied by British troops, but whether we shall continue to hold the country or retire has not yet been decided upon. It would appear that C. is the one weak spot in our northern frontier of India, where no 'buffer' state, like Afghanistan, exists between British territory and that of Russia.

Chitt'agong, chief town of a division of the same name in the province of Bengal, British India, in the N.E. corner of the Bay of Bengal, on the Kurnafuli river. It is built on the extremity of a spur of hills, separating the Kurnafuli valley from that of the Brahmaputra. On the higher ground are situated the residences of the Europeans, while the native quarter occupies the low lands along the banks of the river. C., formerly called *Islamabad,* was selected by the Portuguese early in the 16th c. as one of their first settlements in this region, and was named by them *Xatigam* or *Porto Grande.* Their energy fostered among the natives a liking for a seafaring life, and to this day C. owns a great many of the native craft that trade about the Indian seas, and supplies a large proportion of the native seamen employed in the Indian marine and merchant service under the name of 'Lascars.' After C. passed into the hands of the English (1760) its prosperity gradually declined, as the produce of the country found its way to Calcutta through the Sunderbunds, though it still continued to build and own a fleet of native vessels, generally styled *Parriahs.* But in 1864 some European merchants began to settle in the place, and its former prosperity is again reviving. Pop. 24,069, among whom are some descendants of the original Portuguese families.—The *division* of C. is flat for about 20 or 30 miles inland, and almost every foot of soil is cultivated. Round the villages are some fruit-trees, but there is no jungle till you reach the hills where the tea estates lie. Area 12,118 sq. miles; pop. 4,190,081. Rice, jute, tobacco, cotton, sugar-cane, corn, and gunny are largely grown and exported. The tea-plant also flourishes, and there is now a considerable tea trade. The wood used in the construction of native vessels is called *jarool*, which, in water, is quite as durable as teak.

Chittagong Wood, the timber of several Indian trees, especially *Cedrela Toona* and *Chickrassia tabularis*. C. W. is valued in India for nearly all the purposes to which mahogany is applied in Britain, more especially when veined and mottled. Furniture made from it is light and beautiful, but apt to warp in dry weather.



Pillar of Victory, Chittor.

Chittor' or **Chittur',** two strong towns in India are so named. 1. C. in the district of N. Arcot, province of Madras, 80 miles W. of Madras, on the right bank of the Puni, a feeder of the Palar, came into the possession of the British in 1801. Some remarkable ancient tombs were discovered in the neighbourhood, not unlike the Druidical remains in Britain. In the hot season (sometimes 140° in the sun) the river and tanks are dried up, and fever, ague, and dysentery prevail. Pop. 9,965.—2. C., a town in the native state of Cochin, where there is a palace of the rajah. One quarter of the town is occupied by Brahmins. The chief trade is weaving. Pop. 11,103.—3. C., formerly the capital town of Odeypore, is 270 miles S.W. of Agra. Numerous temples were built in C. A splendid structure, called the 'pillar of victory,' is to be seen here. Rana Khumbo, ruler of Odeypore from 1418 to 1468, erected it in commemoration of his victory over the armies of Malwa and Gujerat. The height is 122 feet. White marble sculptures decorate the exterior of the pillar, which is made up of nine stories, and is topped by a superb cupola.

Chiu'sa is the name of several small places in Italy, of which the most important are—1. **C. de Pesio,** a town in the province of Cuneo, N. Italy, 8 miles S.E. of Cuneo, with manufactures of silk and glass. Pop. 6565.—2. **C. San Michele,** a village in the province of Torino, N. Italy, on the Dorea Ripense, at the foot of Mount Picheriano, on which stands the once famous Benedictine abbey of San Michele, now a hospice for travellers, and the place of burial of the Sardinian kings.—3. **C. Sclafani,** a town of Sicily, province of Palermo, 33 miles S.S.W. of Palermo, with a pop. of 7355.—4. **C.,** a village of N. Italy, province of Udine, at the southern base of the Carnic Alps, on the Fella, and on the highway from Villach to Venice.

Chiu'si, a town of Central Italy, province of Siena, 37 miles S.E. of Siena, known in antiquity under the name of *Clusium*, one of the twelve Etrurian republics. It is historically famous as the residence of Lars Porsena. On the fall of the Roman Empire it was utterly destroyed. The whole valley in which it lies (*Val di Chiana*) was depopulated, and the place became a pestilential swamp. But in modern times, with improved drainage, C. is again thriving. The excavations of the last forty years have resulted in the recovery of a vast number of Etruscan remains, which are to be seen in the town's museum and also in Florence. Pop. 5270.

Chiv'alry (Fr. *chevalerie*, from *chevalier*, and hence literally meaning cavalry, in which sense the word is still occasionally used in romantic poetry) was a development under the auspices of the Christian Church of the ancient Teutonic custom, by which, after preparatory exercises, and ordeals of skill and courage, the youthful warrior was ceremoniously presented to the tribal assembly, and devoted to the public service. It must not be supposed, however, that the Church took advantage of an existing institution, and adapted it to the defence of the faith against the heathens of the Middle Ages. The fascination of adventure, the excitement of travel and combat, the passionate, if somewhat blind, veneration of woman, even the devotion to religion, then universally symbolised for Europe in one Church of splendid ceremonial and splendid piety; these were all strong, natural feelings, which the white dress, the fast and confession, the purification by water of the neophyte in C., his blessing by the priest, and his oath to defend the Church, served in some measure to express. Of necessity the knights were not free from the superstitious intolerance of their age; their patron saints and the Virgin Mary inspired them to acts of great cruelty and injustice. Much of the literature of C. belongs to the decline of the institution, and may have been written more for amusement than for history. The general tournaments, whether *à l'outrance* or with blunted weapons (the wooden spear-heads were called *rochets*), the special *pas d'armes*, and the judicial combats (in which the *preux chevalier* might always appear for the party without champion) no doubt fostered military skill, and gave the sanction of public renown to the duties of C. One of the most notable of these *pas*, mentioned by Froissart, in whose history is the best contemporary account of military C., was the Just of St. Inglebert, or Sandzing Fields, at which three French knights withstood all comers. The custom of tournaments was shaken by the death in the lists of Henri II. of France (1559). The course of education in C. began when the *page* (about the age of twelve) was placed in the household of some knight or at the royal court, where he learned the use of horses and of arms, the art of hunting, and the duty of serving at table. There was a gentleman-page in the family of Buccleuch so late as the beginning of the 18th c. The page became a squire (Old Fr. *escuyer*, from Lat. *scutarius*, the *scutum* or 'shield'-bearer), who acted as groom and personal attendant on the knight, was entitled himself to carry a shield, and from whom the social accomplishments of the time were expected. If an esquire took a prisoner, the ransom belonged to his master. Later on, there arose a class of independent esquires, who, though never entitled to wear gilded spurs or a complete hauberk, had their own armorial bearings, and led their followers to battle under a pennoncele, or small triangular banner. At the age of twenty-one the squire received the *accolade*, or stroke of knighthood, generally from the knight he had served. This ceremony, performed sometimes on field of battle, often in church, or at a *cour plénière*, consisted in the squire, who had laid aside his brown coat and put on armour, receiving helmet, sword, and spurs, and being dubbed 'Sir' or 'Messire,' 'in the name of God and St. Michael,' or with some other religious formula. Knighthood was a military rank, and conferred the right of assembling, and leading under a swallow-tailed pennon, at least 1000 men. Hence the power of conferring it was latterly monopolised by sovereigns; the knighting of Francis I. by Bayard being altogether exceptional. The surcoat, and the triangular *heater* or buckler shield (both of which bore the scutcheon of the knight), the dagger of mercy, the crest and device (which, like the scutcheon, became hereditary), were characteristic parts of the knight's equipment. When the knights-bachelor had in many cases become poor adventurers, living on the spoils of war or of the tourney, the order of knight-banneret was instituted. This was chiefly a military distinction, confined to knights of wealth and position who could bring to the field fifty men-at-arms with corresponding archers and crossbowmen. It was conferred by the commander-in-chief, who ordered the forked tails of the pennon to be cut off, thus converting it into a rectangular banner. In England a 'banneret' was one who had received knighthood on a field where the royal standard was displayed. The English order of the Garter was instituted by Edward III. after the jealousy of Philippe VI. had destroyed his project of a Round Table at Windsor. The courts of Europe introduced many ornamental titles, which were conferred on royal or noble infants by right of blood as well as on capable knights; and the degree of baronet, invented by James I. ostensibly to encourage the settlements in Nova Scotia and Ulster, being hereditary, was quite opposed to the principles of C. Disgrace of knights occurred on conviction of a heinous crime, or on defeat in the appeal to the judgment of God by single combat. Besides the loss of spurs and swords, peculiar bearings, called abatements, were given by the heralds to disgraced knights. C. first came into definite shape at the end of the 10th c.; its most brilliant period was in the 14th c., and it speedily declined before the introduction of regular mercenary troops, a movement initiated by Charles VII. of France (1445). See Sir Walter Scott's *Essay on C.*, in *C., Romance, and the Drama;* St. Palaye's *Chevalerie, considérée comme un Établissement Politique et Militaire* (Par. 1759-81); and Büsching's *Ritterzeit una Ritterwesen* (Leipz. 1823).

Chiv'alry, Court of, a court of which the Earl Marshal and Lord High Constable were judges. When it was merely a court of honour, the Earl Marshal presided alone, but both judges sat when it was a criminal court. This jurisdiction was established by Edward III., but when it was found to encroach on the common law, its sphere was defined by Richard II. It gave relief in matters of honour to such of the nobility and gentry as proved that they had been oppressed, and it guarded the distinctions of degrees and of quality. It is now quite a thing of the past.

Chivass'o, a town in the province of Torino, N. Italy, on the left bank of the Po, 15 miles N.E. of Turin by railway, has manufactures of earthenware, soap, and bricks, and is noted for its lampreys. The French razed the fortifications of C. in 1804. Pop. 10,137.

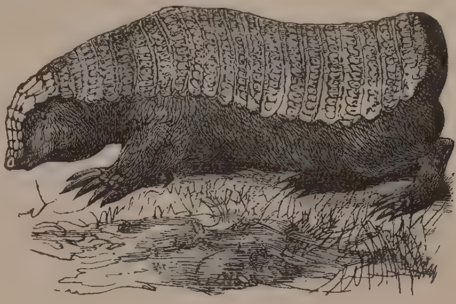
Chive, or **Cive,** a plant of the natural order *Liliaceæ*, and a congener of the leek and onion. See ALLIUM. It is a native of marshy or flooded places in Europe and Asia. It is in Britain a common garden vegetable, used for flavouring soups and dishes, in much the same way that onions are.

Chiz'erot, or **Bu'rin,** a name applied to several communities scattered over Sermoyer, Arbigny, Boz, and Ozan, communes of the department of Ain, and the arrondissement of Bourg-en-Bresse, canton Pont de Vaux. Like the Marans of Auvergne and the Lyzelards of St. Omer, they do not intermarry with their neighbours, who hold them in contempt. They are chiefly labourers, cattle-breeders, and butchers, and are both industrious and rich. The women are fair, pretty, with quick black eyes, and form rather inclined to roundness. An incredible legend gives them a Saracenic origin. The Sermoyers, in particular, have come into collision with their neighbours about the pastures of the Saône.

Chlad'ni, Ernst Florenz Friedrich, the founder of the true theory of acoustics and music, was born 30th November, 1756, at Wittenberg. He travelled for many years through Germany, Holland, France, Italy, Russia, and Denmark, expounding his discoveries in popular lectures, and died 3rd April, 1827, at Breslau.

Chlæna'ceæ, a small order of Dicotyledonous trees and shrubs, containing only eight species, all natives of Madagascar. *Sarcolæna* and *Leptolæna* are examples of the genera, of which there are four described, but the properties or uses of none of the species are known. They are closely allied to *Sterculiaceæ.*

Chlamyph'orus, a genus of Edentate (q.v.) mammals (see also ARMADILLO), allied to the *Dasypodidæ* or armadilloes of S. America, and represented by the species *C. truncatus* of Chili, the average length of which is about 6 inches. The C. is sometimes known as the 'pichiciago.' As in other armadilloes, the integument secretes bony plates, and these are disposed in C. in the form of an armour-casing of square plates, investing the top of the head, back, and hind quarters, the plates terminating abruptly at the hind quarters. The other parts of the body are covered with a silky fur. The feet are provided with strong claws adapted for digging.



Chlamyphorus.

The tail is scaly, and is generally applied closely to the belly; but it has been suggested that it may be used for throwing out the earth behind the animal as it burrows forwards.

Chlo'picki, Joseph, a Polish soldier and patriot, was born in Galicia in 1772, and fought under Kosciusko in 1787. He subsequently served under Bonaparte, commanding the Polish legion at Eylau and Friedland during the Russian campaign. In 1814, on his return to Poland, he was well received by the Czar Alexander; but when the Polish insurrection of 1830 broke out, he was called upon by his countrymen, and made Dictator. The following year he resigned the office, on account of differences with colleagues of more extreme views. After the insurrection was crushed, he retired into private life. He died at Cracow, 30th September, 1854.

Chlo'ral is a substance which of late years has become of great importance on account of its narcotic properties. It was discovered by Liebig in 1832, but was first employed in medicine many years later by Liebreich. To prepare C. dry chlorine gas is passed into absolute alcohol as long as it is absorbed. The resulting liquid is then mixed with three times its volume of sulphuric acid, and allowed to remain for some time at rest, when it separates into two layers. The upper of these is C.; it is siphoned off and purified by rectification. C. is a colourless liquid, possessing a peculiar and disagreeable odour and taste. Its specific gravity is 1·802, and it boils at 99·6°. C. is *Aldehyde*, in which three atoms of hydrogen are replaced by chlorine. C. unites with water to form a crystalline hydrate. This hydrate is the preparation of C. used in medicine. Administered internally or by subcutaneous injection in doses of about 30 grains, it speedily procures sleep. Treated with alkalies, C. splits into formic acid and chloroform—a decomposition which by many has been supposed to occur in the body, thus explaining the therapeutic action of C. On account of the high price of alcohol in this country (owing to the duty), C. is chiefly manufactured on the Continent.

Chlorantha'ceæ, a natural order of Dicotyledonous plants, natives of tropical regions. There are about fifteen species, which possess aromatic stimulant properties. The roots of *Chloranthus officinalis* and *C. brachystachys* are used in Java as stimulants in malignant fevers, &c., and as antispasmodics. The flowers of *C. inconspicuus* (the 'chulan' of the Chinese) are used in China to give the 'cowslip flavour' to tea. Species of *Hedyosmum* are used in the W. Indies for much the same medical purposes as *Chloranthus.*

Chlo'rate of Potash is the potassium salt of chloric acid and has become of importance in the manufacture of fireworks, of oxygen gas for the Lime Light (q.v.), and of Safety Matches (q.v.). It is prepared commercially by acting upon a warm solution of chloride of potassium, in which slaked lime is suspended, with chlorine gas, when in addition to C. of P., chloride of calcium is produced. The solution containing the two salts is evaporated, and when sufficiently concentrated, allowed to cool. C. of P. being far less soluble than chloride of calcium, crystallises out and leaves the latter salt in solution. C. of P. gives up the whole of its oxygen when heated, a reaction which is turned to account in the preparation of that gas. Mixed with charcoal, sulphur, or other oxidisable substances, it forms explosive or combustible mixtures, largely used in pyrotechny. C. of P. is also employed in medicine.

Chlorim'etry is the process by which the available chlorine in *bleaching powder* or *chloride of lime* is determined. By available chlorine is understood the chlorine which is set free when the bleaching powder is treated with an acid. The following is one of the many chlorimetric methods which are in use: it depends upon the oxidising properties of chlorine in presence of water. When arsenious acid is added to a solution of chloride of lime, the chlorine in the latter by removing hydrogen from the water sets free oxygen, which in the nascent state converts the arsenious acid into arsenic acid. From the amount of arsenious acid which can thus be converted into arsenic acid by a given weight of chloride of lime, the quantity of available chlorine in the latter can be determined. The actual process is as follows:—10 grammes of the bleaching powder to be tested are rubbed in a mortar with water, the mixture decanted into a flask, and the mortar rinsed out with water, which is also put into the flask. The contents of the flask are then diluted till they occupy 1 litre. Next, a standard solution of arsenious acid is prepared by warming 6·972 grammes of the acid with a solution of 10 grammes of dry carbonate of soda, till it is dissolved. The solution when cold is diluted to 1 litre. The solutions having been thus prepared, 50 cubic centimetres of the chloride of lime solution (equivalent to 0·5 grammes by weight) are placed in a flask or beaker, and the solution of arsenious acid gradually added from a burette, till a drop of the mixture ceases to strike a blue colour, when placed on a slip of paper which has been soaked in starch paste to which a little iodide of potassium has been added. When this point has been reached, all the available chlorine in the bleaching powder has been used up to oxidise the arsenious acid. With the above quantities every cubic centimetre of the arsenious acid solution is equivalent to 1 per cent. of available chlorine, hence the number of cubic centimetres added to the chloride of lime also represents the percentage of available chlorine in the latter.

Chlo'rine is one of the non-metallic elements, and under ordinary conditions is gaseous. It was discovered in 1774 by Scheele, and was called by him *dephlogisticated muriatic acid.* Sir Humphrey Davy first recognised its true nature, and gave it the name of chlorine from the Greek word *chloros*, signifying pale green.

C. occurs in nature in combination with metals; chloride of sodium or common salt being its most abundant compound. C. may be obtained by heating hydrochloric acid with binoxide of manganese, water and chloride of manganese being the other products of the reaction; also, and more economically, by heating a mixture of common salt, sulphuric acid, and binoxide of manganese. C. at ordinary temperature is a greenish-yellow gas, highly irritating to the lungs and mucous membranes, and exerting a corrosive action on all organised tissues. It is soluble to a considerable extent in water, and forms with that liquid, at a temperature of 0° C., a crystalline compound. Under a pressure of four atmospheres C. condenses to a yellow liquid, but this liquid has never been frozen. C. is not itself combustible, but is a supporter of combustion. A candle burns with a smoky flame when plunged into it. Copper and antimony, in a state of fine division, ignite spontaneously when introduced into the gas. C. has a very strong affinity for hydrogen, and forms with it an important compound called hydrochloric acid. A mixture of C. and hydrogen may be made in the dark without combination taking place, but if this mixture be ignited, an electric spark passed through it, or even be brought into sunlight, the two gases combine with a powerful explosion. The bleaching properties of C. are entirely due to its strong affinity for hydrogen. Moistened coloured fabrics at once lose their colour if plunged into C., but unless they be moist no effect is produced. The reason for this is, that the C. seizes on the hydrogen of the water to form hydrochloric acid, whilst oxygen (the other constituent of water) in the nascent state combines with the colouring matters, forming colourless compounds. C. is employed in immense quantities in the manufacture of *Bleaching Powder* (q.v.). Diffused in small quantities in the air, it is an admirable disinfectant. C. forms important compounds with the other elements, which will be considered elsewhere. Its compounds with oxygen are for the greater part unstable and readily explosive. C. has an atomic weight of 35·5.

Chloroc'odon, a genus of Natal climbing plants belonging to the natural order *Asclepiadaceæ.* The roots, *C. Whitei*, are used by the native tribes under the name of 'mundi' or 'mindi' as a stomachic.

Chlor'oform is a substance of immense value to the surgeon as an anæsthetic. It was discovered almost simultaneously by Soubeiran in France and by Liebig in Germany in 1831. The latter chemist, believing it to be a compound of carbon and chlorine, gave it the name of *perchloride* or *terchloride of carbon;* but in 1835 Dumas discovered its true composition, and observing that when treated with caustic potash, formic acid and chloride of potassium resulted, gave it its present name of C. Its anæsthetic properties were first recognised by Simpson and Bell.

C. is obtained by distilling a mixture of water, lime, chloride of lime (bleaching powder), and alcohol, when it passes over along with water, and is caught in the receiver. Being much heavier than water, C. is readily separated from it by decantation; it is next washed with water to remove alcohol, and later with a solution of carbonate of potash; afterwards it is dried with chloride of calcium and rectified. C. is a colourless mobile liquid of sp. gr. 1·48, and boils at 60·8° C.; it has a pleasant odour and sweet taste. It is an excellent solvent of caoutchouc, phosphorus, iodine, fats, many alkaloids, &c. Good C. is known by the following characters:—it should produce no colour when agitated with oil of vitriol, and no turbidity when mixed with a little water; a few drops evaporated on the hand should leave no unpleasant odour. C. contains carbon, hydrogen, and chlorine. About 2800 lbs. are annually exported from the United Kingdom, and over 2000 lbs. of this amount are sent to British possessions.

Chlor'ophyll, literally leaf-green (Gr. *chlōros*, green; *phullon*, leaf), the substance in the cells of Plants (q.v.) which gives the green colour to the leaves, stems, &c., of plants. In the higher plants C. occurs in grains, each grain consisting of a plastic material and the colouring matter. According to Sachs, starch is formed by the C. granules; but this view, like many others of the same botanist, rests more upon imagination than fact. Withdrawn from the action of light the plant develops no C., and it has also been found that the presence of iron is essential to its formation. At one time it was believed to be only present in plants, but it is now known to give the green colour to *Hydra viridis*, *Stentor*, &c. The very various and often contradictory views which are held regarding it may be found stated in Brown's *Manual*, pp. 23-33, 219, and in Sachs' *Lehrbuch*, and in other recent works.

Chloro'sis, in botany, a disease of plants, consisting of a pallid condition, 'in which the tissues are weak and unable to contend against severe changes, and the cells are more or less destitute of chlorophyll.' It may exist in plants exposed to direct light, and often the best culture will not restore the health of the plant. It is often beyond cure, but the best remedy, according to Berkeley, is to water the plant with a very weak solution of sulphate of iron.

Chlorosper'meæ, one of three divisions of *Algæ* or seaweeds, comprising three species, which have green spores; most of them have also green fronds.

Cho'card, or **Choquard,** the name given to a genus of *Corvidæ* or crows, allied to the choughs, but possessing a shorter bill than the last-named genus. The Alpine crow is the typical species of this genus.

Cho'co, a name given in the U.S. of Colombia, S. America, to a bay, which is also called Buenaventura. It is an opening on the Pacific coast of the republic, in the department of Cauca.

Cho'colate (Sp. *chocolate*, from Mexican *chocolatl; choco*, 'cocoa,' and *latl*, 'water'), the ground seeds of *Theobroma Cacao* (see COCOA) made into a paste and mixed with sugar and various spices, and then formed into moulds and allowed to harden. It is eaten either solid, or dissolved in hot water, and taken like tea or cocoa. It is extensively used, especially on the Continent, and its nourishing qualities were proved during the siege of Paris in 1870-71, when it formed a great portion of the food of the inhabitants. It is adulterated with rice, meal, oatmeal, flour, starch, &c., and with benzoin, storax, &c., in place of vanilla and the other spices used to flavour it.

Choir (Fr. *chœur*, Lat. *chorus*, see CHORUS), that part of a cathedral extending eastward from the nave to the altar, and including the whole area set apart for the celebration of the services of the church. It is generally raised, at least, one step above the nave, and around its sides are rows of seats or stalls. The term is also applied to the staff of choristers or singers of a cathedral or church.

Choir-screen, a partition of open work in wood or stone surrounding the C., and separating it from the nave and side aisles. It is often encircled with niches, statues, &c., which are sometimes coloured and gilt.

Choi'seul, an ancient French family, which takes its name from the lands of C. in Champagne. According to Viguier, its founder was a certain Comte de Bassigny et de Boulogne-sur-Mer, who flourished in the 10th c.; but le Laboureur, whose opinion is more weighty, considers the family an offshoot of the old Comtes de Langres. It was in time divided into four great branches—C.-Beaupré, C.-Gouffier, C.-Praslin, and C.-Stainville—all of which are historically conspicuous, and furnished soldiers, prelates, and statesmen to their country. The last, however, which originated in the marriage of a C.-Beaupré (d. 1711) with his cousin-german Nicole de Stainville, may be regarded as the most illustrious. To it belongs **Étienne François, Duc de C.**, an able and patriotic French statesman in the latter half of the 18th c. He was born 28th June, 1719. After serving as Comte de Stainville with credit in the wars with Austria, he obtained the favour of Madame de Pompadour, and, through her, was appointed ambassador to Rome and Vienna (1756), and raised to the dignity of Duc de C. (1758). Under her he became in reality Prime Minister of France, and made himself very popular by a series of able diplomatic measures. He arranged the 'Family Compact' of the Bourbon sovereigns, secured for his country at the disastrous close of the war in 1763 better terms than had been expected, extended French commerce and influence especially in the W. Indies, where Domingo, Martinique, and Guadeloupe rose into importance, expelled the Jesuits (1764), and almost succeeded in freeing the Church of France from papal authority. For some years after the death of Madame de Pompadour, his influence in France and Europe continued great, and he was nicknamed by the Empress of Russia *Le Cocher de l'Europe* ('The Driver of Europe'). The rise of Madame Dubarry proved fatal to C.'s power, however, and he was compelled (1770) to retire to his estate at Chanteloup. His advice in political matters was frequently taken in the early part of the reign of Louis XVI. He died 7th May, 1785. See the *Mémoires de M. le Duc E. F. de C., écrits par lui-même*, and Soulavie's *Mémoire de M. le Duc E. F. de C.*

Choke-damp remains in coal mines after an explosion of *fire-damp*, and consists of Carbonic Acid (q.v.).

Cho'king, in the human subject, may be caused by any substance, as a piece of meat, being arrested in its passage downwards, before it reaches the stomach, and producing suffocation by pressing on the Trachea (q.v.) or Larynx (q.v.), or by spasm of the muscles of those parts. Unless the obstruction be removed it may speedily produce death. The patient should be made to reject the obstruction by tickling the back part of his throat, or the substance should be forced down into the stomach by drinking water.

Chol'era, most probably from *cholas*, the bowels, and *rheo*, to flow, is one of the most fatal diseases known to man. The suddenness of the attack, the severity of the symptoms, and the great mortality of those affected, all tend to render it one of the most dreaded of diseases. The most prominent symptoms of C. are vertigo, a feeling of oppression in the præcordial region, nausea, griping pains, profuse perspiration, &c. As the disease advances, there is coldness of the extremities; the skin of the hands and feet becomes shrivelled and dusky; the eyes sunken, the features pinched, cramps are felt in the limbs; there are oppressed breathing, intense thirst, rapid and small pulse, and sepulchral voice: the skin becomes cold and clammy, and a peculiar sickly odour is exhaled from the body and breath. Reaction may supervene, or the disease may terminate within a few hours in fatal collapse. The early Sanskrit writers describe a disease called 'Vishuka,' the symptoms of which are identical with those of C. Hippocrates and Galen describe a similar disease in Europe, and Whang-shooho in China. Gaspar Correa, a Portuguese, was the first European who described an epidemic outbreak in Hindustan in 1503, and Sydenham states that C. morbus was raging in London in 1676. C. is endemic in the valley of the Ganges, and in all the large towns along the seaboard of British India, including Chittagong, and part of the Pegu division; but it frequently passes out of the endemic area, and becomes epidemic. C. has visited almost every country, the exceptions being remote islands and isolated populations. Great Britain has been visited four times within the present century (1831-32, 1848-49, 1853-54, and 1865-66). The returns concerning the second, third, and fourth epidemics give 53,293, 20,097, and 14,378 as the number of deaths in England and Wales on those occasions; while 1170 deaths were reported to have occurred in 1866 in Scotland where several counties escaped, and in many the cases of C. were sterile.

In 1869, C. appeared in the government of Kiev, Russia, and in the neighbouring districts, in 1870 it had spread to Moscow, Novgorod, St. Petersburg, and the Baltic provinces. By that time, it was raging throughout S. Russia and in Trans-Caucasia. In 1871 the disease had become generally diffused throughout European Russia, and, advancing westward, it attacked Königsberg, Memel, Danzig, Berlin, Hamburg, and Altona. Later on in the same year, it was carried by the passengers of an emigrant ship from Copenhagen and Christiansand to Halifax, Nova Scotia. Only two cases occurred in England, and these were brought by steamer from Hamburg to Hartlepool. In 1873, there was another outbreak on the Continent. In 1881 there were two contemporaneous inroads of C. into Europe. One line was the same the disease had taken in 1869, the other was from the Persian Gulf, up the Euphrates Valley, through Asia Minor, across to Constantinople and thence northward. In 1883 there was a severe outbreak in Egypt. In 1884 C. again invaded Europe, and commencing at the Mediterranean ports of France, it then attacked Italy, and became somewhat widely diffused throughout the Continent. By the spring of 1885 all traces of C. had disappeared except for a scattered prevalence in Spain, where it showed alarming malignancy during the year and carried off 120,000 persons. France and Italy also suffered during the autumn, but England escaped except for a few cases imported from the Mediterranean. A slight outbreak occurred in 1886 in Spain and Italy.

In Paris alone, 18,402 deaths were due to C. in 1832; 19,184 in 1849; 7626 in 1853-4; 11,008 in 1865-66; and 1708 in 1873. In 1884, France altogether lost 5000 through C., and Italy 14,299. In the latter country there were 3459 deaths from C. in 1885.

In May, 1885, a conference was held at Rome of all the Great Powers to consider the whole subject of C. and, if possible, to devise some plan to prevent any recurrence of the disease in Europe. The representatives of the different countries disagreed on so many points that the meeting broke up without having come to any definite understanding and did not hold any further sittings.

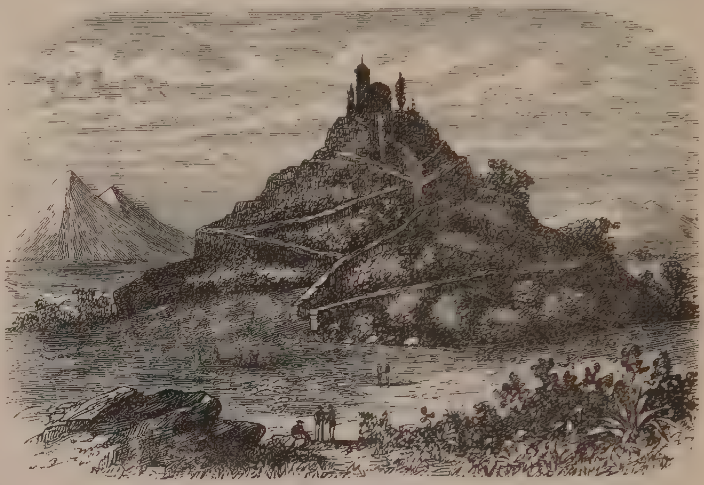
In 1892, Asiatic Russia, Persia, and Turkestan, suffered from a moderately violent outbreak of C. which, however, crossed over into European Russia and killed 300,000 persons. In May and June a few cases occurred in France, and in September and October, although the death-rate rose, the disease seemed to have taken no hold of the country, and eventually disappeared as the cold weather arrived. Hamburg on this occasion suffered severely, the cases were numerous and 9000 deaths occurred. Berlin, Buda-Pest, Rotterdam, and Antwerp were also attacked, but deaths were comparatively few at each town. England again escaped, as did America also, where quarantine regulations were carried out on the strictest lines. During the same year China, where C. is always more or less terribly active, suffered most severely, and in 1893 and 1894 an extremely malignant form of plague decimated the populations of some of the provinces.

C. is propagated along the highways of human intercourse, and its dissemination bears definite relations to that intercourse. The morbific agent has the property of imparting its infective power to large volumes of water, and the danger to which a community is exposed is in exact proportion to the liability of its water supply being contaminated with C. germs. A solitary case may be sterile, or may give rise to a general epidemic, according as the conditions for propagation are present or absent. According to Ernest Hart, C. is 'an exclusively water-carried disease.' At Mecca, in 1865, where the pilgrims used a *single* or common water supply, there were 10,000 deaths in about six days; and in Zanzibar in 1869, where there were many wells liable to contamination, there were 10,000 deaths within six weeks. C. is propagated to distant localities in a few days by those suffering from the disease during the period of incubation; or by means of contaminated clothing, the morbific matter being capable of producing its effects after fifteen or more days; but there is every reason to suppose that tainted water and air are the essential conditions of its local spread. Sanitary and hygienic measures, necessary for the maintenance of the general good health of a community, are sufficient to secure it against the ravages of C., and powers to enforce such measures are vested in local authorities. There is no disinfectant known which has the power of destroying the germs of the disease, but several are of great value, and should be used freely, such as chloride of lime, cupralum, ferralum, terebine, &c. There is no known specific antidote to the disease, but the administration of carbolic acid, on the first accession of symptoms, has been attended with favourable results, and Anti-Choleraic Vaccination, as practised by Pasteur and Hoffkine, is understood to be more or less a preventive to the spreading of the disease.

Choles'terine (*kole*, bile, and *steros*, solid) is a crystalline substance, which was discovered by Conradi in 1775 in human gall-stones. It occurs also as a normal constituent of bile; in the brain, spinal marrow, and yolk of egg, and in various morbid growths. It has also been found in plants, in peas, maize, olives, &c. C. possesses the properties of an Alcohol (q.v.), and is usually regarded as such.

Chol'et, a town in the department of Maine-et-Loire, France, on the Maine, 32 miles S.S.W. of Angers by railway, has large manufactures of cambric, calicoes, flannels, &c., and an active trade in corn, cattle, and wine. The republicans gained two decisive victories at C. during the Vendean war in 1793. Pop. of commune 16,891; of arrond. 123,128.

Cholu'la, an ancient town of Mexico, state of Puebla, 60 miles E.S.E. of the city of Mexico, on the tableland of Anahuac, and 6912 feet above the sea. It was the second largest city of the Aztecs, and at the time of the Spanish invasion had 20,000 houses and 400 temples. Cortes, although received kindly, pillaged the city and slaughtered the inhabitants, pleading in excuse that he suspected treachery. It is now rich in remains, the principal of which is the pyramidal temple of the Quetzalcoatl, 177 feet high, now surmounted by a Catholic church erected by the Spaniards. The pyramid is 160 feet in height and covers 45 acres. The space at the top is over an acre, and its sides, which were cased with adobe, plaster, and stone, are now covered with trees and shrubs. C., in the time of the Aztecs, was considered a holy city and was visited by pilgrims and worshippers of the god, who came from all parts to witness the human sacrifices, which amounted to 6000 annually. A golden collar encircled the neck of the god; he wore tortoise earrings, and a plumed mitre.



The Pyramid, Cholula.

Chon'da, a village in the protected state of Gwalior, India, 18 miles N.W. of the town of Gwalior, and notable as the place where Sir Hugh Gough signally defeated the Mahrattas, 29th December, 1843.

Chon'drine, a substance obtained by boiling the cartilages of an animal's ribs, larynx, or joints in water for forty-eight hours, allowing the fluid to gelatinise, and treating the residue with ether to free it from fat. When dry, C. is a hard, horny, translucent substance, dissolving in hot water, but insoluble in alcohol or ether. It is precipitated by all acids, as well as by alum, sulphate of alumina, acetate of lead, sulphate of copper, ferric and ferrous sulphates, and mercurous and mercuric nitrates. It cannot be supposed to exist as C. in the body, but is the chemical result of certain substances after prolonged boiling in water.

Chondroden'drum, a genus of climbing shrubs belonging to the order *Menispermaceæ*. *C. convolvulaceum* is the wild grape of the Peruvians, so called on account of the form and flavour of its fruits being not unlike that of the vine. The bark is used as a febrifuge.

Chon'etes, an important genus of extinct Brachiopodous shellfish, belonging to the family *Productidæ*. They occur in Silurian and Devonian, but especially in Carboniferous rocks. The shell is concavo-convex, of oblong shape, and with a straight hinge-line. A row of tubular spines exists at the hinge-area of the ventral valve.

Cho'nos Archipelago consists of two large and about thirty small islands, which lie along a part of the W. coast off Chili, and between the island of Chiloë and the peninsula of Taytas. They are extremely barren, and are inhabited only by a few tribes of Chonos, who live by fishing.

Cho'pin, Frederic Francis, a Polish musician, was born

1st March, 1809, near Warsaw, where he studied music under Elsner. Exiled after the revolution of 1830, he took up his abode in Paris. There he was personally very popular; his music also was much admired, but his health was bad, and he suffered much from depression of spirits. He visited England in 1848, and was most cordially received, but the journey seems to have been too much for his strength. He died in Paris, 17th October, 1849. He wrote largely for the pianoforte, chiefly in the form of nocturnes, polonaises, waltzes, &c.; his compositions are full of poetry and imagination. A monument was erected to him at Warsaw in 1869. See the sketches of Liszt (1852), Barbadette (2nd ed. 1869), and Karasowski (1877).

Chop'in, a liquid measure in use before the present system of weights and measures was sanctioned by Act of Parliament. It contained in England ½ pint. In Scotland (under the form *Chapin* or *Chappin*) the name is still applied to a measure, used especially for milk, which is equal to a wine quart.

Chopines.

Chopines, wooden clogs, somewhat resembling those in use at the present day in Japan. At one time C. were generally worn in Italy, whence the fashion spread to England in the 15th c. After the 16th c. they seem to have been no longer in demand. Mention is made of the C. by Shakespeare in *Hamlet* (Act ii. scene 2).

Chora'gic Monuments. The Choregus was the Athenian citizen appointed by his tribe to provide the various choruses that took part in the festive and religious celebrations. The Choregus who was thought to have best discharged this duty received a tripod as a prize. He had, however, to pay the cost not only of the prize itself, but also of erecting a chapel in which it was dedicated. A street in Athens contained so many of these monuments that it was called the Street of the Tripods. The names of the Choregus and his tribe were inscribed on the monument.

Chora'le, the psalm or hymn tune of the Protestant churches of Germany. It has generally a simple diatonic melody, which is sung in unison by the congregation, the harmonies being supplied by the organ, and sometimes by a choir and orchestra. The C. appears frequently in the works of the great German composers, and notably in those of Johann Sebastian Bach (q.v.). Bach's harmonies to many of the old Church melodies, while retaining an ancient form and ancient strict adherence to rule, remain unsurpassed and unsurpassable in intrinsic beauty, and give to the bare melody wonderful richness and loftiness.

Cho'ral Music, a term applied generally to all music written for a choir or chorus having a number of voices in each part. It includes, therefore, oratorios, cantatas, masses, motetts, and most anthems, as well as part songs, madrigals, &c., although it is not often used for the latter. See CHORUS.

Choral Service, the service of the Church of England as generally performed with intoned responses and psalms, and the use of music throughout wherever it is authorised.

Chord, in music, a combination of notes performed simultaneously. Chords may be consonant or dissonant (see CONSONANCE), according to whether the intervals between each one of the notes of the C. and every other are concords or not. The consonant chords are those known as 'common' chords, and consist of a note with a third and fifth above it, or their octaves. When the combination is so made that either the third or the fifth are below the fundamental note itself, the C. is said to be inverted. Common chords may be built upon all the notes of the scale, but the C. of the Mediant (Si or Me) is seldom required, and that of Sub-tonic (Mi or Te) has an imperfect fifth, and on this account has often been excluded from the list of consonant chords. It is so very similar in effect to the much commoner common C. of the dominant with the seventh added ('dominant seventh' C.), that it is in any case unimportant. Common chords are called major or minor, according to the nature of their third. A seventh, a ninth, and so on, may be added to the common chords, and dissonant chords thus constructed. All these chords have their inversions like the common chords, and by this means they have immense variety in construction and effect. The ear can take pleasure in dissonance as well as in consonance, but it cannot dwell upon the former as it can upon the latter, and for this reason the rules of Harmony (q.v.) prescribe certain *resolutions* of the sevenths, ninths, &c., which require to be attended to in all cases except those in which some special effect can be gained by disregarding them. One of the most useful dissonant chords found in modern music is known as the C. of the *diminished seventh*, and consists of three minor thirds, one above the other, as, for example, the G ♯ BDF. Besides its own peculiar effects, which vary very much with the notes of the key of which it is composed, it offers specially great facilities for modulation.

Chord, in geometry, is the straight line joining the extremities of an arc. Tables of chords, so common in old trigonometrical tables, are now superseded by tables of sines, which are much more convenient for calculating purposes. *C. of Curvature* is any C. of the circle of curvature drawn from the point whose curvature is represented by this circle.

Chor'dadorsa'lis, a name given to a delicate semi-transparent thread, at first cellular, but afterwards cartilaginous, which appears beneath the primitive groove in the early embryo. It is seen in the chick as early as three to eighteen hours after incubation. It ultimately contributes to the formation of the bodies of the vertebræ, part of it remaining persistent in the form of the intervertebral disks. It remains persistent in its cartilaginous condition in the lowest or Myxenoid fishes, such as in the lancelet or *Amphioxus lanceolatus*, the lamprey, the sharks, rays, and the *Chimæra*.

Chor'dæ Voca'les are the true vocal chords found in the larynx or organ of voice. They are the superior *thyroanytenoid* ligaments. Attached by one border to the side of the larynx, the other border is free, and by its vibrations, caused by the current of air forced upwards through the trachea by the lungs, voice is produced.

Chore'a (Gr. *choreia*, a dancing or jumping), St. Vitus' Dance, is an affection of the nervous system, characterised by peculiar tremulous movements of certain of the voluntary muscles especially of the face and limbs. It generally occurs in children from six to sixteen years of age, and is more common in girls than boys. C. may be caused by fright, blows, teething, &c. It may be regarded as a form of bad health, and the proper treatment is to try to remove the cause by the use of good nourishing food, with iron tonics.

Choris'ia is a genus of small prickly-stemmed trees of S. America, belonging to the natural order *Sterculiaceæ*. The silky hairs which cover the seeds of *C. speciosa* are used in Brazil (where it is known as *Arvore de Paina*) for stuffing cushions, pillows, &c. The tough bark of *C. crispiflora* is used in the same country for making cordage.

Chor'ley, a flourishing town of Lancashire, on the Chor, 25 miles N.E. of Liverpool by railway, with manufactures of muslins, calicoes, cotton yarn, ginghams, and jaconets. There are also numerous bleachfields and dye-works, and near the town are several coal, lead, and iron mines, and quarries of millstones and slates. Pop. parl. div. of county 67,854; reg. sub-dist. 26,635; mun. bor. and civ. par. (each) 23,087.

Chor'oid, a term applied in anatomy to various textures characterised by a shaggy appearance and a rich supply of blood-vessels. There is the C. plexus, and the C. coat of the eye (see EYE).

Cho'rus, in music, signifies both a composition for numerous voices and the singers who perform the composition. Choruses are commonly parts of some large work, such as an opera or oratorio. In the former they are generally simple in construction, and often in three parts only, and have therefore come to be almost contemptible, while in the latter they play a most important part, and are correspondingly elaborate. The oratorio C. is generally in four parts (soprano, alto, tenor, and bass), but in some cases—notably in Bach's Matthew-Passion and Handel's Israel in Egypt—a double C. is employed.

Chose in Action, a term of English law denoting a thing of which no one has actual possession, and to which a right can only be constituted by legal decree. Thus a debt, or a bond, is a C. in A. According to the Common Law, a C. in A. could not be transferred to a third party; and, with the exception of negotiable instruments, bills of exchange, an *interesse termini*, and one or two other securities, no C. in A. was transferable, without the assent of the debtor, until 1873, when by the Judicature Act of that year every C. in A. became assignable by the assignor doing so in writing to a third party, provided notice were given to the debtor, or any other party from whom the assignor could claim the debt, &c.

C. in Possession, that which a party actually enjoys, having the right to enjoy it.

Chou'ans, the name given to the insurgent royalists of Bretagne, from their first leader, Jean Cottereau, a smuggler and clogmaker, who inherited the sobriquet of Chouan (*chat-huant*, *i.e.*, screech-owl) from his grandfather, so designated from his sad and silent humour. Another explanation of the name refers it to the signal of danger among the smugglers—an imitation of the cry of the screech-owl—which was adopted by the insurgents. In 1792 an insurrection was planned by the Marquis de la Rouarie in conjunction with the brothers of Louis XVI., and communications were opened up with Cottereau, who had organised a band of smugglers. The arrest of the Marquis transferred the chief control of the movement to Cottereau, and the insurrection was henceforth named the *Chouanerie*. After some short-lived successes Cottereau was mortally wounded, 28th July, 1794, near the wood of Misdon, having proved himself an intrepid soldier and a leader of considerable capacity. The movement, however, was not suppressed by the death of Cottereau, but under George Cadoudal (q.v.) and Charette assumed threatening proportions. The events of the 18th Brumaire dashed the hopes of the insurgents, but they were not finally suppressed till 1803, some time after the Vendeans had submitted to the First Consul. Occasional outbursts of an insurrectionary spirit exhibited themselves as late as 1830, following on the insurrection of July.

Chough, a genus of *Corvidæ* or crows, included in the sub-family *Pyrrhocoracinæ*. The C. differs from the true crows in having the bill notched slightly at its tip. The wings are also long and pointed, and the bill slender, long, and of curved shape. The tarsi are either scaly or covered with a single long plate. The choughs are gregarious in habits, and build their nests in rocks, steeples, and like situations. The Cornish C. (*Fregilus graculus*) is the best-known species. This bird is not now peculiar to Cornwall, but may be met with elsewhere, and usually near the sea-coast. It possesses red legs and bill, and is hence sometimes named the Red-legged C. or crow. The Chocard (q.v.), or Alpine crow, is the only other European species of C. The Cornish C. also occurs on the Continent, in N. Africa, Persia, and India. The food consists of grain, berries, and insects.

Chough.

Chrism (Gr. *chrisma*, an 'ointment'), the unguent consecrated by the bishops in the Roman Catholic and Greek Churches for use in the sacraments of baptism, confirmation, orders, and extreme unction; being composed for the first three of oil and balsam (or in the Greek Church forty different spices), for the last, simply of oil.

Chris'ome was a white cloth, which used to be laid on a newly-baptised child after it was anointed with Chrism (q.v.), doubtless a relic of the white robe with which baptised persons were clothed in the early Church. See CANDIDATE.

Christ is the literal Greek translation (*Christos*, 'anointed') of the Hebrew word Messiah, and as applied to Jesus it means that he was the Messiah expected by the Jews.

Christadelph'ians. See THOMAS, Dr. JOHN.

Christ, Orders of. An order of this name was instituted in 1205 by Albrecht, Bishop of Riga, to guard the Christians of Livonia against the heathens. Another was founded by Pope John XXII. in 1322, and reformed by Paul V. in 1615 as the Order of Jesus and Mary. The Portuguese Order of C. was formed in 1317 by Denis, or Dionysius, King of Portugal, from the Knights Templars (q.v.), whom Philippe le Bel expelled from France. The headquarters of the order were first at Castromarino, and afterwards at Tomar, whence they could more easily assail the Moorish kingdom of Granada. They shared in the wars with the Moors, and in the Portuguese expeditions to India. At first they held the lands they conquered, but these were afterwards handed over to the Portuguese crown. They still exist, and are said to possess twenty-six villages. Entrance to the order is granted only to Catholics of high birth.

Christ, Pictures of. In the records left to us of the life of C. there is not a single hint from which we could form the faintest conception of his personal appearance. But very soon attempts were made to satisfy the natural craving, which the early Christians must have felt, to know the personal appearance of one who was so dear to them. Two apparently contradictory views as to what his appearance ought to have been prevailed at different periods, the one being chiefly prevalent in the Eastern Church, the other in the Western, but without any contemporary controversy, as is sometimes asserted. The idea most consonant with the feelings of the humble and persecuted Christians of the second and third centuries, was that expressed in the words of Isaiah liii. 2, 'He hath no form nor comeliness, and when we shall see him, there is no beauty that we should desire him;' and the Christians of this period were ridiculed by Celsus for representing their God as of 'a mean aspect.' But the triumph of Christianity in the 4th c. brought a reaction, and the tendency then arose to represent him according to the words of the Psalm (xlv.), 'Thou art fairer than the sons of men.'

The first definite conceptions of C.'s appearance were portrayed by fictitious descriptions, of which two especially survive: the first in the letter of Publius Lentulus, a fabrication of the 3d c., in which C. is described as 'a man of lofty stature and handsome, with wavy glossy hair, the colour of wine, and golden at the root, flowing down on his shoulders, and parted in the middle; his forehead smooth, his countenance beautiful, with a slight blush, and his eyes bright and sparkling; his beard abundant and reddish, not long, but forked.' Another description occurs in the writings of Joannes Damascenus (8th c.), according to which C. was 'stately, with eyebrows joined together, beautiful eyes, curly hair, black beard, and yellow complexion.' The descriptions, of which these two were doubtless but specimens, were followed by pictures attempting to embody them, for the faithfulness of which various evidence was found, as, *e.g.*, that Luke, as well as Pilate, took C.'s likeness, and that Peter drew it from memory.

There were various legends also regarding P. of C. said to have been impressed upon cloths. One of these was possessed by Abgarus, King of Edessa, who, being afflicted with an incurable disease, and having heard of the miracles of C., sent a letter to him, asking him to come and heal him, on which he received a letter from C. and his portrait impressed on a cloth. According to another legend, a similar portrait came into the possession of Veronica or Bernice, the woman cured by touching C.'s garment (Mark v.) [otherwise merely a woman of Jerusalem, who offered him her veil to wipe his face on the way to Calvary], who greatly desired to have his portrait, and found it impressed on the cloth with which he dried his face on washing when he came to visit her. The woman is manifestly a second invention to help out the first, her name being merely a corruption of *vera icon*, true image, the name given to the picture.

As to the physiognomy given to C. in his portraits, the type of features with which we are now most familiar—oval face, straight nose, and long curling hair parted in the middle—was not invariably adhered to, but was confined to the Byzantine school of art, and even in it was not constant. The fact is, that so long as C. was represented like other men, the type of his head was, generally speaking, the characteristic head of the different nations. He was left with a character of his own only when the Italian masters of the Renaissance, headed by Fra Angelico, gave a personal individuality to those about him, and then the characteristic expression which above all was given to him was *sympathy*. Perhaps the noblest conception of the Son of Man to which art attained was that of Leonardo da Vinci, in his picture of 'The Last Supper.' But the attention of the great painters was devoted to depicting the features of C. when dead or glorified rather than when alive; the Madonna and Child being also a favourite subject. See Lord Lindsay's *History of Christian Art* (Lond. 1847), *The History of Our Lord, &c.* (1864), by Mrs. Jameson and Lady Eastlake, and a series of articles in the *Art Journal* for 1861.

Christ or **Chris Cross Row,** the alphabet arranged in the form of a cross, with the letter A at the top and Z at the foot.

Christ'church, a municipal and parliamentary borough and seaport in the county of Southampton (Hants), at the confluence of the Avon and the Stour (hence its old English name *Tweon-ea*, 'between the rivers'), 24 miles S.W. of Southampton. The priory church (restored 1861) dates from the reign of William Rufus, and contains an old sculptured altar-piece said to be one of the finest in England. There is also a free grammar-school. C. has breweries and some manufactures of watch-springs and hosiery. Pop. parl. bor. (which includes the parishes of Holdenhurst and C.) 53,270; mun. bor. 3994; reg. sub-dist. 54,217; and civ. par. 25,476. Roman remains have been found in the neighbourhood.—*C. Bay* is a spacious harbour, with a double tide every twelve hours, but is obstructed by a moving sand-bar, so that vessels drawing 5 or 6 feet can only enter at high tide. C. returns one member to Parliament.

Christ-Church, one of the chief towns of New Zealand, and capital of the province of Canterbury, is situated on the E. coast of South Island, on Pegasus Bay, to the N. of Banks' Peninsula. It lies on the river Avon, 9 miles from the port of Littleton by railway, and is also the point where two coast lines of railway, from N. and S. respectively, converge. There is an extensive export trade, chiefly in gold, wool, corn and flour, gum, and preserved meats. Pop. 16,223.

Christ-Church, The Cathedral of. The foundation at Oxford of C.-C. was projected on a scale of great magnificence by Cardinal Wolsey, who in 1526 obtained from Pope Clement VII. a bull for the suppression of twenty-two monasteries, the site of one of which he selected for the erection of a college, to be called in honour of himself Cardinal College. On his disgrace in 1529, Henry VIII. took possession of it, and three years later refounded it as King Henry VIII.'s College, a title exchanged in 1546-47 for that of C.-C., which it still bears. The foundation consisted of a dean, eight canons (since reduced to six), one hundred students (to which one was added in 1664, by a benefaction from William Thurstone, Esq.), eight chaplains, a schoolmaster and organist, eight clerks and eight choristers. The canonries, which at first had no duties assigned to them, have been from time to time annexed to professorships in the university, and no canonry can now be held except by a professor, the archdeacon, or the sub-dean. Under the Ordinances of 1858 and 1867 and the statutes of 1882, the students were divided into two classes, official and non-official. These students are equivalent to the Fellows of other colleges. There are now five official students and twenty-six non-official; also two lecturers, twelve honorary students, forty-three scholars (three elected annually from Westminster School), two Dixon scholars, two Indian Civil Service scholars, thirteen College Exhibitioners, three Fell Exhibitioners, six Westminster Exhibitioners, seventeen Careswell Exhibitioners, two Holford Exhibitioners, one Dukes Prize (French), and one Slade (German) Exhibitioner, besides six chaplains, &c. The members on the books are 1352, not including unmatriculated members of the choir. The college has the patronage of ninety benefices.

Chris'tening, as a synonym for Baptism, properly conveys the notion that a person is made a Christian in, or by, that rite; and is used in this sense by those who believe in baptismal regeneration, but is also used without any such reference.

Christian, the name of nine Kings of Denmark, of whom the following are the most notable:—**Christian I.,** son of Dietrich, the Lucky, Count of Oldenburg and Delmenhorst, born in 1426, became King of Denmark in 1448, and was King of Sweden from 1457 to 1467. He founded the University of Copenhagen in 1478, and died 22nd May, 1481.—**Christian II.,** King of Denmark and Norway, and Duke of Slesvig-Holstein, surnamed the Wicked, was born at Nyborg, Fünen, 2nd July, 1481. He was elected heir-apparent to the throne of Sweden in 1499, and became King of Denmark and Norway in 1513. To ally himself to the most powerful house in Europe, he married Isabella, sister of Karl V., at Copenhagen, 12th August, 1515. Meanwhile he sought to develop the trade of Denmark, and raise the status of the burgher class, after the model of the Netherlands, thereby exciting at once the jealousy both of the Hanse towns and of the nobility. His war against Sweden (1518-20) was marked by a horrible massacre known as the 'Stockholm Blood-bath,' which roused the Swedes to assert their independence under Gustavus Vasa (q.v.). Attacked by the Hanse towns, and abandoned by his Danish nobles, C. fled for safety and help to Holland (1523), returned and landed in the S. of Norway 1531, but was defeated and taken prisoner at Aggerhuus in 1532. He died 25th January, 1559, a captive in the castle of Kallundborg.—**Christian IV.,** King of Denmark and Norway, and Duke of Slesvig-Holstein, was born at Fredricksburg, Zealand, 12th April, 1577. After the death of his father he was elected by the States to the throne, 4th April, 1588, and undertook the government of the kingdom himself in 1596. Though bold and enterprising, his foreign policy was unsuccessful, with the exception of his war against Sweden (1611-13). Fortune favoured him neither in the Thirty Years' War nor in his second Swedish war (1643-45); but he was, notwithstanding, the most popular sovereign of the Oldenburg stock. His legislative and administrative reforms were highly beneficial to his country; he did much for the development of trade and commerce, and acquired Tranquebar, the first Danish colony in the E. Indies. He died 28th February, 1648.—**Christian VII.,** King of Denmark and Duke of Slesvig-Holstein, was born at Copenhagen, 29th January, 1749, and succeeded his father, Fredrick V., 14th January, 1766, marrying the Princess Caroline Matilda of England on November 8th of the same year. Soon after he exhibited symptoms of mental aberration, and the possession of supreme authority became the subject of factious strife. For some time Court Bernstorff and the ministers of the late king administered the state, but in 1770 they fell before the influence of Struensee (q.v.), who in turn succumbed to the superior energy and sagacity of the queen-mother, aided by her son Prince Fredrick. Henceforth C. was king only in name. His son, Fredrick VI., 14th April, 1784, displaced his uncle, the crown-prince, and the queen-dowager, and assumed the government himself, assisted by the advice of the young Andreas Peter Bernstorff. C. died 13th March, 1808.—**Christian VIII.,** King of Denmark and Duke of Slesvig-Holstein and Lauenburg, was born 18th September, 1786. He was acting as Stadtholder in Norway when his father, Fredrick, by the treaty of Kiel (14th January, 1814), was compelled to cede that country to

Sweden. C. tried to maintain himself in the country by the force of popular feeling, but an English fleet and a Swedish army were too much for him, and he was compelled to withdraw. Succeeding his father as King of Denmark in 1839, the remainder of his life was devoted to the purpose of thoroughly incorporating the Slesvig-Holstein duchies with the Danish monarchy. He died 20th January, 1848, in the midst of a work that led to the gravest European complications, but the issue of which has been very different from what C. anticipated.

Christian Charity, Knights of, a French order founded by King Henri III. for the support of meritorious officers and soldiers who had been maimed in warfare, the revenues of which were drawn from all the hospitals in the kingdom. Henri IV. gave solidity to the institution by placing it under the charge of the marshals and colonels of France. It was the germ of *Les Invalides*, founded by Louis XIV., on the model of which the British hospitals of Chelsea and Greenwich were founded.

Christian Connection, in the United States, is a sect formed from offshoots of the Methodist, Baptist, and Presbyterian Churches in the early years of the present century. Its members regard the Bible as their only rule of faith and practice, and 'Christian' as their only name, but they deny Christ's divinity. They practise immersion and encourage revivals. The body has churches, colleges, academies, and periodicals.

Christian Knowledge, Society for Promoting, under the patronage of the Queen, and the presidency of the Archbishop of Canterbury, is the oldest association of the kind in connection with the Church of England. Established in 1698, under the name of 'The Society for the Propagation of the Gospel,' chiefly by the exertions of Thomas Bray, who afterwards distinguished himself as a missionary in Maryland, and wrote *Proposals for the Encouragement and Promoting of Religion in the Foreign Plantations*, it was incorporated under its present name in 1701. Its object is chiefly the establishment of churches, schools, and libraries, and the circulation of Bibles and other religious literature in the colonies, where its income is chiefly expended. The central offices are in Northumberland Avenue, London.

Christian'ia (Norw. *Kristiania*), the capital of Norway, romantically situated on the innermost bay of the C. Fiord, which stretches 70 miles N. from Skager Rack. It lies in a fine valley, at the base of the Egeberg, a wooded mass of gneiss, and is the residence of the king, and the seat of the government, of a bishop, and of the superior courts. Its chief buildings are the old feudal castle of Aggerhuus, a fine modern cathedral, a university (since 1811) with 1290 students, and a library of 170,000 books, a royal villa (Oscar's Hall) of Gothic architecture, an exchange, and a theatre. The town is now lighted with gas, and supplied with water from the beautiful Maridall Lake. There are large manufactures of cottons, woollens, paper, oil, soap, brandy, beer, tobacco, &c., and an export trade chiefly in timber, skins, iron, herrings, anchovies, and game. C. has regular steamboat communication with various ports of Germany and Britain, and is the key to the railway system of Scandinavia. Imports in 1893 were valued at £5,441,645 and exports at £1,677,515. In 1892, 2270 vessels of 923,996 tons entered, and 1467 vessels of 621,692 cleared the port, which is free of ice for eight months of the year. In the fiord, near C., are many picturesque islands, on one of which (Hovedö) stands the ruins of a convent founded by Cistercian monks from Lincoln in 1147. The vicinity is rich in the wild scenery of fiord, and fell, and rushing river. Pop. 151,239. C. occupies the site of the old royal town of Opslo, which was burned by Christian IV. in 1624 to make way for the present city.—The *stift* or *province* of C. has an area of 10,347 sq. miles, and a pop. of 576,436. See *Norway: an Illustrated Handbook for Travellers* (Lond. Trübner & Co.).

Christiani'ty is the religion founded by Jesus Christ (q.v.), by whom, its professors maintain, the highest manifestation of God to man was made. As compared with other systems of religion—Polytheistic, Dualistic, Pantheistic—C. is to be considered Monotheistic. Here, however, a distinction is made by some between the C. of Christ and that of the Church, which latter is charged with running into Ditheism (see CHRISTOLOGY), a charge, however, always strenuously repelled by the Church. The C. of Christ had for its essential features the 'fatherhood of God and the brotherhood of man; the necessity and the value of the feelings of repentance, and assurance of pardon; a faith in the unseen and eternal, in the ultimate triumph of good and subjugation of evil, and in a retribution which shall render to every man according to his deeds.' The sum of this religion was a divine life springing from faith in God; or, as the apostles preferred to conceive it, from faith in Christ as the Revealer of God. No other religion depends so much on the person of its founder as C.; other religions rest exclusively on the teaching of their founders, but it, on what Christ was and did. The earliest Christian writers soon began to maintain that moral transgressions were of less importance than errors in doctrine, and the C. of the Church by-and-by came to be identified with a belief of the elaborate system of doctrine which was gradually developed during the first six centuries.

It is interesting and instructive to notice how far the Christian ceremonial in honour of Christ corresponds with the pagan Sun-worship, and even how far incidents in the life of Christ coincide with the same. In the worship of Hercules, Adonis, Apollo, Bacchus, Mithra, Krishna, &c., the sun was adored as incarnate in human form, born of a virgin, underground (the birthplace of Christ is now shown in an underground grotto), in his infancy subjected to perils, and afterwards killed through the serpent or principle of evil, but by his death redeeming mankind, rising again and ascending into heaven, to become the arbiter of life and death. The birthday of the sun-god was at the winter solstice, at which time falls also the Christian festival of Christmas; and he rose again from the dead at the spring equinox, at which time is the festival of Easter (q.v.). Similar coincidences exist in connection with the Virgin Mary (q.v.). Even the sacrament of the Eucharist or the Lord's Supper has a remarkable coincidence with the Eleusinian mysteries, from which the name of Holy Mysteries, as well as some of its rites and symbols, were borrowed, including the monogram IHS surrounded by (the sun's) rays of glory. These Greek letters, representing **I**akchos **E**mōn **S**ōtēr (Bacchus our Saviour), are made to represent the Latin words Jesus Hominum Salvator (Jesus the Saviour of men), although the Greek character H is E, not H. It is not, however, to be supposed that these coincidences in any way invalidate the claim of C. to be considered a religion of divine origin. The life of Christ was not an artificial, imaginary, or non-natural life; on the contrary, it was profoundly real and human. What else, then, could be expected, but that in its great outlines it would exhibit striking resemblances to the lives of heroes and demigods in all the legends of religious history? A divine life must have innumerable 'imitations.' Men everywhere, but most conspicuously in the higher forms of ethnic religion, are ever striving after that ideal which was revealed in the Son of God. Moreover, it should not be forgotten that when C. came into the world it did not find the religious sentiment a blank, or religious rites and usages unknown. The earth was full of these. C. appropriated them wherever this could be done without hurt to its divine character. Half the ritual of the Church has its root in Roman or Teutonic paganism; but it is puerile to argue on this ground that C. has a pagan element. It drew to itself, baptised and purged of all impure or discordant associations, the numberless usages of an overthrown worship, but it did this in obedience to a wise instinct, and by doing so, consciously or unconsciously, testified to the sincerity of its pretensions as a universal religion.

The period when C. arose was that of the Mishnic development of the Talmud, and such terms as redemption, baptism, grace, faith, salvation, regeneration, Son of Man, Son of God, kingdom of heaven, were household words of Talmudic Judaism. The ethics, also, of the Talmud and of C. are, in their broad outlines, identical, including the golden rule, which was quoted as a well-known saying, 'comprising the whole law,' by Rabbi Hillel, who died when Jesus was ten years old. The glory of C. is not to have invented these ideas, but, as has been said, 'to have carried those golden germs, hidden in the schools and among the silent community of the learned, into the market of humanity.' C. was also affected by pagan philosophy, chiefly through the Alexandrian Philo, whose theology was 'in great measure founded on his peculiar combination of the Jewish, the Platonic, and the Neo-Platonic conception of God.' The teaching of the Jerusalem rabbis —*e.g.*, Hillel and Gamaliel—was tinged with Philonism, and the Apostle Paul, the disciple of the latter, was undoubtedly imbued with these Alexandrine ideas, which he introduced into C.

See Parker's *Discourse of Religion ;* Paley, Chalmers, &c., on the *Evidences ;* Greg's *Creed of Christendom* (3rd ed. 1874) ; E. Deutsch on the *Talmud* (*Quart. Rev.* October, 1867, or *Lit. Rems.* 1874) ; Philo's Works (cf. Jones's *Ecclesiastical Researches*) ; Milman's *Hist. of C.*

Chris'tiansand (Norw. *Kristiansand*), the harbour and chief town of a province of the same name, Norway, in the *amt* or *bailivik* of Mandal, at the mouth of the Torredalselv (*Otteraa*), on the Christiansandfjord, is the seat of a bishop and of the provincial courts, and is also a naval station, with a growing trade in wood, copper, iron, dried fish, salmon, &c. It is also a naval arsenal, and forms the central point of the Scandinavian steam navigation. There are manufactures of leather, tobacco, cotton, and beer, besides extensive dyeworks and shipbuilding yards. The cathedral is the principal building. Pop. 12,813. C. was founded by Christian IV. in 1641, after whom it is named. The province or *stift* of C. lies in the S.W. of Norway, includes the districts of Nedenäs, Lister, Mandal, and Stavanger, with Bratsberg, and has an area of 15,811 sq. miles, and a pop. of 368,823.

Chris'tianstad (Swed. *Kristianstad*), a fortified town of Sweden, and capital of a province of the same name, on the estuary of the Helge, in the Baltic, 270 miles S.W. of Stockholm by railway. It has an arsenal, a fine church, a senate-house, several high-class schools, and its manufactures are chiefly woollens, leather, gloves, and tobacco. Pop. 10,670. C. was founded in 1614 by Christian IV., from whom it takes its name. The *län*, or province, has an area of 2486 sq. miles, and a pop. of 207,165.

Chris'tiansted, the capital of the Danish island of St. Croix, W. Indies, lies on the N.E. coast of the island, and is defended by a battery. It is the residence of the Danish governor of the W. Indies, and has a good harbour and some trade. Pop. 5027.

Chris'tiansund (Norw. *Kristiansund*), a town frequently confounded with Christiansand, is situated in the amt or bailivik of Romsdal, in the N. of Norway, and has an export trade in wood and fish. It was a flourishing place of trade in the 17th c., and bore the name Lille-Fosen till 1742. Pop. 11,905.

Christi'na, Queen of Sweden, the only child of Gustav Adolf and of Maria Eleonora, Princess of Brandenburg, was born 6th December, 1626. She succeeded her father in 1632, assumed the reins of government in 1644, and in 1650 was crowned *king*. The originally masculine character of her mind was intensified by a too robust education. She hated to be dressed like a woman, often clothing herself in male attire, and was keenly fond of riding and hunting. Yet for some years she ruled with vigour and intelligence, patronising scientific and learned men. Indeed, so long as the great chancellor Oxenstierna lived she did well. But eccentricity, if not insanity, began to develop itself in her, and in 1654 she abdicated the crown in favour of her cousin, Karl Gustav, reserving to herself sufficient revenues to maintain her in royal state. C. next went to Rome, and embraced Roman Catholicism under the name of Alessandra. For a time she resided in France, where she incurred great odium by the execution for treason of her equerry, the Marquis Monaldeschi. Attempts subsequently made on the crowns both of Sweden and Poland failing, she spent the remainder of her life in Rome in artistic and scientific studies. She died 19th April, 1689. C. left behind her some small works, which may be found in Archenholz's *Memoiren der Königin C.* (Berl. 1751-60). The genuineness of the 'Letters' which appeared under her name in 1762 is undoubted.

Chris'tison, Sir Robert, D.C.L., born 18th July, 1797, at Edinburgh, where his father, the late Alexander Christison, was Professor of Humanity in the University. After graduating here in 1819 as M.D., C. spent some time in London and Paris, applying himself to the study of toxicology, in connection with which his name is deservedly famous. After his return to Edinburgh, he was appointed Professor of Medical Jurisprudence in 1822, and ten years later Professor of Materia Medica, which chair he resigned in 1877. His *Treatise on Poisons* (1829) has a world-wide reputation, and is the standard work on the subject. C. was Ordinary Physician to the Queen in Scotland, was twice President of the Royal College of Physicians, was created a baronet in 1871, was President of the Royal Society of Edinburgh (1868-73), received the degree of D.C.L. from Oxford (1866), that of LL.D. from Edinburgh (1872), and died at Edinburgh, 27th January, 1882.

Christ'mas is the anniversary of the birth of Jesus Christ, observed on the 25th December. The Western Church, in which it appears as generally celebrated after the middle of the 4th c., has always kept to this day; the Eastern observed it first on the 20th April or 20th May, then, along with the Feast of the Epiphany (q.v.), on the 6th January, but at the close of the 4th c. altered its practice to suit Western usage. St. Chrysostom, in advocating this change in the East to the true day, which, formerly uncertain, had been made known by some coming from the West, indicates the existence of a tradition in the West that the angel appeared to Zacharias to announce the birth of John the Baptist on the great day of atonement—23rd September, from which C. was reckoned. Nine months from this date gives 24th June, John Baptist's Day ; and six months more (cf. Luke i. 26 and 36) gives 25th December. This was the date of the great heathen festival of midwinter, and it may be that the tradition was moulded to suit that circumstance. The winter solstice was the birthtime of the sun about to return towards the earth, which was celebrated with all manner of rejoicing and revelry. At Rome this was the Saturnalia (q.v.), which included the Sigillaria or *festival of the infants*. The Church was probably unable to abolish the pagan revelry, but it could at least surround it with other and more sacred associations, and thus gradually wean its converts from all memories or attachments incompatible with their new faith.

Christmas-Box, a gift in money which it was formerly a prevailing custom in England to give on the day after Christmas—Boxing-Day—to domestic servants, apprentices, &c. Tradesmen used to be expected to give a C.-B. to the male and female servants of their customers ; even messengers and other subordinate Government servants looked for it from their superiors. The usage led to so much abuse, the recipients becoming clamorous for it as a right, that tradesmen in London and elsewhere put notices in their windows that the payment of a C.-B. had been discontinued ; and Government backed them in putting an end to it by discontinuing, at Christmas, 1836, the customary gifts. Since then the practice has been on the decrease, but postmen, among others, still expect their C.-B.

Christmas Carols, festal chorals or part-songs, still sung in many rural districts of England in celebration of Christmas. (The word 'carol' is the French *carole*, Ital. *carola*, 'a round dance ;' probably from Lat. *corolla*.) These songs, while mainly religious, were also at times quite secular in their feeling, as one may see from the 'Wassailers,' 'Boar's Head,' and 'Holly and Ivy' C. C. ; but those most popular now are either legendary and narrative, as 'God rest you, merry gentlemen,' or filled with a jubilant religious spirit, as the '*In Excelsis Gloria*' (supposed to have been written about 1500), 'Christ was born on Christmas-Day,' 'Hark ! all around the welkin rings,' &c. Regarded strictly as songs of joyous thanksgiving and praise commemorative of the birth of the

Saviour, the antiquity of the C. C. must reach back to an early period in the history of Christian nations. The most ancient known, however, date from the Middle Ages, and consist generally of portions of miracle-plays, mysteries, and legends. The earliest English C. C. date from the 15th c.; and they continued to be commonly sung down to the reign of Charles I. The Puritans suppressed them, and all other old Christmas customs, by Act of Parliament; but they came into favour again at the Restoration, after which period a number of free and noisy carols were composed. Since then C. C. have gradually fallen into disuse, except in the remoter country districts. The C. C. belong distinctly to the ballad form of poetry. The 'Carol for St. Stephen's Day' is identical in tone and poetic structure with the earliest English and Scotch ballads; and a similar license of incident and expression was claimed by the writers of carols and the contemporary writers of ballads. For example, a number of C. C. have sprung out of a miracle-play, in which Adam, Eve, Herod, and the Duke of Marlborough figure among the *dramatis personæ*. Again, in the carol 'I saw three ships,' the author says, 'O they sailed into Bethlehem,' thus performing a geographical feat equal to Shakespeare's anchoring his fleet in Bohemia. Many of the old C. C., however, are of high merit, and give expression to pure religious feeling in language at once simple and picturesque. Collections of C. C. have been published by Davies Gilbert, Sandys, Rimbault, and Thomas Wright. See also *A Garland of C. C., Ancient and Modern*, edited by Joshua Sylvester (Lond. 1861).

Christol'ogy is the doctrine of the Church regarding Christ. The two influences which were at work in the Church in the first and second centuries—the Hebrew and the Greek—gave rise at once to two antagonistic systems of C., that of the Ebionites (q.v.), and that of the Docetæ (q.v.) and Gnostics (q.v.). According to the former Jesus was a mere man; according to the latter, his body was a mere phantom possessed by a divine being; and the history of C. till the beginning of the Middle Ages is simply a history of the continual tendency of popular piety to exalt the divine element in his nature.

Before the time of Christ the notion of one supreme deity had undergone some modification. The primal deity had been removed entirely beyond the sphere of human sense, and his intercourse with man was supposed to be carried on, and even the creation of the world to have been effected, by an intermediate *inferior* being. This doctrine prevailed from Greece to China. It was the basis of the Indian religion and philosophy, of Zoroastrianism, Platonism, and the Platonic Judaism of Alexandria. According to the Jewish rabbis, the ordinary medium of intercourse between God and the prophets was the Memra or Divine Word, a name which occurs in the Indian, Persian, Platonic, and Alexandrian systems. The great master of the art of allegorising Scripture was Philo of Alexandria, who, in entire ignorance of Jesus, described the Word (Gr. *logos*) as 'the Son of God the Father,' 'the first-begotten of God,' 'the image and likeness of God,' 'the instrument by whom the world was made,' 'the light of the world,' 'alone able to see God,' 'the shepherd of God's flock,' 'the physician that heals all evil,' &c. In the Epistles of Paul and John, and that to the Hebrews, in the Fourth Gospel, and in the Apologies of Justin Martyr, the same ideas regarding the Word are applied to Jesus of Nazareth. By the middle of the 3rd c. this doctrine of the Word, variously understood—the expression 'Son of God' being adopted by Origen—was generally accepted both in the East and in the West; although not without protest from some, hence called Alogists, to whom it appeared that this doctrine of a God of secondary rank incarnate in Jesus was closely akin to Ditheism. To avoid this, therefore, the theory, first propounded by the Shepherd of Hermas (q.v.), that the Son was simply the man Jesus possessed by the Spirit of God, was extended and completed by Sabellius (q.v.), according to whom the three names of Father, Son, and Holy Spirit signified merely three modes of the deity. Another form of the Unitarian protest was typified in the theory of Paul of Samosata, according to whom the Word was, in God and man alike, the principle of thought, by the action of which Jesus became perfectly united to God, and in him God revealed himself to save the human race.

The orthodox doctrine of the Church at the end of the 3rd c. was expressed by the Council of Antioch (269), which condemned Paul of Samosata, when, seeking to avoid both Sabellianism and Ditheism, it decreed that the Son was not consubstantial with the Father. But the tendency was still further to glorify Christ. For logically stating the subordination of the Son implied in the decree of the Council of Antioch, Arius was condemned as a heretic by the Council of Nice (325), which at the same time decreed that the Son was consubstantial (Gr. *homoousios*) with the Father, and perfect God. A middle party between the Arians and the orthodox, hence called Semi-Arians, charged the latter with Sabellianism, and adopted themselves the term *homoiousia* (Gr., similarity of substance); but that party triumphed which most exalted Christ, because they were moving with the current of popular sentiment, while the others were striving against it.

But now arose the difficulty of how to adjust the humanity of Jesus to his perfect deity. Apollinaris did not hesitate to say that a god-man was a logical monster, comparable to a minotaur, and held that the *soul* and *body* in Jesus alone were human, while the Word supplied in him the place of the *mind* in other men, and that he had thus in reality only one nature. Apollinaris was condemned by the Council of Constantinople (384), but his ideas survived under the name of Monophysism (q.v.). To avoid annihilating either the one nature or the other, theologians were driven now to speak of the two natures as separate. Consequently Nestorius (q.v.) refused to call the Virgin Mary *Mother of God*, because, he said, she could only be the mother of the human nature assumed by the Logos. But popular piety demanded this also; Nestorius was condemned by the Council of Ephesus (431), and with the materials now collected the *Athanasian Creed* (q.v.) was constructed, which contains in its essential points the C. which is held both in the Roman Catholic and Protestant Churches.

At the Reformation the C. of the reformers turned on their theories regarding the Lord's Supper. Luther adopted the view called Communion of Attributes, which amounts to this, that the human nature of Jesus had become a participator in the proper attributes of deity. Calvinism greatly toned down the harshness of the notion of personality as applied to the Trinity, the persons being simply divine attributes, which is very like Sabellianism, and denied that worship should be paid to Christ. The scattered Unitarianism of the 16th c. took the name of Socinianism, and maintained that the doctrine of the Trinity is a patent and crying contradiction in itself, and is besides opposed to the idea of the divine perfection. Arminianism taught what very closely resembled the Arianism of the 3rd c. In more recent times there has arisen a feeling of reluctance to pursue C. as a branch of theological speculation. Experience has convinced religious men that it is not a fit subject for precise and dogmatic expression. Yet it cannot be said that there is any visible leaning towards the old Arian or Unitarian view; there seems rather to root itself deeper and deeper in the Christian conscience an indestructible sense of the unique grandeur of Christ's nature, which better accords with the mysterious teaching of the Church than with the Rationalistic protest. See Hagenbach's *Hist. of Doctrine*, Reville's *Deity of Christ*, and Dorner's *History of the Development of the Doctrine of the Person of Christ*.

Chris'tophe, Henri, King of Haiti, born in Grenada, 6th October, 1767, of negro parents, and for some time a slave, became in 1793 one of the leaders of the black insurgents against the French, and in 1797 was raised to the rank of brigadier-general by Toussaint-l'Ouverture. In 1802 he defended Cape Town against General Leclerc, who had conducted an expedition from France to regain Santo Domingo from the blacks. On the death of Dessalines, C. intrigued to succeed him, but Petion, a man of colour, proclaimed a republic at Port-au-Prince. C., however, contrived to have himself proclaimed President of Haiti for life (17th February, 1807), and in 1811 he took the title of King as Henri I. He next created a nobility, established a code of laws, encouraged education, and imitated as far as practicable the proceedings of Napoleon. On the death of Petion in 1818, he attempted to unite the S. and W. of the island with the N., but was defeated by General Boyer, the successor of Petion. An insurrection broke out in 1820, and C., deserted by his bodyguard, shot himself, 24th October, 1820. He was a man of courage, energy, and considerable accomplishments.

Chris'topher, St. (Gr. 'bearer of Christ'), in the tradition of the Church a saint, reputed to be a native of Syria or Palestine, and a martyr, under Decius, in the 3rd c. A.D. He is represented as a man of huge size and strength, who did penance for his early sins and personal attendance on the devil by carrying pilgrims across a river. Once, says the legend, he carried over Christ in the form of a little child, who, when he was sinking under his burden, bade him push his staff into the ground, where it changed before the next day into a fruit-bearing palm. This miracle led to numerous conversions. Relics of C. are especially abundant in Spain. Carved and painted representations of him were very common in mediæval churches. He was invoked during plagues, and to drive away the spirits guarding hidden treasures, was assigned tutelage over fishing, and was very popular among the lower classes, who held a figure of St. C. to be a preventive of secret dangers. Thus Chaucer's yeoman carried 'a Cristofre on his brest of silver schene.' An order of St. C. was founded in Austria in 1517. The Greek Church holds his festival on the 9th of May; the Roman Catholic on the 25th of July.

Christopher's, St., or **St. Kitt's**, one of the Leeward Islands, called by the natives 'the fertile isle,' was discovered in 1493 by Columbus, who gave it his own Christian name, and colonised in 1623 by the English, who were confirmed in their possession of it by the Treaty of Utrecht (1713). It lies N.W. and S.E., and is 23 miles in length, with a very unequal breadth. Area, 89½ sq. miles; pop. 30,876, of whom only 2343 are white. Rugged, sterile mountains of volcanic origin, containing brackish hot springs, traverse the island, culminating in Mount Misery, an exhausted volcano, with a height of 3711 feet. Sugar, rum, and molasses are the staple exports. It has a rich, fertile, and highly cultivated soil; pasture and woodlands ascend almost to the mountain summits. The climate is dry and healthy. The soil is particularly adapted for sugar plantations. The capital is Basseterre (q.v.). In 1866 St. George's Church was built here at an expense of £15,000; and on 31st July, 1865, a terrific fire took place, in which 1000 houses were destroyed, but fortunately only one life was lost.

Christ's College, Cambridge, into which was merged an earlier college founded in 1439 by Henry VI., was founded in 1505 for a Master, 12 Fellows, and 47 scholars, by the Lady Margaret, mother of King Henry VII., and enriched by Edward VI., Sir John Finch, Sir Thomas Baines, Mr. Christopher Tancred, and others. Its scholarships and fellowships have frequently been increased in value. Among the most celebrated students at C. C. have been Bishop Latimer, Milton, Henry More, Ralph Cudworth, and Archdeacon Paley. The college has the presentation to eighteen livings. The fellowships are now divided into senior and junior, and are open, as are the scholarships, to all the subjects of the Queen, without restriction. There are now fifteen fellows, two honorary fellows, thirty-seven scholars, one exhibitioner, and four Tancred students. There are now 680 members on the boards.

Christ's Hospital, popularly known as the Blue-Coat School, and situated in Newgate Street, London, is one of the five great hospitals of the metropolis, and was founded on the solicitation of a number of citizens by Edward VI. a few days before his death, for orphans and foundlings, the site of the building being the Old Greyfriars Monastery. Frequent reforms, the chief of which were made by the governors in 1856, have practically converted C. H. from an hospital into a public school for the sons of London Freemen and Anglican clergymen; but the picturesque dress—a blue tunic and petticoat, yellow breeches and stockings, red waistband, and a worsted cap—has with the exception of the petticoat and cap remained to the present time. Various changes have been introduced into the curriculum and conduct of the school. Under the scheme, compiled by the Charity Commissioners, which came into force in 1890, two day-schools for 600 boys and 400 girls were opened in addition to the hospital or boarding schools—London senior boys 700; Hertford junior boys 120, and girls 350. The Council of Almoners are authorised to examine into each case of admission to the boarding schools, and, if they be of opinion that the parents or next friends of a pupil can afford the contribution, a charge of £10 to £20 may be made. As regards the admission of the children to the boarding schools: 325 presentations belong to the President, some of the City Companies and certain officials, 100 nominations may be made by the Council of Almoners (43 members), and 150 places in the schools are thrown open to competition among children approved of by donation governors. The other places are filled up by 179 children from the public elementary schools of the metropolis, subject to success in the competitive examination, by 12 children nominated by parishes which before 1890 possessed the right to nominate, and by 384 children nominated by the governors of endowed schools after a school attendance of two years. The income of C. H. amounts to between £50,000 and £60,000, the original foundation having been enriched by various subsequent ones, particularly that of King Charles II. of £7000. In 1683 a preparatory school was founded for both girls and boys at Hertford, the former, however, remaining there permanently, while the boys go to London when they are old enough. The age of entrance is nine, and of leaving fifteen, although 'King's Boys' (those who attend the mathematical school, founded by Charles II.) and 'Grecians,' *i.e.*, the highest class, eight of whom are sent on scholarships either to Oxford or to Cambridge, remain longer. Besides these scholarships there are several exhibitions, prizes, and other scholarships. The building of C. H. has had numerous vicissitudes; it was destroyed in the Great Fire of 1666, and has been twice rebuilt, first by Sir Christopher Wren, and secondly, in 1825, by Shaw. The number of masters, including lecturers, at the London Hospital School is thirty and the subjects taught include classics, mathematics, modern languages, drawing and music; boys who require it are trained for commercial posts. Some very eminent men have received the earlier part of their education at C. H.; among others Camden, Stillingfleet, Richardson, Coleridge, Charles Lamb, and Leigh Hunt. Attempts have been made to remove the London scholars to the country, and a site has actually been purchased, but owing to the strong opposition of certain persons who support the school, no further steps have been taken. For interesting accounts of the school, see, among other books, *Annal of C. H. by a Blue*, and *Taunton's Great Schools of England.*

Christ's Hospital.

Chromat'ic passages, in music, are passages proceeding by, or containing, intervals differing (by a semitone in tempered instruments) from those of the ordinary or diatonic scale of the key in which the passages are written. They are used for the sake of variety or piquancy, or to attain some special effect, and under these circumstances are agreeable; but if employed too often, the ear tires of them, and the music (as is so often the case with Spohr's compositions) loses strength and vigour. The expression *C. scale* is often (incorrectly) applied to a series of consecutive semitones like the notes of the pianoforte.

Chromatic, in optics, opposed to Achromatic (q.v.).

Chromatics, that part of optics which treats of colour. A pencil of sunlight, when passed through a prism, decomposes into a beautiful series of various coloured tints, passing by continuous gradation into each other. Newton believed this series to be composed of seven primary colours, the intermediate shades being produced by the intermixture of two of the primary ones. It was Brewster's opinion, and in this he is supported by Clerk-Maxwell, that there are only three primary colours—red, yellow, and blue. See SPECTRUM ANALYSIS.

The colours of natural bodies are dependent upon their power of absorption for the different coloured rays. Every body, if thin enough, is transparent; hence, if a pencil of light fall upon a body, it penetrates to a certain distance, and naturally a portion of the radiant energy of the light is absorbed and transformed into another kind of energy, probably heat. If blue be absorbed in this way, the body will appear orange; if green, red; and so on. The varied tints of mother-of-pearl are due to reflection from a corrugated surface.

Chrome Alum is the double sulphate of chromium and potassium, analogous in composition to the double sulphate of aluminium and potassium, or alum. It may be obtained in large violet octahedra by a spontaneous evaporation of its solution, prepared by boiling a solution of bichromate of potash to which oil of vitriol has been added with alcohol, as long as the smell of aldehyde is perceptible. Solution of C. A., if prepared in the cold, is violet coloured, but when heated becomes green, and from this green solution no crystals separate; on standing for some weeks, however, the green solution becomes violet, and deposits the salt.

Chrome Green (the sesquioxide of chromium) is a beautiful dark-green pigment used in painting porcelain and as an ingredient in green glass and enamel.

Chrome Red (a basic chromate of lead), of various shades of red and orange, is used in calico-printing and the arts generally.

Chrome Yellow (chromate of lead) is most useful in the arts, and exhibits distinct shades according to the mode of its preparation, known as *lemon yellow*, *Paris yellow*, *Leipsic yellow*, &c.

Chro'mium is a metal, and was discovered in 1797 by Vauquelin in a Siberian mineral, called by mineralogists *red-lead*,—a compound of C. with lead and oxygen. C. derives its name from the fact that its compounds are coloured (Gr. *chroma*, 'colour'). Its most abundant ore is *chrome iron*, a compound of its oxide with oxide of iron. The colours of *emerald*, *olivine*, *serpentine*, *spinelle*, &c., are due to its presence. Metallic C. may be obtained by subjecting a mixture of its oxide and charcoal to an intense white heat. It is steel-grey in colour, brittle, and after having been fused, is so hard that it will scratch glass. Its atomic weight is 52·4. Bichromate of potash is the most important compound of C., and from it all other derivatives of the metal are prepared. It is manufactured for commercial purposes by strongly heating chrome iron (previously reduced to a fine powder) with a mixture of carbonate of potash and nitrate, in a reverberatory furnace. After a sufficiently long fusion the resulting mass is broken up and treated with boiling water, when chromate of potash is dissolved out. In order to convert the chromate into bichromate, the solution of the former is mixed with acetic acid, and the whole evaporated to the crystallising point, when the bichromate separates in large prisms, having a beautiful orange-red colour, whilst acetate of potash remains in solution.

Chro'motism, or **Chromism,** a disease of plants consisting of an unnatural colouring of leaves, such as when they become red, variegated, &c.

Chro'motype. Under this name Robert Hunt published in 1843 a photographic process, in which a solution of sulphate of copper and bichromate of potash is employed to prepare a sensitive surface, nitrate of silver to develop the picture, and washing in water to fix it. The process never had any great success, but it is recommended as yielding excellent results in copying botanical specimens and engravings.

Chron'icle (Fr. *chronique*, Lat. *chronica*, from Gr. *chronos*, 'time'), a form of history in which events are narrated simply according to their sequence in time. Chronicles exist both in prose and rhyme. Much of early European history is preserved in this shape. For our own country, the most valuable record of this kind is the old English *C.*, commencing with the Christian era, or rather with the invasion of Britain by Julius Cæsar, and reaching down to the accession of Henry II.

Chron'ogram, or **Chron'ograph** (Gr. *chronos*, 'time,' and *gramma*, 'a letter,' or *graphein*, 'to write'), a device by which a date is expressed by certain letters of an inscription being printed in a larger type than the others. In the C.—

georgIVs DVX bVCkIngaMIæ,

from the name of George, Duke of Buckingham, the date, MDCXVVVIII. (1628), is that of the year of his assassination by Felton. The close of the Seven Years' War is thus finely expressed—

Aspera beLLa sILent: reDIIt bona gratIa paCIs;
O sI parta foret seMper In orbe qVIes,

which gives the year 1763. An anagram was sometimes united with a C., as in this on General Monk—

GeorgiVs MonCe DVx de AumarLe,

which is intended to be read thus—

Ego Regem reduxi, Ano. Sa. MDCLVV.

Chron'ograph, an instrument for registering very small intervals of time. The principle upon which all such instruments depend is that of uniform motion. A graduated dial-plate or cylinder is made to rotate uniformly under the action of clockwork, and a mark or dot is made at the instant of occurrence of any phenomenon. The permanent mark is made either by the observer himself, as in Benson's race-C. and in Strange's astronomical C., or by the action of electric currents and electro-magnets. To this latter class belong the chronographs of Navez, Boulengé, Leurs, Noble, and Bashforth, whose work on the *Motion of Projectiles* gives descriptions of two of his instruments, and accounts of interesting experiments upon the velocities of bullets. See also Owen's *Modern Artillery*.

Chronol'ogy is the science of the measurement of time. That part of it which treats of the units of time as regulated by the heavenly bodies is properly Theoretical or Mathematical C.; that which treats of the methods adopted by different nations of dividing these units into smaller, and uniting them into longer periods of time is Technical or Applied C., and that which treats of the lapse of time in the history of nations is Historical C. The principal parts of the first two of these divisions will be found discussed under HOUR, DAY, WEEK, MONTH, YEAR, &c.; only the last can be briefly noticed here.

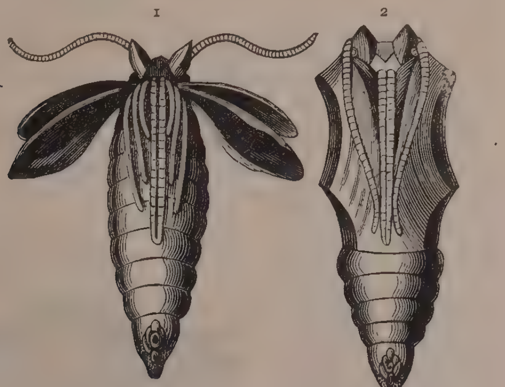
To fix the *date* of an event is to tell how long ago it happened. This is done by counting the time, measured by years, &c., from some *epoch*, that is, a point of time marked by some very striking event. A long period of time, which is measured by events in it being reckoned from a certain epoch, is called an *era*. Thus all Christendom reckons its time from the birth of Christ, and the period from that epoch to the present time is the Christian era. The Greeks reckoned from the first Olympiad at which the victor's name was recorded, *i.e.*, B.C. 776; the Romans from the foundation of Rome, B.C. 753; the Mohammedans from the flight of Mohammed, A.D. 622. The Egyptians, Hindus, Chinese, Assyrians, Babylonians, Persians, &c., all had their systems of C. The Hebrew system has always been regarded by Christians, who hold the Hebrew Scriptures to be inspired, as the most important, because by it the age of the world and of mankind is supposed to be fixed. According to Hebrew C., which is counted almost entirely by lives of men, from the Creation to the Deluge (q.v.) was 1656 years, from the Deluge to the birth of Christ, 2348. In modern times the science of geology has shown this 6000 years to be too short for the age of the world and of man; and authentic records of the Egyptians and Assyrians have shown the time allowed from the Deluge to be too short. Accordingly various plans have been adopted for allowing more time, without imperilling the infallibility of Scripture. The latest chronologers, on this principle, taking into account the variations of the LXX., &c., fix the Deluge at B.C. 3099, or 3159, and the creation of Adam about B.C. 5361, or 5421.

Chronom'eter (Gr. *chronos*, 'time,' and *metron*, 'a measure'), the name usually given to an instrument, constructed upon the same principle as a watch, but much more delicate and trustworthy, the irregularities arising from changes of temperature and other external influences being as far as possible compensated for. The C. is indispensable for the determination of longitude at sea. See Horology.

Chron'oscope (Gr. *chronos*, 'time,' and *scopos*, a 'mark'), one of the many inventions of Sir Charles Wheatstone, is an instrument which is capable of measuring the duration of short-lived flames, and of showing discontinuities in certain luminous streaks. A mirror is made to move rapidly in such a manner that the reflection of a continuous flame would be a complete circle, that of a flame of short duration a greater or less arc, that of an instantaneous flash a point, and that of a discontinuous flame a succession of points. The electric spark is found by this means to be instantaneous.

Chru'dim, a walled town of Bohemia, on the Chrudimka, about 62 miles S.E. of Prague, with a splendid collegiate church, a Capuchin convent, and high school. Cloth is manufactured, and there are great horse markets. Pop. town 12,220; district 48,338.

Chrys'alis (Gr. *chrusallis*, 'the gold-coloured sheath of butterflies'), the name popularly applied to the second or pupa stage in the metamorphosis of insects, and more notably to those pupæ which exhibited golden spots or lustres. There are infinite variations, not only in the coloration, but in the general form and attachments of chrysalids, and for fuller information the reader may consult the articles Insect, Transformation, Metamorphosis, Butterfly, Moth, &c.



Chrysalis of large Tortoise-shell Butterfly, magnified.

1. With the upper parts opened; 2. With the upper parts pressed down and adhering to the body.

Chrysanthemum (Gr. *chrusos*, 'gold,' and *anthemon* =*anthos*, 'a flower,'), a genus of Herbaceous or somewhat shrubby plants, belonging to the natural order *Compositæ*, chiefly natives of the temperate parts of the Old World. There are only two native species in Britain, the ox-eye daisy and the corn-marigold, the former having a white flower with a yellow disk, the latter a bright yellow flower, often very common in corn-fields. Many foreign species have been long cultivated in our gardens, but the flower popularly known as the C. is *Pyrethrum Sinense*.

Chrysipp'us, an ancient Greek philosopher, born in Cilicia, B.C. 280. After losing his property, he attached himself to the Stoic lecturer Cleanthes, became the head of the Porch, and attacked with great spirit and a keen logic Epicureans, Academicians, and Aristotelians. It is said that he was for a time converted to scepticism by Arcesilaus, and then composed his work on Custom. Undoubtedly C. was more accurate than his predecessors, tracing the Cataleptic Phantasm (or true perception) to repeated and intense modifications of the soul, and taking as the principle of duty the nature of man, and not of the universe. The latter view he carried into great detail, insisting on the duty of preserving health and of acquiring riches, while still condemning most of the emotions to eradication. C., who was said to have written 700 books, discoursed on the education of children. In logic his name is connected with the elaboration of the *Sorites*. In physics he adopted the usual optimist theory of the Stoics based on a passive matter and an active reason. Only fragments of his numerous writings remain. See Petersen's *Philosophiæ Chrysippeæ Fundamenta* (Hamb. 1827).

Chrys'is (Gr. 'golden'), a genus of Hymenopterous insects, including those forms popularly known as 'ruby-tailed' flies. The *C. ignita*, or 'ruby-tail' of this country, is the most familiar species. These insects belong to the tribe *Tubulifera* of the Hymenopterous order, and are generally found on walls, palings, sandbanks, and like situations. The larvæ of C. attack bees in their hives.

Chrysobalana'ceæ, a family of Dicotyledons allied to the order *Rosaceæ*, of which order, indeed, it is sometimes looked upon as only a subdivision. There are nearly 100 species—all trees or shrubs—natives of the tropics of the Old and New Worlds, though more abundant in the latter.

Chrysobalanus, a genus of plants of the natural order *Chrysobalanaceæ* containing four species, natives of the tropical parts of Africa and of America. One of the most common species is the cocoa-plum, which in the W. Indies forms a favourite conserve with the Spanish colonists, especially in Cuba. The kernels yield a fixed oil, and when made into an emulsion they are said to be a useful medicine.

Chrys'oberyl (Gr. *chrusos*, 'gold,' and *berullos*, a 'gem'), a transparent or translucent gem of great hardness, composed of alumina and glucina, coloured various tints of pale green by protoxide of iron, and sometimes with a bluish-white opalescence internally. When cut in facets, it exhibits a resplendent lustre almost equal to the yellow diamond. The opalescent variety shows best *en cabochon*, that is, with a convex surface The C. is chiefly found in alluvial deposits of rivers of Brazil and Ceylon; it also occurs in granite of the Mourne Mountains, in Ireland, and a variety called *Alexandrite*, after Czar Alexander I., is obtained from mica-schist in the Ural Mountains.

Chrysochlo'ris, a genus of Insectivorous mammalia represented by the golden mole of S. Africa. The C. resembles the Common Mole (q.v.) in form, but is somewhat less in size. Its peculiarity consists in the iridescence of its fur; the beautiful play of metallic tints and lustres exhibited by this form procuring for it its name of golden, changeable, or shining mole. The *setæ* or bristles of the sea-mouse amongst the worms of *Annelida* (q.v.) exhibit the same iridescent lines. The front feet have four toes, and the hinder ones are five-toed. No outer ears and tail are developed. The teeth of both jaws fit exactly into each other, and the food consists of insects and worms.

Chrysocoll'a, an impure hydrous silicate of copper of a green or bluish-green colour, found associated with copper ores. C. means 'golden glue,' an illusion to its resinous lustre and transparent edges.

Chrys'olite (Gr. *chrusos*, 'gold,' and *lithos*, 'a stone'). Transparent greenish-yellow crystals of olivine are so called. They are seldom an inch long, and are little used in jewellery on account of their brittleness. The best stones are brought from the Levant. *Peridot*, which, like the C., is a silicate of magnesia coloured by protoxide of iron, is sometimes used synonymously with it; but peridot is much softer, and of a yellowish-green colour.

Chrysolo'ras, Manuel, one of the scholars who promoted the great revival of learning, was born of noble family, at Byzantium, about 1350. He was sent, probably in 1389, by Joannes Palæologus, the Byzantine emperor, to France, Italy, and England to solicit aid against the Turks. Though his embassy was not successful, C. made many friends in the W., and in 1397 he settled, as teacher of Greek literature, at Florence, where he attracted numerous audiences, and had among his pupils Aretino, Guarini, Leonardo Bruni, Poggio, and Filelfo. He taught also at Milan, Pavia, and Rome, where he won the esteem of the Pope, who intrusted him with a mission to the Emperor Sigismund. He died on 15th April, 1415, at Constance, whither he had gone in 1413 to represent the Greek Church at the Council held there. C. is the author of numerous works which exist in MS. in the different libraries of Italy. Only two have been printed, the *Erotemata* (1488), a Greek grammar, 'the first, and long the only channel to a knowledge of that language, save oral instruction' (Hallam's *Intr. to Lit. of Europe*, ch. i.); and *Epistolæ tres de Comparatione veteris et novæ Romæ* (Par. 1655).

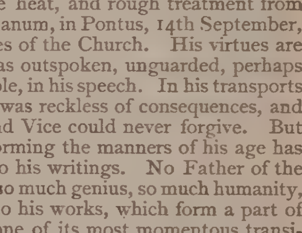
Chrys'oprase (Gr. *chrusos*, 'gold,' and *prasinos*, 'leek-green'), a variety of chalcedony, of an apple or leek-green colour, due to the presence of oxide of nickel. It is found in Lower Silesia, and in different localities in the U. S., and although made into brooches, bracelets, seals, &c., it is not held in great esteem by jewellers. The chrysoberyl of the ancients is supposed to have been C.

Chrysosple'nium, a genus of Saxifrages. *C. oppositifolum* and *alternifolum* are two common British species, the former being, however, rather more generally distributed than the latter. There are various other species scattered over the world, but none of any great beauty. In the Vosges they are used as a salad under the name of *cresson de roche* (rock cress).

Chrys'ostom, Joannes, Archbishop of Constantinople, and the most eloquent of the Christian Fathers (hence his name, Gr. *Chrusostomos*, 'golden-mouthed'), was born at Antioch in 347. His father Secundus, imperial general in Syria, died shortly after C.'s birth, but his pious mother Anthusa, who had been left a widow at the age of twenty, procured for him the best teachers in all the branches of learning. At first intended for the law, he studied rhetoric under the great pagan Libanius, who said, with bitterness on his deathbed, 'I would have left the care of my school to Joannes, but the Christians have snatched him from me.' After remaining three years with Bishop Meletius, he was induced to receive Christian baptism, abandon his profession, and enter the Church. He then spent six years of ascetic seclusion in the mountains of Antioch, engaged in a profound study of the Scriptures under the abbot Diodorus (afterwards Bishop of Tarsus), and having for companions Basil (St.), Gregory (Nazianzen), and Theodore (of Mopsuestia). Worn out with austerities, he returned to Antioch, and was ordained a deacon by Meletius in 381, and a priest by Flavianus in 386. For twelve years he preached at Antioch, delivering an immense number of sermons, orations, and homilies. Eutropius, the minister of the Emperor Arcadius, had heard the great preacher, and now inveigled him to Constantinople, much against his will, to fill the vacant archbishopric. But his life was too austere, his discipline too strict, and his denunciation of every kind of profligacy and error too faithful for that corrupt metropolis: the lax clergy (headed by Theophilus, Patriarch of Alexandria), many courtiers, and the Empress Eudoxia, combined against him, got him condemned by a packed synod (403). The charges brought against him were secret intemperance, inhospitality, violence towards his own clergy to the extent of striking them, reckless dissipation of the wealth of his church, impious and arbitrary acts, infractions of canonical laws, toleration of pagans (whom he too easily admitted to baptism), and an attachment to the doctrines of Origen. That C. indignantly repelled these accusations mattered nothing. The forty-five bishops were bent on his ruin, and they succeeded. C. was banished. When the populace of Constantinople heard the news they were stirred with fierce indignation. It was thought prudent to bring the great preacher back from his exile at Prinetos, in the Gulf of Nicomedia. But only a few months later he burst forth in church with a stern denunciation of the excesses that had marked the games held in honour of the empress. Eudoxia was furious. A council was again held at Constantinople, and the previous condemnation was confirmed. It was in vain that C. appealed to the Pope. Rome was helpless. The Goth was almost at her gates. On the 20th of June C. was carried off from his see by an armed force. His residence was fixed at Cucusus, in Armenia; but when his indefatigable pen, and the fame of his apostolic virtues, made him as powerful in adversity as on his episcopal throne, Arcadius ordered him to be transported to the remotest limits of the empire, under the shadow of Caucasus. On the way thither he sank under the fatigue of the journey, made on foot, the heat, and rough treatment from his guard; and died at Comanum, in Pontus, 14th September, 407. C. is one of the heroes of the Church. His virtues are noble and exalted. He was outspoken, unguarded, perhaps we may even say ungovernable, in his speech. In his transports of Christian indignation he was reckless of consequences, and uttered words that Pride and Vice could never forgive. But this sacred passion for reforming the manners of his age has given an immortal vitality to his writings. No Father of the Eastern Church has thrown so much genius, so much humanity, so much of his own age into his works, which form a part of Byzantine history during one of its most momentous transitions. They embrace homilies, sermons, commentaries, and epistles. Of the complete editions we may note those of H. Savile (Eton 1612); and Montfaucon and the Benedictines (1718-38).

Chrys'otype (Gr. *chrusos*, 'gold,' and *tupos*, 'impression'), a photographic process invented by Herschel, and one among the many modes of directly receiving the impression upon paper. The paper is prepared by immersion in a ferric salt, which is reduced by the action of light to a ferrous salt. Upon the reduced portions metallic gold is then precipitated, and the picture fixed by several washings in water and in a weak solution of potassic iodide.

Chub, a Teleostean fish, included in the Carp family, and found in most English and southern Scotch rivers. The average weight is about five pounds. It is coloured of a bluish-black on the upper parts, and silvery-white beneath. The sides of the head and gill-covers are yellow. It also occurs in European rivers, and spawns in April and May. The flesh is somewhat coarse, and hence the C. is not esteemed as a table-fish. The food consists of worms and insects; and the C. may be caught by means of insect-bait—real or artificial. The flesh is most seasonable in June or July. The scales used to be employed, like those of the dace and bleak, in inlaying-work, and in manufacturing artificial pearls.



Chub.

Chubb, Thomas, one of the English Deists of the first half of the 18th c., was born at East Harnham, near Salisbury, 29th September, 1679. First a glover, then a chandler in Salisbury, he was essentially an illiterate man, but had a mind which was fascinated by the theological controversy then raging, and he acquired facility in writing by making notes and observations on the deistical writings which were eagerly read by him. He produced a multitude of tracts similar to the writings of the time on the same side. C. died at Salisbury, 8th February, 1747. His posthumous works were published in 1748.

Chuck-Will's-Widow, a Fissirostral bird, belonging to the order *Insessores*, and to the family of Goatsuckers. This name is applied to it from its peculiar cry. It inhabits the southern regions of the U.S. of America, and is allied to the Whip-poor-will (q.v.).

Chucui'to, a town of Peru, department of Puno, on the W. shore of Lake Titicaaca, 15 miles S.E. of Puno, was a flourishing place till the 18th c., when it is said to have had a pop. of 300,000, which has now dwindled to 4520.

Chumbul' or **Chambal'**, a river of India, rises in the Vindhya range, and in the Malwa agency, flows N. and N.E. through a region of wild beauty, and joins the Jumna 90 miles S.E. of Agra, after a course of 570 miles. It has a rapid current, and receives many affluents, of which the chief are the Kally Sind, Parbutti, and Bumnass.

Chu'nam, the Indian name for lime obtained by calcining sea-shells, as well as for mortar or plaster prepared from it. The walls of houses in Madras usually receive three coats of plaster, the two first being composed of lime and fine river-sand, and the third of lime mixed with 'jaggery' (palm-sugar), and moistened with a strong infusion of coco-nut husks. When polished with rock-crystal rubbers, and stained, the plaster resembles the finest marble, and indeed almost equals it in durability.

Chunar', or **Chanar**, a town in the district of Mirzapore, N.W. Provinces, British India, on the Ganges, 17 miles S.W. of Benares. It has a strong fortress, overlooking the native town, and containing an old palace, an excavated well, a hospital, a prison, &c. The British gained possession of C. in 1764, and it was here that the treaty between Warren Hastings and the Governor of Oude was signed in 1781. Pop. 11,423.

Chuquisa'ca, also **Sucre**, formerly **Charcas** or **La Plata**, the capital of Bolivia, S. America, on the Chachimayo, in a sheltered plain 9000 feet above the sea. It is the seat of the government and of an archbishop, has a cathedral and other churches, a palace, the University of St. Xavier, a hospital, and a military academy. Pop. 24,120. C. was founded by the Spaniards in 1538, on the site of the native *Choqua Chaka* (*i.e.*, 'Bridge of Gold'), and received the name of La Plata from being near to the silver mines of Porco. Sucre, its latest name, was that of a general in the war of Bolivian independence. The *province* of C. contains rich silver mines and splendid antiquities, and has an area of 39,871 sq. miles, and a pop. of 285,980.

Church. It has been suggested that the word C., in Old Eng. *circ*, *cyrc*, or *cyrice*, is the Latin *circus*, and that it was first applied to the stone circle or Druidical temple of the Britons, and afterwards transferred to the Christian building. But this would leave unexplained the occurrence of the word in the other Teutonic tongues—*e.g.*, Dutch *kerk*; Ger. *kirche*. It is therefore more probable that the origin of the word is the Gr. *kuriake*, 'the Lord's house;' though it is sufficiently perplexing to understand how a nation like the English, who got their religion from Rome, should not have adopted the Roman name for a C. Perhaps Theodore of Tarsus, Archbishop of Canterbury, himself an Eastern by birth, may have had something to do with it. Its use among the other Teutonic races is more easily explained through the influence of Ulfilas (q.v.) and the Mœso-Goths. C. is the word used in the English version of the New Testament to translate the Greek *ekklēsia*, except when the latter occurs in its original civil sense (a number of people called together from among others), in which case 'assembly' is employed (Acts xix. 32). It was applied to the Jews, as the worshippers of Jehovah called from among the heathen (Acts vii. 38), and also, among them, to a congregation of worshippers (Ps. xxii. 22; *cf.* Heb. ii. 12). As used by Christians, it has several shades of meaning:—1. An assembly of Christians who meet for worship in a particular place (Rom. xvi. 5). 2. The collective Christians in a certain place, or as it were a national C. (Acts xi. 22, 26). 3. The whole body of Christian people, of all times and of all places, understood as called out from the whole body of mankind. 4. The idea of C., as a building, which is not found in the New Testament, unless it be in Matt. xvi. 18, but in the 4th c. the word had come to be generally used in that sense.

C., like the Gr. *kuriakē*, and Lat. *dominicum*, has the meaning of the Lord's house, or the building in which Christians meet for worship. Originally they were oblong, standing E. and W., with chambers for the clergy on both sides, and two doors in the W. end as separate entrances for men and women. They afterwards came to be built in various shapes—round, square, and especially in the form of a cross, sometimes with the eastern division inclined off the straight line towards the S., to indicate, it is said, the drooping of the Saviour's head upon the cross. All had an Apse (q.v.) borrowed from the Roman *basilica*. The threefold division lengthwise, of nave, choir, and sanctuary, is derived from the Jewish temple, with its court of the Gentiles, holy place, and holy of holies. There is also properly a threefold division latterly, formed by the nave and the aisles, and a triple elevation, the base-arcade, triforium, and clerestory. Churches are distinguished into various grades:—*Cathedral*, which contains a bishop's cathedra or throne; *collegiate*, served by a dean and chapter; *conventual* or minster, if connected with a convent or monastery; *abbey* or *priory*, if governed by an abbot or prior; *parochial*, if furnished with a font.

The following incidents in connection with churches may be worth recalling:—In Burnham Norton Church, Norfolk, seven stone weight of honey was found in a cavity of the roof, and in the parish church of Long Clawson, a comb of honey was discovered, measuring 5 by 2 feet. In the episcopal church of Tulare Co., California, a swarm of bees settled in the loft and comb after comb of honey was attached to the rafters until the temperature reached the melting point when the wax succumbed and altar, pulpit, chancel, and pews beneath were flooded with hundreds of pounds of the finest honey. At St. Mary's Church, Bristol, the horns of a cow are preserved in memory of the animal which kept many children alive with its plentiful supply of milk during a great dearth of pure water in the city. One of the most ancient churches in England, namely that of Greenstead-Ongar, Essex, is possessed of a nave composed of half trunks of oaks, set upright and close to one another. The trunks, about 1½ foot in diameter, have been split through the centre and roughly hewn at each end so that they are fixed in a plank at the top and in a sill at the bottom by means of wooden pegs. The length of the nave is 29 feet 9 inches, and the width 14 feet, and it is said to have served at the commencement of the 11th c. as a shrine of King Edmond the Martyr. Of all the churches in England, St. Michael's at Coventry has the widest nave, which is 125 feet in width. That of York Minster is 104½ feet wide, and next to it comes that of the Brompton Oratory. The nave of St. Paul's Cathedral is 102 feet in width, while that of Westminster Abbey is but 71¾ feet. St. Mary Magdalen at Oxford possesses the widest nave in proportion to its length of any church in England; the width is 90 feet while the length of the church is not more than 78 feet.

As a rule only one church is to be found in a churchyard, but there are exceptions. In the yard at Reepham, Norfolk, there are three churches, one in ruins being that of Hackford (All Saints) which suffered in the conflagration of 1600, the other two being actually in use, St. Mary's, Reepham, and St. Michael's, Whitewell. In the Priory grounds at St. Andrews, Fife, there are three churches in one yard—the Cathedral, the church of St. Regulus, and the church of St. Leonard's Priory—all in ruins. But there are several yards containing two churches; well-known examples being—the

Abbey and St. Margaret's, Westminster; St. James' and St. Mary's, Bury St. Edmunds; the Old and the New Grey Friars, Edinburgh, &c.; where service is held in both. There are also cases of two churches in one yard where one is in ruins or nearly so, such as Westbury-on-Severn, Overstrand (Norfolk), Heptonstall (Yorkshire), Hornsey (Middlesex). Many of our church steeples are covered with copper. St. Sidwell's at Exeter received a copper sheeting in 1825, and in 1745 St. John's, Hampstead, was covered with copper which has not been removed. St. Nicholas, Yarmouth, is understood to be the largest parish church, superficially, in England. It covers 23,085 sq. feet and contains over 3000 sittings, with standing room for 10,000 persons. Next to this church come St. Michael's, Coventry, with 23,080 sq. feet; St. Botolph's, Boston, with 22,270 sq. feet; St. Nicholas', Newcastle, with 20,110 sq. feet; Holy Trinity, Hull, with 20,036 sq. feet; and St. Saviour's, Southwark, with 18,200 sq. feet.

Church Dis'cipline. From the earliest times the principle was maintained in the Church that those who had violated their baptismal vows by scandalous transgressions should be excluded from participating in the Communion, and should not be again admitted to it till they had given satisfactory proofs of repentance. When this was done they were again admitted to the standing of Catechumens (q.v.), being divided into the same classes. Their penitence having thus been satisfactorily proved, they received absolution and benediction before the congregation, and were restored to the fellowship of the Church. This was the first form of Penance (q.v.) which the Church of Rome systematised, in connection with the Confession (q.v.), for all kinds of sins, even the most secret. But nowhere was C. D. more consistently and rigorously carried out than at Geneva, under Calvin, and nowhere has it lingered longer, in anything like its original form, than in the Calvinistic Churches of Scotland.

Church Discipline Act, is the statute, 3 and 4 Vict. c. 86, which repealed statute 1 Hen. VII. c. 4. By this, any clerk in holy orders, as to whose conduct doctrinally, ritually, or morally there may be some scandal or offence, may be proceeded against—first before a commission whose members are nominated by the bishop of the diocese where the offence is said to be perpetrated; and, secondly, before the bishop himself, sitting with assessors. The Judicial Committee of the Privy Council possess appellate jurisdiction in these cases.

Churchill, Lord Randolph Henry Spencer, third son of the sixth Duke of Marlborough, was born 13th February, 1849. He studied at Eton and Merton College, Oxford, where he graduated in 1871. He entered Parliament in 1874 as member for Woodstock, which place he represented till 1885, when he was elected member for South Paddington, which seat he retained till his death in January, 1895. At the general election in 1885 he was also a candidate for one of the divisions of Birmingham and was defeated. As leader of a small section of Conservatives, called 'the Fourth Party,' he became a power in the House of Commons, and his abilities were recognised in his being appointed in 1885 Secretary for India, and in 1886 Chancellor of the Exchequer, which he soon afterwards resigned. Though standing high in Tory favour, he did not conceal his democratic opinions, and pronounced again and again for Liberal measures. He was consequently observed with curiosity by both political parties. His oratory and his whole political bearing were characterised by a thoroughgoing audacity. He was dauntless in attack, and never yielded before the most hostile criticism. In 1893 C. returned from a lengthened tour in South Africa. In 1894 he visited America, travelled round the world, was taken ill on the journey, and returned to England in a comatose state, from which he did not recover. See *Life of Lord R. C.*, by T. H. S. Escott (Lond. 1895).

Church History is usually divided into *external* and *internal*. The former, which is C. H. proper, would at first be synonymous with a history of the propagation of Christianity, and would always be concerned chiefly with the relation of Christianity to the civil and religious state of the countries in which it was propagated, on which the fate of the Church would depend. The latter, which is properly the history of the Christian religion, is concerned chiefly with the doctrine and government of the Church. The first Church historian was Eusebius (261-340, q.v.), who wrote a history of the Church, 'from the very origin of the dispensation of our Lord,' to the accession of Constantine as sole emperor (324). He seems to have relied upon something like inspiration to guide his researches, for he acknowledges that his materials were next to none. His work was continued by Theodoret (q.v.) down to 429. The next who wrote was Socrates (q.v.), whose C. H. extended from the accession of Constantine (306) to 439. Sozomen (5th c.) wrote a history of the same period as the last two. Next Philostorgius (born 358), an Arian, wrote a history of Arianism from about 300 to 425. Evagrios wrote a C. H. of the period from 431 to 594. Sulpicius Severus (end of the 4th c.) wrote a sacred history from the Creation to A.D. 400. These are the chief writers of C. H. proper near the fountain-head, from whom the legion of later writers must all derive their materials. For a history of doctrines, which is a branch of C. H., of rites and ceremonies, and of some other matters connected with it, much information is also to be found in the numerous and voluminous writings of the early Christian Fathers. On the rise of separate states in Western Europe, after the dismemberment of the Roman Empire, each country in due time produced its roll of Church historians, of whom the most interesting and important for Englishmen is the Venerable Bede (q.v.). Since the Reformation C. H. has been written from the Roman Catholic and Protestant points of view by many erudite and able scholars. Others, again, like Neander in Germany and Milman in England, have sought to exhibit the historical development of the Christian Church without any polemical bias. A full account of all the writers of C. H. up to the middle of the 18th c. will be found in Walch's *Bibliotheca Theologica Selecta;* of more recent ones in Lowndes' *British Librarian.*

Church Rates, in England, constitutes a tax on the parishioners to defray the expense of upholding and repairing a church and its appurtenances. The rate was imposed by the parishioners, convened by the Churchwardens (q.v.), and the vote of the majority was binding on the whole. There is no law which obliges the parishioners to provide C. R., consequently when Dissent is in a majority, or even possesses a strong minority, there is often no fund to repair churches—many have consequently become ruinous. The levying of C. R., and questions in connection with so doing, was long a source of animosity in England; but by the Act of 1868 (31 and 32 Vict. c. 109) compulsory payment has been abolished. Voluntary contributions and bequests, for the ecclesiastical purposes of a parish, are, under the Act, now administered by a body of Church trustees. Those who do not contribute are by the statute disqualified from interfering with the administration of the funds raised as C. R. But by the same statute C. R. were continued in those parishes where at the time (1868) money had been borrowed and remained due on the security of the C. R. The statute did not interfere where the rates were applied to purposes not ecclesiastical, or where they had been imposed by special legislation in lieu of tithes or other valuable consideration.

Churchwardens, in England, are ecclesiastical officers whose function it is to take care of the edifice of the church, and all that belongs to it. They are also expected to take cognisance of the behaviour of the congregation in all matters within ecclesiastical jurisdiction. They are chosen annually in Easter week, either by the clergyman or by the parish, or by both together, and generally are two in number. They are obliged to serve after being chosen and are sworn to serve faithfully. The following are not compelled to serve: peers of the realm, members of Parliament, sheriffs, acting justices of the peace, clergymen, solicitors, practising physicians or surgeons in London, practising apothecaries, Roman Catholic clergymen, officers in navy, army, or marines (even when on half-pay), registrars of births, &c.; excise, custom, and post office officials, non-residents within the parish, if they do not occupy there a house of trade.

Church′yard. In England a C. has been legally described by Sir William Scott as 'a consecrated place, entitled to public protection, and in which nothing should be done but under the direction of a public authority.' In Scotland, there is no rite of *consecration* either according to civil or ecclesiastical laws; but the C. is entitled to legal protection. The rector or vicar is the freeholder of the C.

Churchill, Charles, an English satirist, whose profligacy has perhaps hindered justice from being done to his genius, was born at Westminster in February, 1731, and educated at Westminster School, where he neglected his studies, and contracted a clandestine marriage in his eighteenth year. In 1756 he took holy orders, and in 1758 succeeded his father as curate of St. John's, Westminster. In 1761 he published anonymously the *Rosciad*, a clever satire on actors and theatrical managers, which took London by storm. 'The noise in the theatrical world was like that caused by the report of a gun in a rookery. The actors ran about the town, spreading their own grievances, and the satirist's name at the same time' (Hannay). Now avowing the authorship, he published in rapid succession *The Apology* (addressed to the writers of the *Critical Review*), *Night*, *The Ghost*, and other satires. Meanwhile he had been living so dissipated a life that he had to resign his curacy. His health failed, and he died at Boulogne on a visit to Wilkes, of whom he was a warm partizan, 4th November, 1764. C. was once known as the British Juvenal, and even yet, all who can forget the man and look only at his works must admit him to be a true poet. See Bell and Daldy's edition of his poetical works, with a Memoir by James Hannay.

Churching of Women, or *Thanksgiving after Childbirth*, is a usage of the early Church, borrowed from the Jewish rite of purification (Lev. xii.), still retained as compulsory in the Roman Catholic and Greek Churches, and for which there is also a service in the Liturgy of the Church of England.

Churn (Old Eng. *cyrn*, from *cerran*, 'to turn;' Low Sc. *kirn*), an implement for preparing butter from cream or milk. For the separation of the fatty particles which form butter, it is necessary that the minute sacs in which the fat is enclosed should be ruptured, and this is accomplished by violent agitation or 'turning' about of the fluid in a C. The object of churning is therefore to enable the solid fat to come together in the masses which constitute butter. A great many plans for the construction of churns have been adopted, and as the operation they have to perform is simple, they are all more or less efficient. The chief aim in the construction of the C. is to save time and labour, and to separate the butter completely. The most common form of the C. is the upright plunger, which consists of a long narrow tube or cylinder of cooper-work, tapering gently upwards, with a movable cover on the top. Through the centre of this cover the staff of the plunger is made to work piston-wise, at the lower extremity of which the agitator is secured. The agitator consists of a reticulated framework of wood, of a diameter sufficient to work easily within the C. Another common form is the Box-C., which consists of a box of birch or plain wood very carefully jointed, having an agitator formed of four radial arms joined by cross-bars, which is worked by a winch-handle. Some churns have a reciprocating motion, and others a see-saw or cradle motion, but they are little used. The atmospheric C. is a form which has also come into favour. Its peculiarity consists in an arrangement by which air is introduced into the fluid, and by its bubbling out causes a very effective agitation. It is said to save considerable time and labour, while at the same time it thoroughly separates the butter.

Chusan′, the principal island in a small group off the E. coast of China, 45 miles N.E. of Ningpo, is about 18 miles long and 10 broad, and 50 miles in circumference. It is mostly mountainous, but is intersected by cultivated valleys, yielding tea, rice, wheat, sweet potatoes, cotton, tobacco, chestnuts, &c., and growing bamboo, camphor, and tallow-trees. Ting-hai, the capital, is surrounded by walls, and has a fine Buddhist temple. C., called 'the key of China,' was taken in 1840 by the British, who evacuated after eight months' occupation, but again seized it in October, 1841, and held it till the end of the Chinese war. It was again taken by them in 1860, but was ceded to China by the convention of Pekin. The sacred island of Pu-tu is the next in importance of the group to which C. gives name. It is inhabited solely by Bonzes and others of the religious class, and contains many fine pagodas and Buddhist temples.

Chut′ney, a condiment of Indian origin, used with meat, game, fish, and animal food generally. The basis of the preparation is an acid or sub-acid fruit, to which spices and flavouring ingredients are added. The fruit most usually employed as a basis of C. is the mango, and numerous varieties are prepared for use, the recipes for which vary. The banana and lime are also used in the preparation of C.

Chyle (Gr. *chulos*, 'a juice,' from *chein*, 'to pour'), the name given to the matter absorbed by the lacteals in the villi of the small intestine. It is found in two conditions—first, before, and second, after, it has passed through the mesenteric glands. To the naked eye, in both conditions it presents much the same appearance; but when examined under a magnifying power of 250 diameters, it is found to present a marked difference. Before passing to the mesenteric glands it consists of a fluid in which there are multitudes of very small molecules which refract light strongly, and evidently consist of fat. These molecules have been termed the *molecular basis of the C.* When examined after passing through the glands into a special cavity called the *receptaculum chyli*, it is found that the molecular matter is much more scanty, while there are numerous corpuscles present, resembling either the colourless cells of the blood, or biscuit-shaped cells, not unlike the coloured corpuscles. The C. passes from the receptacle just alluded to through the thorax along the thoracic duct, and is poured into the venous system at the root of the neck, at the junction of the left internal jugular vein with the left subclavian vein. C. has been found to contain fibrin, albumen, fat, alkalies, and a small amount of iron. During fasting the C. is poor in solid matters, more especially in fat. A diet containing fat increases the milky appearance of C. owing to the increased amount of fat absorbed. The C. of a cat, according to Nasse, yielded in 1000 parts the following constituents:—Water 905·7, and solid matter, 94·3. The solid matter was composed of—fibrin, 1·3; fatty matter, 32·7; albumen, 48·9; chloride of sodium, 7·1; other soluble salts and traces of iron, 2·3; and earthy salts, 2·0. See Digestion, Lacteals, Villus.

Chyme (Gr. *chumos*, 'a liquid or juice,' from *chein*, 'to pour'), the name given to food after it has been digested in the stomach, and before it has been acted on by the biliary, pancreatic, and intestinal secretions. Some apply the term to food while in the stomach or small intestine. In the latter, part of it becomes absorbed either by the blood-vessels or by the lacteals. See Digestion.

Cialdi′ni, Enrico, an Italian general and politician, was born at Lombardinæ, Modena, 8th August, 1811. Exiled for sharing in a rising against the Austrians in 1831, he studied at Paris and fought against Don Carlos in the Spanish war of succession. He played a brilliant part in the Venetian campaign of 1848-49, and served as colonel among the Piedmontese who engaged in the Crimean war. He won distinction in the Italian war of 1859; defeated the Papal troops at Castelfidardo in 1860; was made, after capturing the citadel of Messina, general of the army; and in 1861 succeeded San Martino as lieutenant-general of Naples, where he strove vigorously to suppress brigandage. He was elected senator in 1864. He ably opposed the Austrians in the Venetian campaign of 1866, and was in the same year made commander-in-chief of the troops of Central Italy.

Cibb′er, Coll′y, English dramatist, was the son of Caius Gabriel Cibber or Cibbert, a sculptor from Holstein, and was born in London, 6th November, 1671. About 1690 he became an actor, and came before the world as a writer of plays in 1695, when he produced the *Love's Last Shift*, soon followed by *The Woman's Wit*, *Careless Husband*, &c., which were very popular at the time, and brought C. much money. In 1711 he became one of the joint patentees of Drury Lane, and in 1730 was made poet-laureate, an appointment which secured him an unenviable immortality in the *Dunciad*, to the author of which he had given offence. He died 12th December, 1757. Some of C.'s pieces are still acted, but the work by which he is best known is his amusing *Apology for his own Life*.

Cibra'rio, Luigi, an Italian jurisconsult and historian, born at Turin, 23rd February, 1802, where he graduated as doctor of civil and common law in 1824. Nominated a senator in 1848, he was, after the fall of Carlo Alberto and his retirement to Oporto, deputed by his colleagues to visit him in his voluntary exile, and try to induce him to return to his kingdom. The result of this unsuccessful mission he published in 1850 in *Ricordi di una Missione in Portogallo al Re Carlo Alberto*, which threw a vivid light on the Italian Revolution of 1848. Besides these he published several histories, as well as numerous editions of ancient Italian authors, illustrated by valuable notes. Under Vittorio Emanuele he was appointed superintendent-general of customs in 1850, Minister of Public Instruction in 1852, Minister of Foreign Affairs in 1855, and afterwards principal secretary to the King. His *Operette Varie* were published at Turin in 1860. C. died at Salo, in Brescia, 1st October, 1870.

Cica'da, a genus of Homopterous insects, included in the section *Trimera* (three-jointed tarsi). These insects belong to the Hemipterous group of the order Homoptera, and possess short broad heads. The eyes are large and prominent, and three ocelli exist, placed in the back of the head. The beak or rostrum is long and three-jointed. The males possess peculiar 'drums' at the base of the abdomen, whereby they produce loud sounds. The females possess ovipositors, saw-like in form. The antennæ are seven-jointed. The sound of the males is very loud, and can be heard at a great distance. The colour of the insect is yellowish. The wings are firm, transparent, and shining, and the nervures are distinct. These insects are mostly tropical in habits, one species occurring in the S. of England. Several species are eaten like locusts. The ancients knew of these insects, and said that the cicadas should be happy insects, since they had 'voiceless wives.'

Cicc'a, a genus of plants of the natural order *Euphorbiaceæ*, consisting of small trees and shrubs, natives of tropical India, Africa, and America. The 'Otaheite gooseberry,' is a C., and is a native of India, but is cultivated in that and in many other countries for the sake of its fruits, which are used either raw or cooked in various ways. The Europeans pickle or preserve them, or bake them in tarts. In Java they are sold in the market for about threepence per gallon. A decoction of the leaves causes perspiration, and the roots are a violent emetic. The wood of the *Indian C.*, of Bombay and Ceylon, is white and tough, and is used for shipbuilding in the latter country. Its light-blue seeds constitute a favourite food of the green pigeon.

Cic'ely, a genus of umbelliferous plants, of which one species, the sweet C., is common in Southern and Central Europe, though in Britain, from being generally found near human habitations, it is looked upon as introduced. It is allied to the *Chevril* (q.v.), and indeed is sometimes so called; in Scotland it is known as *Myrrh*. In Germany the seeds, roots, and young leaves are used for giving an anise-like flavour to soups, &c., and at one time they were used as an aromatic in medicine. In America, *Osmorrhiza* is called *sweet C.*

Cic'ero, Marcus Tullius, the prince of Roman orators, and famous also as a statesman and man of letters, was born near the town of Arpinum, under the Volscian Hills, 3rd January, B.C. 106. His family belonged to the equestrian order, but was not accounted 'noble.' C.'s father—a quiet country gentleman—anxious to give his sons the best education in his power, had them removed to Rome, where the future orator was instructed under Greek teachers in all the branches of a liberal education. At the age of sixteen he entered on his special studies for the bar. In the Marsic War, in 89, he acquired a knowledge of military tactics under Sulla; but after a brief period of service he returned to philosophical studies. He made his first appearance as a pleader at the age of twenty-five, and two years after secured the acquittal of Roscius, who had been charged with parricide by Chrysogonus, one of Sulla's favourites. Briefs now poured in upon him, and after a time of intense exertion, which threatened to impair a constitution never robust, he retired for a while to Athens and Asia Minor, to pursue the congenial studies of elocution and philosophy. Fame and honours awaited him on his return. Elected Quæstor in 76, he earned by his able and just administration of the government of Sicily in the following year the gratitude of the Sicilians, to whom he still further endeared himself by his successful impeachment of their Prætor, Verres, B.C. 70. After passing through the offices of Ædile, in 69, and Prætor, in 66, he was elected Consul in 64 by acclamation rather than by vote. In the following year, with consummate courage, caution, and decision, he denounced and crushed the famous conspiracy of Catiline (see CATILINE), for which he received the thanks of the people, and was hailed 'Father of his country.' Public thanksgivings in his name were voted to the gods, an honour hitherto accorded only to victorious generals. But in putting the imprisoned conspirators to death without trial, C. had been guilty of an act which, though perhaps morally justified by the emergency, was clearly illegal, and he was called to account for it by Metellus Celer. The enthusiasm of the people proved all-sufficient for him at the time, and but for the vehemence with which he attacked Clodius for invading the rites of the Bona Dea, the charge might have been allowed to rest for ever. Clodius, however, bent on revenge, sought, and in time obtained, the tribuneship, revived the charge, and compassed C.'s banishment, April, 58. On 4th August, 57, a bill for his recall was submitted to the Comitia Centuriata and carried; whereon he set out for Rome, which he reached on 4th September, 'borne back,' as he himself says, 'on the shoulders of Italy.' But his spirit had been broken by exile, and he tamely submitted to many degradations, and condescended to acts of servility towards men whom he despised. His time-serving policy with regard to Cæsar and Pompey was fraught with mischief to the state, and marred his reputation as a patriot. On the other hand, the independence evinced by his defence of Milo is a redeeming feature in his character. During the years 57-52 were composed his *De Oratore*, *De Republica*, and *De Legibus*. In 53 C. was elected into the College of Augurs, and in the following year appointed to the government of Cilicia, which he managed with great ability and success (51-50). He returned to Rome by Ephesus and Athens at the outbreak of the civil war, in 49, and after much vacillation joined the side of Pompey, whose standard he forsook after the battle of Pharsalia, B.C. 48. Having obtained a reconciliation with Cæsar, he retired to the country and wrote many philosophical and theological works, chief of which were *Orator*, *De Finibus*, *Hortensius*, *Tusculanæ Disputationes*, *De Natura Deorum*, *De Senectute*, *De Amicitia*, *De Officiis*. On the murder of Cæsar, in 44, C., who was inclined to throw in his lot with Brutus and Cassius, advised an adjustment of the differences between Antony and the Senate, but to no purpose. Then followed those terrible Philippics—of fame how fruitful, to himself how fatal!—in which he denounced Antony with relentless bitterness. The dazzling glory with which he had been for a few brief months encircled now paled; the defection of Octavian, in whom he had placed unlimited confidence, was followed by the second triumvirate, and the name of C. was in the list of the proscribed. Octavian made no effort to save him, and the emissaries of Antony overtook him near Formiæ as he fled in a litter to Cajeta. Deeming resistance vain, with becoming fortitude and resignation he extended his head from the litter, and it was severed from his body by

Herennius, 7th December, B.C. 43, in the sixty-third year of his age.

Middleton, in his charming but partial biography of the orator, has exhibited him as a pattern of splendid virtue and blameless honour; while Drumann and Mommsen have assailed him with great bitterness and severity. C.'s character was of the Asiatic type. He was ambitious, fond of pomp, greedy of applause, timid, and irresolute. In private life he was kind and amiable. In his literary compositions his fame is of the highest, and his style is a model of purity. His philosophical works breathe the strictest morality, and are especially valuable as reflecting the different views of the Greek schools of philosophy. As a poet he ignominiously failed. As a statesman his abilities were great, but often misdirected; to the active virtues of a patriot he can lay no claim. As an orator he was without a rival.

The *editio princeps* of C.'s collected works was printed at Milan in 1498.

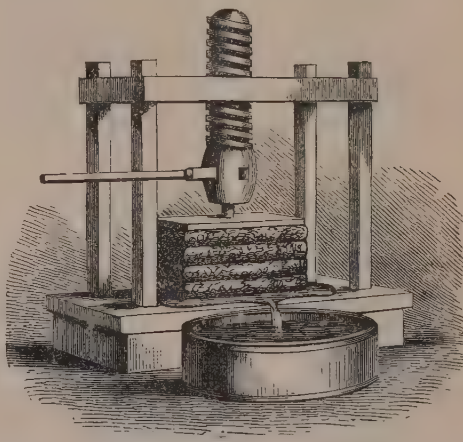
Cicero'ne (from *Cicero*, the orator), a term given by the Italians to those persons who point out to strangers the curiosities of a place, and now generally applied to any one who acts as a guide. The etymology of the word indicates ironically the noted garrulity of such officials.

Cicisbe'o, an Italian term for a gallant, a dangler after ladies. In the *Dizionario della Crusca* it is applied to the knot of ribands formerly attached to the hilts of swords or to the handles of fans. So a C. is a man in constant attendance upon a lady, and at hand to receive her commands. The term was applied more particularly to a class of men who attended on married ladies, and is synonymous with *cavaliere servente*. The custom, formerly prevalent in fashionable Italian society, has now almost disappeared.

Cid, The, Don Rodrigo Diaz de Bivar ('he of the perfect beard'), was born at Burgos in the year 1025, in the reign of Sancho III. of Navarra, and of a family from whom had been chosen the 'judges of Castilla.' C. is derived from the Arabic *Said*, or master: his other title, *El Campeador* (corrupted by the Arabs into *Cambitûr*), means either national champion or umpire. Soon after his birth, the dynasty of Ommeyad Caliphs at Cordoba was broken up, and Fernando I. of Castilla united the petty Christian states of N.W. Spain. The story of *The C.*, told by Corneille and Voltaire in their dramas so named, of his love for Ximena, the daughter of Count Lozano of Gormaz, whom he had slain to avenge an insult offered to his father, of his conquest of five Moorish chieftains who had invaded Castilla, of his horse Babieca (or Booby), on which he drove the Moors from Estremadura (on E. bank of Douro) and captured Coimbra, how he resisted the imperial pretensions of Henry III., and assisted Sancho II. of Castilla to annex his brother's inheritances of Leon and Galicia, of his banishment by King Alfonso, and his great deeds at Barcelona, Zaragoza, Valencia, Alicante, and other places on the E. coast, how he defended Valencia against the Moors, how the cause of the C. and the Counts of Canion was tried before the Cortes at Toledo: all this is told in the prose *Chronicles of the C.*, belonging to the end of the 13th c. (one of which has been translated and edited by Southey), and in the *Ballads of the C.*, collected by Juan de Escobar in 1615, which have been translated into German by Herder, and partly into English by Frere, Lockhart, and Dennis. These ballads are among the finest and earliest of the Spanish *redondilhas* sung by the *Juglares*, the form of which has been connected with Arabian poetry, and also with the songs of the Roman soldiery. They are written in *coplas* of four lines, each line with seven or eight syllables, or three and a half feet, generally trochaic; the chief feature being the assonant rhyme, according to which the *last vowel*, when the line ends with a single syllable (a half foot), or the *last two vowels* when it ends in a trochee, should correspond in every alternate line, be the consonants what they may. The *Poem of the C.* is in Alexandrines. See Southey's *Chronicle of the C.* (Lond. 1808).

Cid'aris, a genus of Sea-urchins, included in the family *Cidaridæ*, and distinguished by having the mouth central in position. The ambulacra, or perforated areas of the shell, are prolonged on the buccal membrane, or that surrounding the mouth, and no buccal branchiæ, or gill-like processes surrounding the mouth are developed. *C. papillata* is a familiar species of these forms.

Ci'der, or **Apple-Wine,** a fermented drink prepared from the juice of apples, for which particular varieties of apples are cultivated in Herefordshire, Somerset, and Devonshire, Normandy and Holland, the most famous C.-producing districts. The apples, when thoroughly ripened and matured, are reduced to a pulp in a grinding mill under edge rollers, with a small quantity of water added, and after being left in a tub for twenty-four hours, the juice is pressed out by the application of strong pressure. The expressed juice, after being put into barrels, soon begins to ferment violently, and when the fermentation has sufficiently advanced, which happens in from two to ten days, according to the strength of the must, and the amount of alcohol desired, the C. is racked off into stone barrels. C. contains generally malic acid, alcohol, and sugar, besides water, &c., its alcoholic strength varying from 5 to 10 per cent.



Cider Press.

Cïe'za, a town in the province of Murcia, Spain, 25 miles N.W. of Murcia, near the river Segura, has manufactures of linens, silk, and hemp, and a trade in oil and wine. Pop. 10,905.

Cigar' (Span. *cigarro*), a loosely wound spindle-like roll of tobacco-leaf for smoking, supposed to be of Spanish origin. A *cheroot* is a variety of C. in the form of a slightly conoidal cylinder, with the tips cut straight. A *cigarette* (Span. *cigarrito*) is a small roller of finely-cut tobacco, or of triturated leaf (as in Spain), wrapped in a binder of unsized paper or the leafy covering of Indian corn. Cigars are manufactured in enormous quantities wherever the tobacco plant is cultivated. Those made from Havannah tobacco are unsurpassed for fine flavour, aroma of smoke, and firmness and whiteness of ash, and next in order of excellence stand the Manilla cigars and cheroots; it should be stated, however, that the smokers of Indian tobacco, especially of the cheroots called *Trichinopolies*, and the smokers of Sumatra and Borneo cigars, think very highly of the different brands submitted to them by the dealers in those regions. The value of a C. does not increase in direct ratio with its size, for the difficulty of obtaining wrappers of proper length, colour, and fineness for the larger sizes, immensely augments the expense of manufacture. A duty of 5s. per lb. is levied upon cigars imported into Great Britain. Simple and well-contrived machines for making cigars and cigarettes are in extensive use. The following is a table, setting forth the weight of cigars, together with their value, imported into the United Kingdom from foreign countries and British possessions during the year 1894. Of the total weight imported 2,065,362 lbs. were registered for home consumption. The gross amount of duty paid was £516,336:—

Country.	Weight in lbs.	Value in £.
From Germany	60,667	21,129
,, Holland	101,652	32,188
,, Belgium	171,275	53,570
,, France	228,268	84,454
,, Spain	12,025	4,617
,, Canary Islands . .	8,306	2,963
,, Philippine Islands . .	244,016	66,348
,, U.S. of America . .	1,314,637	416,479
,, Other foreign countries .	17,710	8,451
	2,158,556	690,199
From Channel Islands . .	10,580	4,673
,, Brit. E. Indies . .	195,207	42,391
,, Hong Kong . . .	47,241	8,173
,, Australasia . . .	4,119	2,032
,, Brit. W. Ind. Islands .	3,641	2,280
,, Other Brit. Possessions .	3,404	1,600
	264,192	61,149
Total . . .	2,422,748	751,348

Cig'oli, Ludovico Cardi da, an Italian painter, was born at Cigoli in Tuscany in 1559, studied Correggio assiduously, and was among the first of the Florentine school to successfully oppose the anatomical style of the imitators of Michael Angelo and the other mannerists of his day. His design is correct, his colour is remarkable for force, warmth, and harmony, and his handling exhibits much vigour and *abandon.* His 'Apostle healing the Lame' in St. Peter's was declared by Andrea Sacchi to be surpassed by only two pictures in Rome—the 'Transfiguration' of Raphael, and the 'Communion of St. Jerome' by Domenichino. Tuscany is particularly rich in specimens of his work. The 'Martyrdom of St. Stephen,' in the palace of the Uffizi, Florence, is reckoned one of his finest efforts. C. died at Rome in 1613.

Cil'ia. These are small hair-like bodies, having a power of motion, attached to a variety of epithelial cells. A layer of cells of this variety is called a layer of *ciliated epithelium.* Such cells are of a columnar shape, bearing the C. on one extremity, while the other lies on, or is attached to, subjacent tissue. The cells are usually arranged in three or four layers deep, but the external layer is the only one fully developed, the deeper layers being destitute of C. Ciliated epithelial cells vary in size. In the human trachea or windpipe, they are about $\frac{1}{4000}$th to $\frac{1}{2500}$th of an inch in length, but in many of the invertebrata they are much larger. The following are some of the situations in the human body where C. are found:—(1) On the mucous membrane of the respiratory tract, from the base of the epiglottis to the smallest bronchial tubes in the lung. The vocal cords and the air-cells of the lung are not covered by C. (2) On the mucous membrane of the nose, with the exception of the area in the upper chambers devoted to the sense of smell. (3) In the Eustachian tube and in the middle ear or tympanum.

Form of Cilia.—They are slender, conical, or sabre-shaped filaments, narrow at the free extremity, and broad at the base. Under the highest powers, they show no indication of definite internal structure.

Motion of Cilia.—This may be best studied by examination of a portion of the gills of the common mussel. It is seen to be a sort of lashing movement, and when many act together on the same bar or surface, the motion gives rise to the optical effect of a series of waves passing along the free border of the ciliated surface, like the waves caused by the wind passing over a field of corn. Occasionally the movement is so rapid that the C. are not seen, but their presence is indicated by the movements of particles of matter in their vicinity. Adopting the classification of Valentin and Purkinje, the movements of C. may be divided into (1) the *hook-like,* in which the movements are like those of a finger alternately flexed and extended; (2) the *funnel-shaped,* in which there is a kind of twisting action of the cilium by which its apex describes a circle or ellipse, and the whole cilium a cone having the base uppermost; (3) the *oscillating,* in which it swings like a pendulum; and (4) the *undulating,* or flail-like, in which it acts like the lash of a whip. Few objects are more beautiful than a mass of C. in vigorous action. In cold-blooded animals the motion of the C. may continue for hours, or even days after the death of the animal, but in warm-blooded animals they rarely act for more than two hours.

Effects of physical and chemical applications on Cilia.—(1) *Temperature.*—A rise of temperature increases the activity of the movement, but it ceases at 57° or 60° F. Cold does not retard the action even when reduced to freezing-point. (2) *Water.*—Fresh water retards or destroys the action of C. of sea-animals, while salt water has a similar effect on those which frequent fresh water. (3) Bile, alkalies, acids, and alcohols arrest the motion. (4) Vapour of chloroform arrests the motion for a time, if not applied for too long a period. (5) Oxygen is required for the activity of C.; deprivation of it, or an atmosphere of hydrogen, arrests the movement. (6) A stream of carbonic acid retards the action. (7) Continuous or Faradic currents of electricity, or a discharge from a Leyden jar, have no effect unless extremely powerful, when they cause either electrolysis or sudden stoppage.

C. are endowed with the vital property of contractility, and it is in virtue of this they move. Their actions are not dependent directly on the integrity of the nervous or circulatory systems, as they work vigorously for some time after the death of the animal. See CONTRACTILITY.

Cili'cia, anciently a province of Asia Minor, coinciding partly with the modern vilayet of Adana, bounded on the N. by Taurus, on the S. by the Levant, on the W. by Pamphylia, and on the E. by the range of Amanus. Its physical characteristics divided it into two parts, the Western or Rough C., and the Eastern or Plain C., the former clothed with forests, and the latter producing corn and wine. C. was governed by native kings, even after it became a Persian satrapy. After the victory at Issos (B.C. 333) it became a Macedonian province, and on the death of Alexander it became part of the kingdom of the Seleucidæ, till Pompey made it a Roman province, B.C. 63.

Cimabu'e, Giovanni Gualtieri, an early Italian painter, was born at Florence in 1240. Being sent while a youth for purposes of education to the convent of Santa Maria Novella, he there learnt his art from certain Grecian painters, who were engaged in decorating the church of the convent, and soon acquired so much celebrity that in 1263 he was commissioned to adorn with frescoes the church of St. Francis at Assisi. Among his subjects were the 'Life of Christ,' 'Life of St. Francis,' 'Life of the Virgin,' 'Four Evangelists,' &c., portions of which still remain. Returning to his native city, C. painted his famous 'Madonna' (still preserved), which was regarded as a marvel of art, and excited such enthusiasm that the people bore it in procession from his studio to the Church of Santa Maria. He died at Florence, probably in 1302. His chief distinction is, that he materially helped to emancipate Italian art from Byzantine traditions. He ceased to be a copyist, turned his attention towards nature, and diversified the mechanical *pose* of Greek figures by study from living models. In this restoration of art, however, C. cannot be regarded as having done more than prepare the way for Giotto (q.v.), who was his pupil and *protégé.*

Cimaro'sa, Domenico, an Italian musician, was born at Naples in 1754, and studied under Sacchini at Loretto. He very early attained celebrity as a composer of operas, of which one—*Il Matrimonio Segreto*—is still well known. C. undertook musical engagements at St. Petersburg, Vienna, and other European courts, but eventually returned to Italy, and died at Venice, 11th January, 1801.

Cim'balo, an old keyed instrument, one of the precursors of the harpsichord.

Cim'bri, or **Kim'bri,** a people who, in conjunction with the Teutones, invaded Southern Europe towards the close of the 2nd c. B.C., and defeated several Roman armies in succession, till they themselves were conquered by C. Marius, B.C. 101, in the Campi Raudii, near Vercelli, with a loss estimated at from 100,000 to 140,000 men. Who these C. were has given rise to much discussion. Tacitus, Pliny, and Strabo agree in making their original country the Chersonesus Cimbrica, now the peninsula of Jutland. The preponderance of ancient testimony is in favour of their Celtic origin, and H. Müller, in his *Die Marken des Vaterlandes*, holds to this opinion, and contends that the name is identical with *Kymri*, the designation of the modern Celts of Wales. Modern opinion, however, favours their Germanic origin; and the definite facts that support this hypothesis are stated by Mommsen, *History of Rome*, vol. iii. pp. 178, 179 (Dickson's translation). The name C., or *Chempho*, is certainly Teutonic (comp. Old Eng. *Kempa*, and Ger. *Kämpfer*), and means the 'champions,' which their enemies translated the 'robbers.' Mommsen suggests that 'round a nucleus of Germanic emigrants from the Baltic' had gathered in the course of their wanderings 'an immense multitude of various origin.' This would satisfactorily account for many Celtic traits which the motley host exhibited.

Cimicifu'ga, or **Bugbane,** a genus of plants belonging to the order *Ranunculaceæ*, natives of Eastern Europe, Siberia, and N. America. The European *C. fœtida* is extremely fetid, and is used to drive away vermin.

Cimme'rians, or **Cimme'rii,** a people of whom Homer may be said to give a dim, fabulous tradition, and Herodotus a definite and partially historical account. In the Odyssey they are represented as dwelling in darkness beyond the ocean-stream. In Herodotus they occupy the territory between the Borysthenes (Dnieper) and the Tanais (Don), and are represented as having invaded Asia after they were expelled from their own country by the Scythians. They seem to have occupied the Tauric Chersonesus (Crimea), and from them the Cimmerian Bosporus (Strait of Yenikale) takes its name. They were a nomadic race.

Ci'mon, a famous Athenian general, son of the Miltiades who conquered at Marathon, was born B.C. 510. His life was mainly devoted to the overthrow and humiliation of his country's great enemy, Persia. In 477 he shared with Aristides the command of the Athenian contingent of the Greek armament under Pausanias, reduced Eion on the Strymon, and in 476 subdued and colonised the island of Scyros. In 466 he completely defeated a great Persian fleet at the river Eurymedon, and subsequently expelled the Persians from the Chersonese. C. regarded Sparta as the 'yoke-fellow' of Athens, and on the revolt of the Helots headed two expeditions to aid the Spartans. Having been, however, on the second occasion, insultingly dismissed by them, C. lost his popularity at Athens, failed in the struggle against Ephialtes and Pericles, and was eventually ostracised. He was recalled five years later, and under his influence the Athenians made peace with Sparta, and renewed the war with Persia. In 449 he sailed with 200 ships to Cyprus, where he died at the siege of Citium.

Cincho'na, an important genus of evergreen shrubs or trees, natives of the valleys of the Andes, which gave the name to the order to which they belong (*Cinchonaceæ*). They are found from about lat. 19° S. to Caracas, in about 10° N. lat., and at heights from 4000 to nearly 12,000 feet above the sea-level. There are many species, but all do not yield the medicinal bark known in medicine and commerce as C. or Peruvian bark. The different species have been the subject of elaborate investigation, by Weddell, Howard, Markham, Spruce, and others, and the general result of their investigations is, that the Calisaya or yellow bark is the produce of *C. Calisaya*, the grey or Huanco bark of *C. micrantha* and *C. nitida*, Loxa or crown bark of *C. Condaminea* (*officinalis*), while the red bark is furnished by *C. succrirubra*. The value of C. bark as a tonic and remedy for fever is owing to the presence of the alkaloids *quinia*, *quinidia*, *cinchonia*, and *cinchonidinia*—some of the barks, however, containing more than others. For instance, *quinia*, the most useful of all of them, is found in greatest quantity in Calisaya bark, *cinchonia* in grey and red bark, while *quinidia* exists in largest amount in Loxa bark. All of these alkaloids, though varying in degree of strength, have similar properties. The C.-trees grow in the forests of Bolivia, Peru, and neighbouring countries in small groups. The *cascarilleros* or bark-gatherers are native Indians or half-castes, whose occupation is one attended with great labour. After a tree is cut down, the bark is stripped off, and the larger pieces stacked to dry, while the thinner bark from the twigs and branches rolls up in 'quills' like that of the cinnamon-tree. The bark nearest the root is most esteemed, on account of the quality of alkaloids contained in it. After being dried, it is conveyed to the coast on the backs of the *cascarilleros*, or in any other way that the circuitous paths through the mountainous forest will admit of. The object of the *cascarilleros* being to collect the greatest quantity of bark in the shortest possible space of time, they indulge in the most wasteful destruction of the C. forests, young trees and old being indiscriminately cut down without any attempt to replace them by planting others. In course of time the effects of this suicidal policy began to be apparent. The supplies of bark became more and more difficult to obtain, and it was evident that in time the tree yielding this drug, so all-important in tropical countries, would soon become practically extinct. Accordingly the Indian Government took measures to neutralise it in the cooler hill-regions of India. This task was committed to C. R. Markham, R. Spruce, M‘Ivor, and others, and was performed with such success, that extensive forests are now growing in various parts of India, and promise to yield, in course of time, a supply of C. much greater than ever was obtained by the precarious labours of the S. American *cascarilleros*. Owing also to the scientific skill with which the trees are cultivated, it is found that the Indian-grown bark yields a greater supply of the alkaloids than the wild trees. It is also now naturalised in Jamaica and Java. C. bark was first employed in Europe about the middle of the 17th c., though its valuable properties as a febrifuge were long known to the natives of Peru. It was first brought from that country to Europe in 1639 by the Countess del Chinchon, wife of the then Viceroy of Peru, and from whom the genus is now named, though—notwithstanding the appeal of Markham for the correct spelling of the word, C*h*inchona—long usage has now established the genus without the *h*. From the fact of the Jesuits using it as a remedy in intermittent fever, the C. bark was at one time generally known as, and is still sometimes yet called, 'Jesuit's bark.' It is also called China bark, Quinia, Quinquina, &c. It is now generally administered in the form of its alkaloid quinine, or in the sulphate or bisulphate of quinine, in doses of from 1 to 20 grains. In addition to its antiperiodic febrifugal and tonic properties,

Cinchona.

the bark is somewhat astringent, and has been occasionally found serviceable as a topical astringent and antiseptic. See Pereira's *Materia Medica;* Moquin-Tandon's *Botanique Médicale*, and the various works and reports of Markham, Weddell, Howard, Spruce, and others on the subject.

Cinchona'ceæ, a natural order of Dicotyledonous plants, of which the genus *Cinchona* (q.v.) is the type. By some botanists it is considered only a division of *Rubiaceæ* (q.v.). There are about 2600 species, distributed over 300 known genera, consisting of trees, shrubs, and herbs, all natives of tropical and warm regions. It is very important as furnishing many plants useful in medicine, the arts, and domestic economy. Some possess tonic, febrifugal, or astringent properties; others yield dye and tanning agents; while a third group possess edible fruits and seeds. A few are reputed to be intoxicating and even poisonous, and several are cultivated for the sake of their beauty and the fragrance of their flowers. In addition to Cinchona, Coffee (q.v.), Ipecacuanha (q.v.), *Morinda citrifolia*, the root of which yields Soorangie dye, *Uncaria Gambir*, which yields white Gambir, a variety of catechu, *Gardenia*, and other plants yielding pleasant fruits, Chayroot (q.v.), &c., may be mentioned as some of the more important economic plants of this order.

Cin'chonine and **Cinchon'idine** are isomeric alkaloids (q.v.), contained, along with the quinine alkaloids, in the bark of the different varieties of Cinchona. Pale Peruvian bark is richest in C. and its isomer; yellow Peruvian bark in quinine. Another alkaloid called *Cinchonicine*, isomeric with C. and C., is obtained under certain conditions by heating the latter substance. Sulphate of C. is used in medicine, and is similar in its physiological action to sulphate of quinine. See QUININE.

Cincinde'la, a genus of Beetles, forming the type of the family *Cincindelidæ*, and popularly known as 'Tiger-beetles' or 'Sparklers,' from their carnivorous habits, and from the brilliant hues and lustres of their bodies. The tiger-beetle is a familiar British species, and is noted for its voracious habits, feeding on other insects, and being able to pursue its prey into the air. It exudes a powerful odour or scent, like that of a crushed verbena leaf. The Indian tiger-beetle is another well-known species. These insects have five-jointed tarsi; the head is wider than the chest, and the mandibles are large, sharp, and toothed.

Cincinna'ti, the 'Queen City of the West,' is the chief town in Ohio, and is situated on the N. bank of the Ohio river. It is built on two terraces, the one 50, the other 100 feet above the river. The streets and the environs of the city are alike beautiful. C. has many fine buildings, as the C. College, the custom-house, the post-office, and Burnet House. There are two Roman Catholic colleges, and one Methodist; a Presbyterian theological seminary, a law school, several medical and ladies' institutions, besides many free schools, and about a hundred churches. C. is connected with Covington, on the Kentucky side of the Ohio, by a magnificent suspension-bridge, 100 feet above low-water. The city is supplied with water from the Ohio by a reservoir which cost $796,000. C. is one of the greatest pork-markets in America, the packing being an immense industry; the value of the annual production being over 9½ millions of dollars. Wine, from the native Catawba (q.v.) grape, is also an extensive article of trade, and there are large manufactories for iron, steam-engines, lard, flour, soap, and candles. The Ohio is the great outlet for traffic, the river being navigable to its junction with the Mississippi, 500 miles below, and to Pittsburg, 460 miles above the city. C. was founded in 1788, and had only 500 inhabitants in 1800; in 1830 it had 24,830; in 1870, 216,289; and in 1890, 296,908.

Cincinnati (Order), a society in the United States, which was formed in 1783 by the officers of the revolutionary army, to perpetuate their friendship, and to provide for the widows and orphans of those who had fallen in the war. The badge of the society is a bald eagle of gold, with the motto *Omnia reliquit servare rempublicam.* It is suspended by a deep-blue ribbon edged with white. The order was to be hereditary; hence it met with much opposition. It still, however, exists in some of the States, and meets on the 4th of July.

Cincinna'tus, Lucius Quinctius, a Roman statesman and soldier, famous in the national legend preserved by Livy for the simplicity of his life and manners. He was born some time before the expulsion of the Tarquins. In 460 he was illegally appointed *consul suffectus;* and two years afterwards, being made dictator, he extricated the Roman consul and army from imminent destruction at the hands of the Æqui. Livy's narrative of the manner in which he effected this is rejected by Niebuhr as transparently mythical. In 439 B.C., at the age of eighty, he was a second time appointed dictator, to suppress a plebeian discontent fostered by Spurius Mælius, after which he disappears from history.

Cin'erary Urns (Lat. *cinis*, 'ashes') were the vessels in which the ashes of the dead were placed amongst those nations who were accustomed to burn their dead. When the funeral pyre was burned down, the embers were extinguished with wine, and the bones and ashes of the dead collected by the nearest relatives, who sprinkled them with perfumes and placed them in an urn, which was then deposited in a niche of the *sepulcrum*, or family tomb. The urns were mostly made of baked clay, but also of stone and metal, and even, though rarely, of gold and silver. They were of various shapes, but commonly square or round.

Cinn'a, Lucius Cornelius, the leader of the Marian party during the absence of Sulla in the East. Though elected consul (B.C. 87) with the sanction of Sulla, his first act was to impeach him, and to take measures for bringing back the banished Marians to power. Defeated in the senate, he fled from the city, on which, however, he soon marched with an armed force, and invested it by land, while Marius, who had returned from his African exile, blockaded it by sea. They captured the city, massacred the friends of Sulla, and declared themselves consuls (B.C. 86). Marius died soon after. In his fourth consulate, Cn. Carbo being his colleague, C. collected an army at Brundisium to meet Sulla, who had returned to Italy to take vengeance on his foes, but he was slain while attempting to quell a mutiny that had broken out among his troops.

Cinn'abar, native mercuric sulphide, the most abundant ore, and chief source of the quicksilver or mercury of commerce. It occurs fibrous and amorphous, also crystallised in hexahedral prisms. In the mass it is dull-red coloured, opaque or translucent, with adamantine lustre. The most important mines are those of Idria in Carniola, Austria, of Almaden in Spain, and of New Almaden, New Idria, and Redington, in California. C., artificially prepared, constitutes the well-known colour Vermilion (q.v.).

Cinnam'ic Acid and the **Cinnamyl Group.** C. A. is a white crystalline substance, resembling benzoic acid in appearance, and is contained in Storax (q.v.), Tolu, and Peru balsams, in old oil of cinnamon, and in gum benzoin. C. A. is best obtained by boiling storax with a dilute solution of caustic soda, when soluble cinnamate of soda is formed. The aqueous solution of this salt is filtered from the undissolved portions of the storax, and mixed with excess of hydrochloric acid, when the C. A. is precipitated, and may be purified by recrystallisation from boiling water.

C. A. crystallises in rhombic prisms: it fuses at 133° C., and boils at 290° C., with partial decomposition. It rises in vapour at temperatures below its boiling-point, and may therefore be purified by sublimation. It is sparingly soluble in cold water, more readily in boiling water, but its best solvent is alcohol. C. A. is a monobasic acid, and forms crystalline salts with metals, and several interesting derivatives, the following being amongst the most important:—

Cinnamic Aldehyde, an oily liquid, which forms the chief constituent of the essential oils of cinnamon and cassia, and gives to them their characteristic odour. It may be prepared artificially by distilling a mixture of formiate and cinnamate of calcium.

Cinnamate of Cinnyl or Styracine, a crystalline substance contained, along with C. A., in storax, and may be obtained from the latter after the C. A. has been extracted by squeezing the remaining resin, when the styracine is forced out in oily drops, which crystallise on standing.

On distilling styracine with caustic potash, it is resolved into *Cinnamic Alcohol* and cinnamate of potassium. The cinnamic alcohol passes over as an oily liquid, which soon crystallises. It has a pleasant odour of hyacinths.

Styrol is another substance contained in storax. If the latter be distilled with water, styrol is carried over with the steam, and condenses in oily drops, which are readily separated from the water by decantation. It is a liquid body, which, when heated to 200° C., is converted into a solid crystalline substance called *meta-styrol*.

Cinnamon.

Cinn'amon, a bark much employed as a condiment, and in medicine as a stimulant, tonic, astringent, carminative, antispasmodic, &c., chiefly derived from the inner bark of *Cinnamomum Zeylanicum*, a tree belonging to the natural order *Lauraceæ* (q.v.). The best comes from Ceylon, but it is now naturalised in various tropical countries. The tree grows to the height of from 20 to 30 feet, and sometimes attains the thickness of 1½ foot. Its properties are owing to a volatile oil, the *oil of C.* It contains in addition a concrete fatty substance, obtained from the ripe fruits, and known in Ceylon as *C.-suet;* this is believed to be the *Comacum* of Theophrastes. From the leaves a volatile oil, having the odour and taste of oil of cloves, is also distilled. The tree itself has been long known: in the Bible, for example, it is frequently referred to under the name *kinnemon* or *kinman*. There are various other species in addition to the one mentioned. Aromatic C. yields the Cassia Bark of commerce (q.v.), and C. buds—also, however, obtained from other kinds of C. This tree is the *kiddah* or *cassia* of the Bible. C. bark is frequently used to adulterate C. Indian Clove Bark (q.v.) is obtained from *C. Culilwan*, Sintoc bark from *C. sintoc*, while *C. nitidum* (*eucalyptoides*) and *C. Tamala* were the sources of the *folia Palabathri*, in such repute among the old pharmacologists as stomachics and sudorifics. The 'Nepal sassafras' is the root of *C. parthenoxylon* and *C. glandulifera* (Bentley).

C. is obtained by stripping the bark off the branches, when it rolls up into 'quills.' The smaller of these are introduced within the larger, and then dried in the sun, and the whole tied up in bundles, each of about 88 lbs. weight. The thinner bark is accounted the finest flavoured. About 500,000 lbs. are annually imported into London.

Medicinally C. is valued as a stomachic and carminative. Its uses by cooks and confectioners are too well known to require description. There are, besides, bastard C., black C., Isle of France C., Santa Fé C., wild C., &c.

Cin'que Cento (Ital. 'five hundred'), an art term for the 'fifteen hundred period,' *i.e.*, the 16th c., especially the early part—the second period of the revival of the arts in Italy—and for the style of art then prevalent.

Cinquefoil, or **Quintfoil,** in heraldry, a flower of five foils or leaves, which are usually depicted as issuing from a ball as a centre point. In architecture, the name is applied to an ornamental foliation in five compartments—often represented in a circular form—five points or cusps marking off spaces between each pair, which are called the leaves. The C. is to be observed in the tracery of windows and panellings.

Cinque Ports were originally Dover, Sandwich, Romney, Hythe, and Hastings, and to them were afterwards added Winchelsea and Rye. They are under the government of a Lord Warden, whose office was formerly an adjunct of the premiership. The C. P. have various privileges as to pilotage, issuing of writs, and other judicial matters. They are supposed to have been incorporated previous to the Conquest, by Edward the Confessor. Their ancient organisation has, however, been broken up by the Municipal Reform Act, and assimilated to that of English municipalities in general. The jurisdiction of the Lord Warden has been curtailed by Acts of the present reign, and the office has become one of mere honorary dignity, without any emoluments, saving the right to live in Walmer Castle. The present holder is the Marquess of Salisbury, who succeeded the Marquess of Dufferin and Ava in the autumn of 1895.

Cin'tra, an old town in the province of Estremadura, Portugal, near the base of Sierra de C., 15 miles W.N.W. of Lisbon. It has two royal residences, one originally a Moorish palace, the other formerly the convent of La Penna. There is also a ruined castle, and many handsome private buildings. Pop. town-dist. 22,842. The well-known *Convention of C.*, concluded between Sir Hew Dalrymple and Marshal Junot, was signed here, 22nd August, 1808. By this treaty, the French, who had retreated from Lisbon after the defeat at Vimiera, were allowed to return to France with all the honours of war. A storm of indignation was roused in England by this event, and the generals concerned were subsequently tried by court-martial, but acquitted of blame. Wellington sided in opinion with the generals. A severe comment is made by Byron on 'that martial synod' in the first canto of his *Childe Harold*.

La Penna Convent, Cintra.

Ci'otat, La, a town in the department of Bouches-du-Rhône, France, on the Gulf of Lèques, 15 miles S.E. of Marseille. It has a good harbour, has Government shipbuilding yards and valuable fisheries, and is surrounded by plantations of the olive, orange, and pomegranate. Pop. 12,223. C., the ancient *Citharista*, a Massilian colony, was destroyed by the Teutonic invaders of Gaul, but rose to importance through the Levant trade in the 16th c. It was ruined a second time by the revocation of the Edict of Nantes, and has only begun to recover its prosperity in the present century.

Ci'pher (Fr. *chiffre*, Low Lat. *cifra*, from Arab. *çifr*, 'empty'), in arithmetic, properly denotes the character 0, used to fill an empty space, but is now loosely applied to any of the nine figures. In metaphorical language, however, it retains its primary sense—*e.g.*, 'he is a mere C.,' *i.e.*, a non-entity, a person who counts for nothing. Another use of the word is to designate the interweaving of the initials of a name, an arrangement which renders them a private mark. This usage has long been especially affected. Lastly, and perhaps from the preceding practice, the word has also come to be a name for secret writing—*e.g.*, 'the despatch was in C.,' *i.e.*, in an arrangement of letters or marks the meaning of which was only known to the initiated. See CRYPTOGRAPHY.

Cipria'ni, Giovanni Battista, painter and engraver, born at Florence in 1732, travelled to Rome when nineteen years of age, and devoted himself to the study of Correggio. He removed to England in 1754, and settled in London, where he died in 1785. His drawing is correct, and his painting is marked by harmony of colour and sweetness of style. His best plates are his composition named the 'Mother and Daughter,' the 'Death of Cleopatra,' after Benvenuto Cellini, and his 'Descent of the Holy Spirit,' after Domenico Gabbiani. C. furnished the design for the diploma of the Royal Academy, of which he was one of the original members.

Circæ'a, a genus of Herbaceous plants of the natural order *Onograceæ*, of which there are various species in the Himalayas, Europe, &c. *C. Lutetiana*, the 'enchanter's nightshade,' is a native of Britain. It has no relation to the nightshades, and probably the name has, through some mistake, been transferred from the Mandrake (q.v.) to this plant (*Prior*); while the term 'enchanter' has been given it from the sorceress-goddess Circe (q.v.), after whom the genus was named. The Alpine C. is not unfrequent in Scotland and the N. of England. Beyond a little astringency, the plants possess no notable properties.

Circass'ia, formerly an independent country, now incorporated in the Caucasian provinces of Russia, occupies the N. and part of the S. declivity of the Caucasus (q.v.).

Circass'ians. Under this name may be included all the tribes of the Caucasus, but the C. proper held only the north-western slope of that range, excepting the country of the Abasians, between the lower Kuban and the Black Sea. The C. are called by the Turks *Tcherkas* (*i.e.*, robbers), but call themselves Adighé. They numbered about 300,000, and comprised fifteen tribes. They do not belong to the Aryan race—of which, from their fine physique, they were once regarded as a high type—but to the Semitic or Turanian variety. Their peculiar language seems akin to the Turanian tongues. They were brave, strong, and handsome, and the beauty of the Circassian women was famous throughout the East. Their social state was rude and unprogressive. They were predatory and warlike; and their most stringent customs were to respect age, to revenge a kinsman's death, and to observe a law of hospitality called *kunadi*. Almost none of them except their bards, who were much respected, could write. They were governed by a kind of feudal oligarchy, and were divided into five castes—the chiefs, the nobles, the ordinary freemen, who formed the mass of the people, the vassals, who tilled the soil and followed the nobles to war, and the slaves, either prisoners of war or descendants of such prisoners. Their religion was a mixture of Christianity, Mohammedanism, and Paganism. Christianity was introduced among them in the 11th and 12th centuries, but ultimately Mohammedanism, which was the creed of the chiefs and nobles, prevailed. During the Middle Ages they were subject to the Arabs and Georgians. After throwing off the Georgian yoke in 1425 they fell under the power of the Khans of the Crimea, but during the 18th c. they became free from Tartar influence. The Russians, after annexing Anapa on the Black Sea in 1807, made repeated efforts to subdue the C., who, by the treaty of Adrianople in 1830, were ceded to Russia by Turkey, but, under Schamyl, resisted Russia until Prince Orbelliani defeated them in 1857, and captured Schamyl in 1859. A large number of the C. then sought refuge in Turkish territory, many of whom perished by starvation. Their country was thoroughly conquered, and the bold spirit of the mountaineers finally quelled. See Spencer's *Travels in Circassia*, and Haxthausen's *Tribes of Caucasus*.

Cir'ce (lit. 'the she-hawk'), a mythic sorceress, 'the daughter of the sun,' who dwelt in the island of Ææa, on the W. coast of Africa. Her 'charmed cup' had the power of changing those that tasted it into swine. When Ulysses, in the course of his wanderings, came to her isle, this fate befell twenty-two of his companions, but the hero himself escaped it by the aid of Hermes, and remained in safety with the enamoured witch for a whole year. The story is told in the 10th and 12th books of the Odyssey. The Latin poets make great use of the story of C., particularly Ovid in the 14th Book of the Metamorphoses.

Cir'cle, according to Euclid, is a plain figure contained by one line called the *circumference*, and is such that all straight lines drawn from a certain point within the figure to the circumference are equal to one another; this point is the *centre*. It is perhaps easiest conceived of as the path described by either extremity of a rod which rotates in a given plane round a given *fixed* point in the rod. This definition suggests at once a practical method for its description. For the fundamental properties of the C. see Euclid's *Elements*, Book III. The great problem among the ancient geometers with regard to the C. was its *quadrature*—*i.e.*, the construction by rigid mathematical methods of a square equal in area to the C. This area was soon shown to be equal to the product of the radius and the semi-circumference; and accordingly the problem was reduced to that of rectifying the curve and of finding the ratio of the circumference to the diameter. This ratio is the same for all circles; but it is undiscoverable by the geometry of C. and straight line, the constituents being incommensurable. The incommensurability seems to have been suspected by Euclid, whose most wonderful and complete book is perhaps his 10th, dealing with the investigation and classification of incommensurable quantities. The ratio, then, of the circumference to the diameter, invariably represented in mathematics by the Greek letter π, can only be approximately expressed as a number. The first approximation (22 : 7) was given by Archimedes. Another, and nearer, and very convenient value, is 355 : 113. Vieta calculated it to the 10th decimal place, Van Ceulen to the 36th, Sharp to the 72nd, De Lagny to the 128th, and Clausen to the 250th. The value of π to the first 15 decimal places is 3·14159,26535,89793.

In modern geometry the C. is classed among the quadrics or curves of the second order, to which the ellipse, parabola, and hyperbola also belong. Many of the properties of the C. can be extended to the sphere by the substitution of planes for straight lines; and this similarity is recognisable at once from their *quaternion* equations, which are identical, there being merely the further condition, in the case of the C., that it lies in one plane. See QUATERNIONS.

The *Curvature* (q.v.) of a C. is the same wherever you take it. Hence the curvature of a curve at any point is determined by drawing through this point the C. which has the same tangent, and the same ultimate deflection from the tangent, that the original curve has, since there is no other C. that can have a more perfect and higher degree of contact. This C. is called the *C. of curvature*, and its radius the *radius of curvature*; in practical life, the unit angle or *Degree* (q.v.) is that angle which is subtended by an arc, equal in length to the 1-360th part of the circumference of a C. of unit radius.

Circle, Magic, the charmed limits within which magicians and sorcerers, according to popular belief, were safe from the fury of the evil spirits whom their spells had raised. Described on a space of 9 sq. feet—7 was the number in the E.—there was an outer and an inner C., and the spaces between them, as well as in the angles of the square outside the larger one, were filled ‘with all the holy names of God,’ and other symbols, in which lay the potency of the charm.

Cir'cuits. England and Wales, except Middlesex, are for judicial purposes divided into seven C. Each of these districts is visited by one judge at least (or by two when an extra judge is required and can be obtained from London), twice every year, or more frequently whenever the circuit work necessitates it. Both criminal and civil cases are tried before these judges. The criminal charges for the county of Middlesex and city of London, and certain parts of Essex, Kent, and Surrey, are adjudged at sessions held monthly at the Central Criminal Court (see CRIMINAL COURT, CENTRAL). In 1865 the civil cases, which had formerly been tried at the Guildhall, were removed to the Royal Courts. In 1883 the civil cases were directed to be always thereafter tried at the Royal Courts of Justice, but in 1891, by statute 54 Vict. c. 14, provision was made for holding such civil courts in the City of London, and two judges were appointed for the purpose. The circuit districts are seven—the Midland, the Oxford, the North-Eastern, the South-Eastern, the Northern, the Western, and the N. Wales and S. Wales. In Ireland they are the N.E., the N.W., the Home, the Leinster, the Connaught, and the Munster. The Act of 1672 divided Scotland into three districts, in which C. are to be made by the justiciary judges. This regulation is affected by different statutes. The circuit courts are now held every year six times at Glasgow, four times at Perth, Dundee, and Aberdeen, and twice at Ayr, Dumfries, Jedburgh, Stirling, Inveraray, and Inverness. Special sittings may take place at any convenient town. A single judge sits except when the court is one of review or an important case has to be tried. All the Lords of Council and Session are judges of these courts.

Circular Notes are a kind of bank-notes, which the chief banking-houses of the United Kingdom supply for the convenience of travellers abroad. They are of the value of ten pounds and upwards. No charge is usually made by the bank for commission, as it makes its profit on the interest arising on the purchase-money between the time of purchase and the date at which the bank is called on to cash the C. N. A French *Lettre d'Indication,* addressed to a long list of foreign bankers, is given along with the notes, which must be presented on discounting any of them. The traveller should sign this letter at once on receiving it, and put it in one repository and the notes in another; thus, if his notes are lost or stolen, they cannot be cashed if he retain the letter, and even though both letter and notes come into the possession of a dishonest person, the former being signed, there will be the difficulty of endorsing the notes with a sufficiently good imitation of the signature to the letter.

Circular Numbers are those whose powers all end in the same figure—that is, every number whose final figure is 1, 5, 6, or 0.

Circular Parts, the name given to two rules, invented by Napier, which facilitate the solution of right-angled spherical triangles. They may be found in any treatise on spherical trigonometry.

Cir'culating Library, a library of books lent on hire. In the Middle Ages the stationers of Paris were compelled to lend books to students at rates of charge fixed by the university. The first C. L. in England was established about 1740 by Samuel Fancourt, a Salisbury clergyman, and in 1748 there was a large C. L. in Crane Court, London. Allan Ramsay opened a C. L. in Edinburgh about 1725. The *London Library* was founded in 1841, and is now a very valuable institution. Circulating libraries are now common throughout the country. The largest in England are those of Mudie, New Oxford Street, which was founded in 1842, and W. H. Smith and Son.

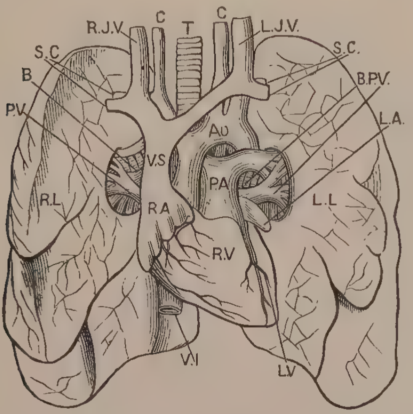
Circula'tion of the Blood. The blood is formed (1) from the chyle poured into it by the thoracic duct, (2) from the fluid and soluble matters absorbed by the blood-vessels of the alimentary canal, and (3) from the matter collected by the absorbents from all parts of the body, and elaborated by the lymphatic glands, called the *lymph.* (See BLOOD.) This fluid contains in it all the materials necessary for nourishing the various textures of the body; and, consequently, for the purposes of nutrition, and also for the purposes of respiration and excretion, it must be distributed throughout the body. It is in a state of constant movement in a definite direction, and the name given to this movement is the *C. of the B.*

A description of the C. of the B., or nutritive fluid, in the different great groups of the animal kingdom, will be found under such headings as AMPHIBIA, ANNULOSA, ANNULOIDA, CRUSTACEA, FISHES, MOLLUSCA, PROTOZOA, REPTILIA, and what will be detailed here will be the function as manifested in man, the mammalia, and birds.

History of the Discovery of C. of the B.—Hippocrates confounded veins and arteries under the general name of *phlebes*, the term *arteria*, artery, being applied by him only to the windpipe. Aristotle distinguished between arteries and veins, but supposed that the latter alone contained blood, which they carried outwards. The arteries were believed by him to be filled with air. Galen demonstrated that the arteries did not contain air, but blood. He thought, however, that there was a communication between the two sides of the heart through the septum. Vesalius pointed out that there was no such communication. Servetus showed that before the blood could pass from the right to the left side of the heart it must pass through the lungs. It was still thought, however, that blood passed from the heart outwards into the body by both arteries and veins. Fabricius ab Aquapendente showed that there were valves in many of the veins, so placed that the blood could only pass through these vessels *towards* the heart, not *from* it. At last the celebrated William Harvey appeared, and in 1628 he published his great work, *De Motu Cordis et Sanguinis,* which finally established our knowledge of the C. of the B., and which has always been regarded as one of the finest examples of purely experimental research and of inductive reasoning. He based his discovery, the greatest ever made in physiology, on the following considerations and facts:—(1) the continuity of the connections between heart, arteries, and veins; (2) that on dividing an artery blood spurted out from the end still connected with the heart, while on dividing a vein, blood flowed from the end further from the heart; (3) that when he applied a ligature to a vein, the vessel became swollen on the side of the ligature further from the heart; (4) on the arrangement of the valves in the heart and veins being such that it could flow only in a certain direction; and (5) that on calculating the amount of blood sent out from the heart along the arteries in a given time, it was found to be so great as to prove that a large proportion of it must return to the heart in that time, as there was not sufficient time either for the complete consumption of the old, or for the formation of new blood, to keep up the supply. Still Harvey did not understand how the blood passed from the extremities of the arteries into the commencement of the veins. The capillaries were not then known. In 1661 Malpighi showed, by means of the simple microscope, the circulation in the web of the frog's foot. Thus it was shown that the blood passed from arteries to veins by the capillaries or intermediate vessels, and the discovery of the course of the circulation was complete.

The Organs of the Circulation.—These are the heart, arteries, veins, and capillaries. A description of the structure of the last three will be found under their respective headings, but in order to understand the C. of the B., it is necessary here to describe the heart.

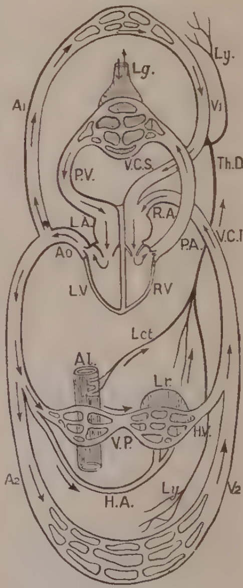
The Heart.—This is an organ placed somewhat obliquely in the thorax. It is of a conical shape. The base is directed upwards, to the right, and somewhat backwards, and corresponds to the middle of the back. The apex is situated a little to the left of the breastbone, opposite the space between the fifth and sixth ribs, a little below the left nipple. The organ, in the human being, is about the size of the clenched fist, and in the male it weighs from 10 to 12 ounces, while in the average female it is somewhat lighter. The heart is divided into four cavities, two corresponding to the base, called the *auricles*, RA, LA, and two to the body and apex, known as the *ventricles*, RV, LV. The auricular part is separated from the ventricular by a transverse groove, called the *auriculo-ventricular* groove, in which lie the nutrient vessels of the organ. Two longitudinal furrows are also seen, one on the anterior, the other on the posterior surface of the heart, and indicating a division of the organ into a right and left half, each consisting of an auricle and a ventricle. When the thorax is opened, the right side is the part chiefly seen, the left resting on the diaphragm. The auricles are called *right* and *left auricles*, RA, LA, the ventricles, *right* and *left ventricles*, RV, LV. Into the right auricle two great vessels open, namely, the superior and inferior *venæ cavæ*, VS, VI, the former of which returns the blood from the head, neck, and upper extremities, while the latter does the same office for the abdominal and pelvic portions of the body, and the lower extremities. Into this cavity there are also numerous apertures of small veins belonging to the heart. The blood then passes into the right ventricle by an opening called the *right auriculo-ventricular* aperture, which is guarded by a valve called the *tricuspid*. The right ventricle is shut off from the left by a strong partition between the cavities. From the right ventricle there issues a large vessel, termed the *pulmonary artery*, PA, which conveys the blood to the lungs. At the orifice of this vessel there is a valve, termed *semilunar*, from its shape. After the blood has passed through the lungs (see RESPIRATION), it is returned to the left auricle of the heart by four pulmonary veins, PV. From the left auricle it then passes to the left ventricle. The left ventricle is longer than the right, and has much thicker walls. At the left of the base of this cavity is the oval opening from the left auricle known as the *left auriculo-ventricular* opening. In front, and to the right of this, there is a round aperture, the mouth of the aorta, Ao, the great trunk artery of the body. The left auriculo-ventricular opening has a valve known as the *mitral*, so termed from its fancied resemblance to a bishop's mitre, and the orifice of the aorta has a semilunar valve, resembling that seen in the pulmonary artery.



The Heart, Great Vessels, and Lungs. (Front view.)

The cavities of the heart are lined by a serous membrane, called the *endocardium*, which is continuous with the lining membrane of the vascular system. The substance of the heart is composed of muscular fibres, which are remarkable for being striated, whilst they belong functionally to the class of involuntary muscles. (See MUSCLES.) They are arranged in a series of layers. According to Pettigrew, who has chiefly dissected the hearts of ruminants, seven layers enter into the composition of the walls of both ventricles—three external, three internal, and one intermediate between these two groups. He has also shown that certain fibres of the external layers are continuous with corresponding internal layers, thus forming a series of loops. This continuity occurs around the auriculo-ventricular orifices, and upon the septum, and at the apex of the ventricles. The fibres of the first or external layer are continuous with the deepest, those of the second with the sixth, those of the third with the fifth, while the fibres of the middle or fourth layers return as it were upon themselves. Again, he has shown that some fibres pass round both ventricles. The direction of the fibres changes as we proceed from without inwards; the external layer is very oblique, and in the right or left ventricle passes from right to left, from base to apex, of the heart; the next two layers are less oblique; the fourth layer is transverse; and in the three innermost layers the obliquity becomes greater as we pass inwards, and the direction is changed, so that the fibres pass from right to left, but now upwards, from apex to base.

Mode of Action of the Heart.—The right auricle, RA, receives the blood from the body by the inferior and superior venæ cavæ, VCI, VCS, and the left, LA, receives it from the lungs by the pulmonary veins, PV. When both auricles are full of blood, they contract and expel the blood from their cavities through the auriculo-ventricular orifices into the ventricles. The blood is prevented from passing backwards into venæ cavæ, or pulmonary veins, by the pressure of the blood filling the lungs and venous system. The two auricles contract simultaneously. After the ventricles have filled completely, they also contract simultaneously, and force the blood from the right into the pulmonary artery, PA, and that from the left into the aorta, Ao. To prevent the blood from regurgitating into the auricles, the auriculo-ventricular orifices are guarded by valves already alluded to. The right possesses the tricuspid, while the left has the mitral. It is necessary to understand the mechanism of these valves, which is identical in both. Take, for example, the tricuspid. As its name indicates, it consists of three cusps. These are of a somewhat triangular shape, the base of the triangle being attached to a fibrous ring surrounding the auriculo-ventricular opening, while the margins are free. When these three cusps have their edges in opposition, the orifice is nearly closed. They are brought into opposition when the ventricle contracts by the blood behind them lifting them up, but when the ventricles are dilated, the cusps hang downwards into the cavity of the ventricles. It is evident that some provision must be made for preventing the cusps from being forced backwards into the auricle. This is accomplished as follows: To the ventricular surface of the cusps a number of delicate tendinous cords (*chordæ tendiniæ*) are attached. These are in continuation with small muscular papillæ (*musculi papillares*) springing from the wall of the ventricle. When the ventricular wall contracts, these papillæ also contract, and pull upon the cusps, when these are forced upwards in the manner already described, so as to keep them tense, and thus prevent the possibility of their being forced backwards into the auricles.



Course of the Circulation. (Back view.)

We have now to consider how the blood is prevented from flowing backwards into the ventricles, during their relaxation, from the aorta, Ao, and pulmonary artery, PA. This is effected by the action of the semilunar valves placed in these vessels, near their junction with the ventricles, RV, LV. These valves are each composed of three semilunar segments, attached by their convex margins to the sides of the vessel, but free at their borders, which, during the flow of blood past them, are turned upwards in the direction of the vessel. In the middle of the free border there is a small fibrous nodule, the *corpus aurantii*, and by the apposition of the three *corpora aurantii*, the irregularly triangular space, which would be left when the margins of the segments are brought into the same plane, is completely filled up. Behind each segment a small dilatation or pouch is seen, termed the *sinus of Valsalva*, most distinct in the pulmonary artery. The mechanism of these valves is extremely simple. After the complete contraction of the ventricle by which it forces the blood into the vessel, it dilates. The walls of the vessels, being highly elastic, when relieved from the propelling or distending force (*vis a tergo*), recover themselves, and tend to push part of the blood backwards into the ventricles. But as it passes behind the segments of the semilunar valves, and fills the sinuses of Valsalva, the segments are pushed downwards as far as they will go, thus closing the lumen of the vessel and preventing regurgitation into the ventricles.

Cycle of the Actions of the Heart.—A complete action of the heart consists (1) of contraction of the auricles, (2) of a short pause, during which the auricles have begun slowly to dilate, (3) of contraction of the ventricles, and (4) of a long pause, during which the ventricles relax and become filled with blood which is flowing into them from the auricles. After the auricles have filled they again contract, and another cycle of actions is begun. It has been found that the time occupied by the contraction of the auricles is about equal to that of the short pause, and the time of the contraction of the ventricles to that of the long pause. If so, it is evident that in each cardiac cycle the muscular walls of the heart are relaxing as long as they are contracting; or, in other words, there are brief periods of rest equal to brief periods during which energy is being expended.

Sounds of the Heart.—When we listen over the cardiac region of the chest of a healthy person, we feel an impulse, and we hear two sounds like those occasioned by pronouncing in a medium pitch of voice the words *lupp dupp*. The first sound is dull, deep, prolonged, immediately precedes the pulse at the wrist, and is heard most distinctly over the apex of the heart. It is called the *first* or *systolic* or *inferior* sound, and it coincides with the contraction of the ventricles. It is due, or at all events coincident with, the combined effect of the four following actions:—(1) the contraction of the ventricles; (2) the rush of blood through the aortic and pulmonary orifices; (3) the flapping together of the auriculo-ventricular valves; and (4) the movement of the apex of the heart against the wall of the chest, caused by the change of form of the ventricular portion of the heart during its contraction. The second sound is sharp, short, superficial, and is heard with greatest distinctness over the base of the heart. It has been experimentally ascertained to be entirely due to the sudden closure of the semilunar valves in the way already described.

Forces carrying on the Circulation.—1. The chief of these is the heart. 2. The next usually mentioned is the elasticity of the larger arteries, which effects (1) the gradual conversion of the pulsatile or wave-like movement into a uniform flow, and (2) diminishes the resistance the ventricle has to overcome. But it can scarcely be said that the elasticity of the vessels is a new force, as the amount of recoil, supposing the arteries to be perfectly elastic, will be exactly equal to the amount of distension caused by the action of the ventricles. The elasticity of the ventricles modifies the character of the flow of the blood rather than adds to the force for propelling it forwards. 3. By some it is contended that the attractive influence of the tissues in the meshes of the capillary system forms one of the forces of the circulation (*vis a fronte*). 4. The blood is propelled along the veins towards the heart by muscular pressure on their walls forcing the blood onwards, as it cannot pass backwards, on account of the pressure of the valves in these vessels, which open *towards* the heart. 5. Lastly, Burdon Sanderson and others have shown experimentally that inspiration, by diminishing pressure on the venæ cavæ, favours the flow of blood to the heart, and thereby increases the vigour of the succeeding contractions. See RESPIRATION.

Arterial and Cardiac Pressure.—By this is understood the force or pressure of the fluid on the inner surface of the heart or arteries during a contraction of the heart. It is measured by an apparatus termed a *kymograph* (see KYMOGRAPH), and it has been estimated in the human subject to be about 4 lbs. 4 oz. on the sq. inch. Now, if we assume the superficial area of the inner surface of the left ventricle, which has to propel the blood through the whole body, to be 13 inches, as has been determined to be the mean, it follows that when the walls of this cavity contract they do so with a force equal to about 52 lbs.

Rapidity of the Circulation.—There is no accurate method of measuring this. According to Vierordt, the blood flows in the carotid, an artery of the neck, at the rate of about $10\frac{1}{2}$ inches in a second. In smaller arteries he estimated the speed as being much slower. Volkmann found in the carotid of the horse the rapidity to be 20·28 inches per second. According to Valentine and Weber, in the capillaries the rate is 1 inch per minute. All of these measurements are vague and unsatisfactory, and this most difficult problem is still unsolved.

Circumcis'ion is a religious rite which has prevailed among various nations all over the world. It is probably a relic of nature-worship, and points back to the practice of offering human sacrifices to the God of Increase.

The idea long prevalent among Christians was that C. is and was exclusively a Jewish rite, and that it was given to Abraham as a token and seal of the covenant, the institution of which is described in Gen. xvii. This idea may now be considered to be abandoned; for it is capable of absolute demonstration that C. was practised among people well advanced in civilisation—*e.g.*, the Phœnicians and Egyptians—long before the ancestors of the Hebrews had left Mesopotamia. But Scripture does not say that C. was first made known to Abraham. In fact, it implies exactly the reverse. The passage in Genesis assumes a knowledge of the practice, and only represents it as transformed for the first time into a religious rite, and acquiring a symbolic meaning.

Circumduc'tion of the Term, in Scotch law, is the sentence of a judge declaring the time elapsed for leading proof in a case, after which no further evidence can be adduced.

Circum'ference, or **Periphery,** the curved boundary of a plane figure: when the boundary is made up more or less of straight lines, it is usually termed *perimeter*.

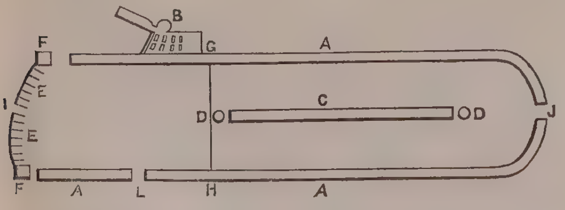
Circumnaviga'tion, the act of sailing round the world. This feat was performed first by Magalhæns (q.v.) in 1519. Drake (q.v.) accomplished it in 1577; and Captain Cook (q.v.) between the years 1768 and 1779 circumnavigated the globe no less than three times. In the present day it is frequently done, but not in the same way, nor in the same vessel. A traveller may now pass round the world in ten weeks. His starting point being London, he will take the train to Dover, cross over to Calais, and proceed to Brindisi. There he will catch the P. and O. steamer bound for Calcutta *viâ* Suez Canal, Red Sea, and Colombo. At Colombo he will change steamers and embark on that from Bombay to China *viâ* Singapore. From China he will proceed by the Empress Line of steamers to Vancouver *viâ* Japan. At Vancouver he will enter the train on the Canadian Pacific Railway, which will convey him to Quebec *viâ* Selkirk Range, Stephen, Regina, Brandon, Winnipeg, North Bay, Ottawa, and Montreal. From Quebec he will take steamer to Liverpool, and thence go on by train to London. Under favourable conditions he might traverse the distance in eight weeks, but as a rule some time is always spent in waiting for a steamer either in China, or at Quebec, or at both places.

Circumstan'tial Evidence is evidence which—assuming it to be true—does not directly prove a question at issue, but indirectly tends to prove it. Thus if A swear that he saw B stab C, the evidence is direct; and if we believe A, the question of whether or not B stabbed C is disposed of. But if A swear that he saw B and C quarrelling on the day when C was stabbed, belief in A does not satisfy us of B's guilt; but it is C. E. of more or less weight. And if we have an accumulation of such items of evidence, they may, though there be no direct evidence, amount to conclusive proof of guilt. But if any one item of circumstantial proof depend on another, the two must only have the weight of one. Thus A swears that he sold to B the knife which D swears that he found blood-stained near the murdered C. Here we have not two but only one item of proof, since if either A or D is swearing falsely, the testimony of the other is valueless against B. C. E. is in this better than direct evidence, that the witnesses to it can hardly combine to swear falsely without being detected. It is plainly impossible that any concatenation of circumstances should ever prove the innocence of one accused to be impossible. When the probability of innocence bears an appreciable ratio to that of guilt, according to the just principle of our law, the prisoner must be acquitted.

Circumvalla'tion (Lat. *circum*, 'about,' and *vallum*, 'a rampart'), in fortification, is a line of entrenchment thrown up by the besieging party round a place under siege, but facing outwards so as to resist attacks from the field.

Circumven'tion means in Scotch law deceit or fraud in making a bargain, or in procuring the making or execution of a deed. Either may be set aside by law if proved to have been entered into or done through C. It will not, however, be sufficient to prove that the act sought to be annulled is hurtful to the doer, or irrational on his part; for the law will not protect a man from the consequences of his own folly. It must be shown that deception was used towards him. If, however, the granter of a deed or maker of a will be of weak mind, a very slender circumstance or fraud may lead the law to set the deed or will aside.

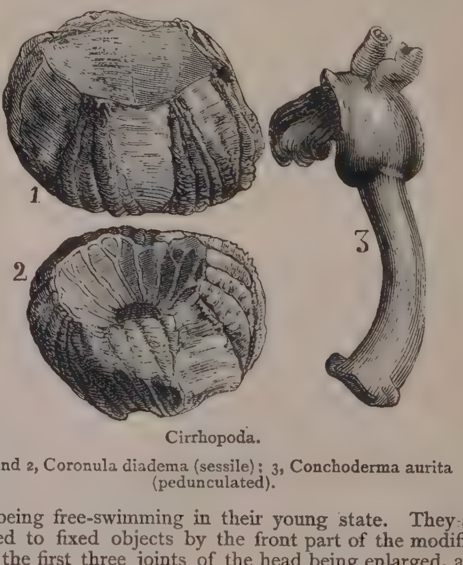
Cir'cus, The, of ancient Rome, was a place in which chariot-races and other games were exhibited. The Circensian Games were believed by the later Romans to have been first instituted by Romulus, and were named *Consuales*, in honour of the god Consus. To Tarquinius Priscus was ascribed the construction in the Murcian Valley, between the Palatine and Aventine, of a building for such exhibitions, which was known by way of eminence as the *C. Maximus*. It was frequently repaired and extended, and was reconstructed by Julius Cæsar, in whose time it was three stadia (about 600 yards) long, one stadium wide, and the surrounding buildings half a stadium deep. At different periods of its history, it was computed to contain 150,000, 260,000, and 385,000 persons. Scarcely a vestige of it now remains; but an excellent idea of an ancient C. may be obtained from the remains of the Circus of Caracalla, the ground-plan of which is shown in the annexed woodcut. Around the lines A A were placed the seats, as in a theatre, the lowest being separated from the ground by a parapet or balcony. At B was probably the station of the emperor. Down the middle of the area ran a dwarf wall C, called the *spina*, decorated with emblematic devices, and terminating at either end in three wooden cylinders DD of a conical shape, called *metæ*, round which the rival chariots were driven. At the end EE were placed the stalls for the horses and chariots, called *carceres*, the usual number of which was twelve. The whole of this side of the C. was called *oppidum*, from its gates and towers, FF. From G to H stretched a chalked rope (*alba linea*), for the purpose of securing a fair start, by bringing all the horses abreast at the entrance of the course. There were in all five gates, of which the chief were the *Porta Pompæ* (I), through which the opening procession entered; the *Porta Triumphalis* (J), through which the victors departed; and the *Porta Libitensis* (L), through which the bodies of those killed in the games were carried out. The *Euripus* in the C. Maximus was a canal 10 feet wide round the bottom of the front balcony, formed by Julius Cæsar to protect the spectators during the wild-beast hunts. The shows exhibited in the C. were the races, of which the Romans were passionately fond at every period of their history; the *Ludus Trojæ*, a sort of sham-fight, by young men of rank on horseback; the *pugna*, the representation of a battle; gymnastic contests in running, leaping, &c.; the *venatio*, a fight of wild beasts with one another or with men; and the *naumachia*, or representation of a sea-fight. In the races four chariots usually entered, drawn by two or four horses. The extent of the course was seven times round the *spina*, and twenty-five races were run in each day.



Circus of Caracalla.

Ciren'cester, or **Cic'ester,** a town of Gloucestershire, on the Churn, and on the Thames and Severn Canal, 17 miles S.E. of Gloucester, has some manufactures of woollens, carpets, and cutlery. It possesses a fine old church (St. John's), and in the vicinity there is an agricultural college, founded in 1846. C., according to Henry of Huntingdon, was originally a British city, called *Caer-corin* ('camp on the Corin,' mod. Churn). It became the *Corinium* or *Corinum* of the Romans, and stood at the junction of five Roman roads. The English invaders added *ceaster*, to mark that it had been a military station; and the modern name is only a corruption of *Corinium-ceaster*. Canute held a council here in 1020. C. once possessed a fine abbey, founded by Henry I., but no remains are extant. The town was attacked by Rupert in 1642-43, and was afterwards captured by Essex. Traces of a fortified wall have been discovered, as also various Roman remains. The C. division of Gloucestershire returns one member to Parliament. Pop. parl. div. of county 53,341; reg. subdist. 12,073; civ. and ecc. par. 7521.

Cirrhop'oda, or **Cirrip'edia,** an order of lower Crustacea represented by the Barnacles and Sea-acorns. These forms are distinguished by the fact that when adult they are fixed, being free-swimming in their young state. They are attached to fixed objects by the front part of the modified head; the first three joints of the head being enlarged, and



Cirrhopoda.

1 and 2, Coronula diadema (sessile); 3, Conchoderma aurita (pedunculated).

enclosing the rest of the body. The larva or embryo fixes itself by means of a peculiar *cement* furnished by special glands, which consist of modified parts of the ovaries. The hinder part of the animal, with its twelve feet converted into *cirri* or tentacular organs (hence the name *Cirripedia*), can be protruded from within the shell with which it is provided, and the cirri subserve respiration and nutrition. The mouth is provided with mandibles and maxillæ, and a complete digestive system exists. No distinct heart is developed. The larva is a free-swimming body known as a *nauplius*, provided with antennæ, a single eye, and a dorsal carapace or shield. Subsequently twelve limbs are developed on the abdomen, and the antennæ become prehensile organs, whilst a pair of eyes now exist. The antennæ are next fixed to some rock or stone by the cement, the carapace becomes calcified to form the adult 'shell,' and the feet become the cirri of the fully grown and metamorphosed animal, which loses the eyes of the larval stage. The Barnacles (q.v.) are stalked and possess peduncles, at the free end of which the body of the animal, contained within a shell, composed of calcareous plates, is found. The Balani or sea-acorns are sessile or unstalked, and fix themselves directly to rocks, their bodies being enclosed within shells, composed each of six segments or pieces, and having the twelve divided cirri, capable of being protruded from or retracted at will within the aperture of the shell, which is closed by an *operculum*.

Cirr'hus, or **Tendril**, is the name applied to the thread-like twining organs by which plants climb around others or up any support. They may be formed by various modifications of the leaves, as in the Pea tribe, various species of *Clematis*, &c. In other cases they may be thread-like leafless branches capable of coiling spirally. Some tendrils hook their tops round supporting objects, while others expand their tops into a flat disk, which clings to objects, and enables the plant to climb up in the same way as do the accessory rootlets of the Virginian creeper. The term C. is applied in zoology to any curled filament, and also to the modified feet of the *Cirripedia*.

Cis, a Latin preposition, meaning 'on this side,' the opposite of *ultra* and *trans*, and prefixed to names of mountains and rivers to form adjectives of place: Cisalpine, 'on this side of the Alps,' the opposite of Transalpine, 'beyond the Alps'; Cismontane, 'on this side of the mountain'; Ultramontane, 'on the further side of the mountain'; Cisrhenane, 'on this side of the Rhine'; Transrhenane, 'beyond the Rhine,' &c. It must be noted that the standpoint of those who first used the term was Rome, or some place within the bounds of the Roman dominion.

Cisal'pine Republic, The, formed out of the Cispadane and Transpadane republics, was proclaimed by General Bonaparte, 28th June, 1797, and recognised by Austria as an independent state at the peace of Campo-Formio. It comprehended Lombardy, Mantua, Bergamo, Brescia, Cremona, Verona, Rovigo, Modena, Massa, and Carrara, Bologna, Ferrara, and Mesola. On the 22nd October of the same year it received an accession of territory, and was divided into ten departments, with an area of 16,384 sq. miles, and a pop. of 3,500,000. The victories gained by the Russians and Austrians in 1799 produced a temporary dissolution of the republic, but it was re-established by Bonaparte after the decisive battle of Marengo. On 25th January, 1802, it assumed the name of the Italian Republic, and was divided into thirteen departments, with Bonaparte for its president, a title exchanged in 1805 for that of King of Italy, held by him till 1814, when the so-called Kingdom of Italy was dissolved.

Cissampelos (Gr. 'ivy-vine'), a genus of plants of the natural order *Menispermaceæ*. The root of *C. Pareira*, the 'velvet leaf' of the W. Indies, Central America, and India, yields the '*Pareira brava*,' or 'Butua root' of the shops, extensively and beneficially used in diseases of the bladder, &c.; other species are used as tonics. The root of *C. obtecta* is used for making an intoxicating drink, while *C. glaberuma* and *C. ebracteata* may be classed among that category of plants which have been reputed as remedies for serpent-bites. The root contains an alkaloid, *Cissampelin*, to which it owes its active properties.

Ciss'oid (Gr. *kissos*, 'ivy,' and *eidos*, 'a shape') **of Diocles,** a curve invented by Diocles (a Greek geometrician of unknown date) for the solution of the duplication of the cube, and the insertion of two mean proportionals between two given straight lines. If, from the extremity of a diameter of a circle as origin, lines be drawn to meet the tangent at the other extremity, that point on each line whose distance from the origin is equal to the distance between the intersections of the line with the circle and tangent, lies on the C. It has a cusp at the origin, and a point of inflection at infinity. The space between the curve and its asymptote (the tangent of the circle) is triple the area of the circle. Newton, in his *Universal Arithmetic*, gives a mechanical method of describing this curve.

Cister'cians, an order of monks founded in 1098 by Robert, abbot of the Benedictine monastery of Molesme in Burgundy, who retired with twenty companions to Citeaux (Lat. *Cistercium*), and there established the fraternity of C. The C., after degenerating, were reformed in the beginning of the 11th c. by St. Bernard of Clairvaux, who founded ninety-two monasteries, and from whom the C. in France were known as Bernardines. After St. Bernard's death, the C. shook off episcopal control and became very influential through Europe. They wore a white robe with a black scapulary. Their rule was austere. At first they shunned luxury, ate no flesh, slept on straw, and walked unshod. Among the various offshoots from the C. were the Recollets in Spain, the Feuillans or Bare-footed monks in France, and the Trappists of La Trappe in Normandy, who in the 16th c. sank into dissolute banditti. In England and Scotland the C. were very numerous. In the reign of Henry VIII. there were in the former country seventy-five Cistercian abbeys, among which were Woburn, Tintern, Furness, Kirkstall, and Rievaux. The Scotch abbeys of Melrose, Dundrennan, Culross, Deer, &c., belonged to this order. In France the Cistercian convent of Port Royal became famous in the Jansenist controversy. Since the French Revolution the C. have had few convents in Europe.

Cis'tern, a vessel for storing water or other liquid, with apparatus for regulating its supply and discharge. The kind most extensively in use is of wood lined inside with lead soldered at the angles. Cast-iron in one piece for small cisterns, and for large, in plates joined with flanges and bolts, and made water-tight with cement, is also employed, notably for water-tanks at railway stations. Very efficient and cheap cisterns are likewise made of slate slabs.

Cis'tus, or **Rock-Rose,** a genus of Dicotyledonous plants, belonging to the natural order *Cistaceæ*, to which it gives its name, shrubs, natives of Southern and Western Europe, N. Africa, and the Canary Islands. From the leaves and branches of *C. Creticus* exudes the ladanum or labdanum gum of Crete. In that island it is collected by means of a kind of rake 'with a double row of long leathern straps,' employed in the heat of the day when not a breath of wind is stirring. Seven or eight country fellows, in their shirts and drawers, whip the plants with these straps, which, by rubbing against the leaves, lick off a sort of odoriferous glue sticking to the foliage. At one time, it is said that it was gathered from the beards of goats who had been browsing on the foliage. It is now used as a perfume, but it was formerly esteemed as a stimulant and expectorant in the cure of the plague, and as a constituent in plasters. The ladanum of Spain and Portugal is chiefly derived from *C. ladaniferus*, and is said to be obtained by boiling in water the summits of the branches. It has somewhat similar properties to the former, but is not in such high repute. Many of the species of C. are cultivated in our gardens, *e.g.*, *C. ladaniferus*, *C. cyprius* (often confounded with the former), *C. virginatus* of Teneriffe, &c. Altogether there are about 200 species known, a number of which are figured in Sweet's '*Cistineæ*.' *Helianthemum vulgare*, the 'rock-rose,' a common little plant on dry ground, and remarkable for the irritability of the stamens, is the only species of the genus found as far N. as Scotland.

Cit′adel (Fr. *citadelle*, from Ital. *cittadella*, 'a little city'), a fort serving the double purpose of keeping in subjection the inhabitants of the town or city in or near which it stands, and, in case of a siege, of forming a stronghold to shelter the defenders after the rest of the town has been taken. The C. is always built in a space clear of buildings, and commands the entire fortifications of the city or town.

Cita′tion is the act of calling upon a party to appear in court to answer to an action, to give evidence, or to perform some other act before, or in obedience to, the Court. In England the term is chiefly used in the probate, matrimonial, and spiritual court. In Scotland C. is done by an officer of the court, or by a Messenger-at-Arms (q.v.) under warrant. When a party is not in Scotland, but under the jurisdiction of the Court of Session, he is cited edictally; formerly this was by a citation published at the market-cross of Edinburgh and on the shore and pier of Leith; but now it is done by leaving a copy at the office of the keeper of Edictal Citations. Lists of citations are printed and published. In criminal cases it is not sufficient that the party appear voluntarily. He *must* be brought into court in regular form, and he can plead any omission of form, even though he has consented to it. Prescription, positive or negative, in a process may be interrupted by C.

Cithara.

Cithara, a musical instrument, in shape like a guitar, which the player struck either with his finger or with a plectrum. Both the Greeks and the Egyptians used it.

Cities of Refuge were six Levitical cities—namely, Kedesh, Shechem, and Hebron on the W. side of Jordan, and Bezer, Ramoth, and Golan, on the E. side—appointed as a refuge to which the manslayer might flee from the Avenger of Blood (q.v.), and where he was protected till he could be tried by the authorities of his own city. If it was found on his trial that the deed had been involuntary, he was taken back to the C. of R., and on the death of the high priest, could return in safety to his home. The right of sanctuary was also possessed by many Greek and Roman cities, especially Ephesus, and by many churches in the Middle Ages—a privilege which was often too much abused, by letting real criminals escape.

Cit′izen (Old Eng. *citezaine* and *cyteseyne*, from the Old French form of *citozen*, and that from Low Lat. *civitadanus*, a derivative from *civitas*). Neither *C.* nor *city* is a word of definite meaning in modern Britain. The *civitas* of the Romans, which was a central corporation governing inferior ones of a like kind, was unknown here. Some burghs were called cities because they were royal residences, others because a bishop's cathedral stood there. Thus St. Andrews and Glasgow in Scotland, though mere burghs of barony, were called cities, and their inhabitants citizens. In Athens, citizens had the privilege of receiving a *theoricon*, or two oboli to each, as entrance money to the theatres; each C. who attended the ecclesia or public assembly received three oboli about fifty days in every year; every member of the *boulè* or senate, a drachma a day about 300 days in every year; besides, the freemen who served as jurymen or dicasts in the courts of justice received daily pay from the public treasury. The resident aliens were compelled to pay a capitation tax of twelve drachms and to choose patrons; and there was a large body of slaves. Such state donations were, however, rare. At Rome we find *civitas* along with *libertas* and *familia* making up the notion of *status*. Freemen were divided into *cives* and *peregrini*. The rights of cives were—(1) the *jus suffragii*, electoral and legislative power; (2) *jus honorum*, capacity for office; (3) *jus commercii*, or full rights in property; and (4) *jus connubii*, full rights in marriage. Aliens enjoyed only numbers (3) and (4), and these only in a limited way. An intermediate class, Latini, enjoyed number (3) fully. These rights were liable to be lost by the various modes of degradation (*capitis minutio*), and the political rights *suffragium* and *honores* were forfeited by infamy (*infamia*) or loss of civic honour (*existimatio*). Although the imperial revenue consisted to a great extent of provincial tributes, Roman citizens had, after the time of Augustus, to pay customs on most imported articles, an excise not exceeding 1 per cent. on all articles sold in the home markets, a tax of 5 per cent. on legacies and successions. Caracalla did not exempt from tribute where a subject became a C., and citizenship thus became a burden instead of a privilege. The Roman army felt insulted when addressed as 'citizens.' All political significance had, of course, left the term, and the state at last supported its citizens by distributions of corn and largesse, and by giving gratuitous spectacles. The Italian cities were generally administered by a *curia* or municipal senate elected by the people, and *duumvirs*, or annual consuls. In the 9th c. these cities began to rebuild their walls; and after the War of Investiture many were able to recover a jurisdiction and corporate life independent of their feudal surroundings. They had the parliament or general meeting of citizens for election; their *gonfaloniere* and *barroccio* of the town militia; the secret financial council, or *consilio di credenza*; the *signorias*, or municipal magistrates. The feudal lord frequently became a burgess. These free Italian cities formed a league against Barbarossa, and by the treaty of Constance (1183) all their previous privileges and immunities were confirmed, although the Emperor reserved a full right of sovereignty over most of them. Charters of immunity and franchise began to be granted in France in the reign of Louis le Gros. These were distinct from the early charters freeing serfs and fixing their feudal payments; they made careful provision for security of the person and property of citizens, on the principle of a common responsibility and of joint contribution to the expenses of defence and justice. The term C. was used universally during the French Revolution to express the complete political equality of all Frenchmen. In the municipal constitution of Brissot the electoral right was confined to the *citoyens actifs—i.e.*, those paying a *marc d'argent*, or yearly tax equal to three days' labour. In America the term has been used with a similar connotation.

Cit′ric Acid is a colourless crystalline compound contained in the juice of lemons, oranges, gooseberries, tamarinds, and in most acidulous fruits, and was first isolated by Scheele in 1784. C. A. is usually prepared from lemon-juice. The juice is allowed to remain for some time undisturbed, when fermentation sets in and mucilaginous substances separate: the clear liquid is decanted from these, neutralised with chalk, and then boiled with lime, when insoluble citrate of calcium is deposited; this is washed with cold water, decomposed by the proper quantity of sulphuric acid, and the solution of C. A. which results, after being syphoned off from the insoluble sulphate of lime, is evaporated to the proper concentration and allowed to crystallise. C. A. crystallises with one molecule of water of crystallisation. It has a pleasant acid taste, readily dissolves in water and in alcohol, and forms salts in which one, two, or three atoms of its hydrogen are replaced by metals; it is therefore a tribasic acid. C. A. is used by the calico-printer to discharge the mordant from cloth, and in the manufacture of bright colouring matters from cochineal and safflower. It is also used in medicine. Lime-juice is always given on board ship to sailors as an antiscorbutic. C. A. is also employed in the manufacture of effervescing powders, lemonade, &c.

Cit′ron, a tree cultivated in Southern Europe, but a native of the N. of India, belonging to the natural order *Aurantiaceæ* (the Orange family). By some botanists it is looked upon as a variety, or even as the type of the various plants which we now distinguish by the names of orange, lemon, shaddock, and lime, an opinion which Dr. Lindley was inclined to adopt (*Journ. Horticultural Society*, ix. 171). It has, however, been cultivated in Europe since the earliest period of the Christian era, or even before that time, and is now naturalised in most countries the climate of which is suitable for its growth. There are many cultivated varieties, distinguished by the shape, &c., of the fruits. In China, the variety known as the 'five-fingered C.' has the lobes separated into finger-like divisions. The pulp of the C. is cooling, but it is for the rind, which is made into a preserve, that the fruit is chiefly valued, and it may be said that it is used for the same purposes as the fruit of the lemon. From the *cedrate* variety of the C., oil of cedrate, greatly valued by the perfumers, is obtained. C. is frequently cultivated in Great Britain. It is believed that the word which the translators of the Bible have rendered 'apple' would in most places be more appropriately translated C.

Citron.

Citros'ma, a genus of trees of the natural order *Monimiaceæ*, containing about fifty species, all natives of tropical S. America. The leaves are covered with glands, which secrete an oil with a citron-like odour; hence some of the species are called *Lemoncillo*, or 'little lemons,' the fruit being only about the size of a pea when ripe.

Cit'rus, a genus of plants of the natural order *Aurantiaceæ*, consisting of trees and shrubs, natives of India and of the warmer parts of Asia, though also extensively cultivated in America, Southern Europe, and other warm regions, for the sake of their fruits. The flowers are very fragrant, and, like the leaves and rind of the fruit, abound in a volatile oil. Among the best-known fruits referred to the genus C. are the Citron, Orange, Lemon, Lime, Bergamot, Shaddock, Pompelmoose, Forbidden Fruit.

Citta', the Italian form of *city*, enters into the composition of many names of places in Italy, of which may be noted :—

CITTADELLA ('little town'), a walled town in the province of Venezia, N. Italy, on the Brentella, 14 miles N.E. of Vicenza; has woollen-cloth and paper mills. Pop. 9368.

CITTA DI CASTELLO ('castle town'), the *Tiphernum Tiberinum* of the Romans, a town in the province of Perugia, Central Italy, on the Tiber, 12 miles N. of Arezzo; has some manufactures of silk-twist, &c. It is chiefly notable in connection with Raphael, who painted many of his earlier pictures here. The town has many rare Gothic churches and other fine buildings. Pop. 24,688.

Others will be found under CIVITA.

Cit'y, a term introduced about the time of the Norman conquest. The word is derived from the Latin *civitas*, and is not limited in its application to episcopal towns. It is applicable to all towns of eminence, signifying that they are subject to municipal government. Long after the Conquest, C, is used synonymously with *burgh*, as appears in the charter of Leicester, it being called *Civitas Burgus*, which shows that it is an error to suppose the term to be only applicable to a town which 'either is or has been the see of a bishop.' On this point Woodeson, who was Vinerian Professor, adduced a decisive authority. It is that of Ingulphus, who relates that at the great council assembled in 1072 to settle the claims of two archbishops, it was decreed that bishops' sees should be transferred from *towns* to *cities*. In London, when 'the C.' is spoken of, it denotes the mercantile quarter of the town E. of Temple Bar. In America, the term is applied to all incorporated towns governed by a mayor and aldermen.

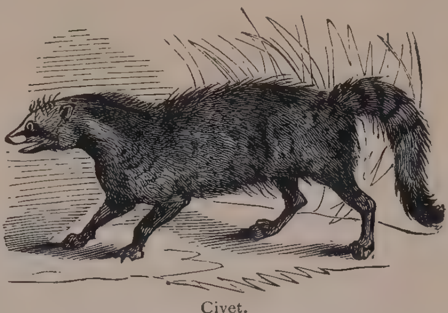
Ciudad', the Spanish form of the Lat. *civitas*, enters into the composition of many names of places both in Spain and her colonies. The most important are :—

CIUDADE'LA, a walled town of Minorca, on the N.W. coast of the island, 30 miles N.E. of Port Mahon, has some woollen manufactures, and a trade in agricultural produce. Its cathedral is an imposing structure. Pop. 8447.

CIUDAD REAL' ('the royal city'), the capital of a province of the same name, Spain, between the rivers Jabalon and Guadiana, 100 miles S. of Madrid, with which it is connected by railway. It has several famous Gothic churches, a public square of 150 by 75 paces, some manufactures of woollens, leather, tablecloths, &c., and a trade in wine, oil, fruits, and mules. Pop. 14,702.—The *province* of C. R. occupies the S. of New Castile, and has an area of 7840 sq. miles, and a pop. of 292,291.

CIUDAD ROD'RIGO ('city of Rodrigo'), a strongly fortified town in the province of Salamanca, Spain, overlooks the Agueda, 50 miles S.W. of Salamanca, has a citadel, a cathedral, part of which was erected in the 12th c., and several fine churches. In the Plaza Mayor are three Roman columns bearing inscriptions. The river is here spanned by a magnificent bridge. As a key to the W. of Spain, C. R. was a place of great importance during the Peninsular War. The French captured it in 1810, and the British besieged it for eleven days, and eventually carried it by storm in one of their most brilliant actions, 20th January, 1812. Pop. 8330.

Civ'et, a genus of Carnivorous mammalia included in the family *Viverridæ*, which, from their applying part of the sole of the foot to the ground in walking, have been named *Semiplantigrada*. They are of moderate size. The muzzle is sharp and the tail long. The flesh-tooth has a cutting edge, and the canines are sharp, long, and pointed. The tongue is roughened with numerous sharp papillæ. The claws can be partly retracted. The pupils of the eyes can contract very markedly on being exposed to light. The C.-cat of N. Africa is the most familiar species. It is nocturnal in habits, and supplies the C. of commerce, in the form of a pomade-like secretion, elaborated by a double pouch present in both sexes. This substance is used in the manufacture of perfumes, and is removed periodically from the secreting glands. Another C., called the genette, inhabits N. Africa and S. Europe, and may be domesticated like a cat. The food consists of raw flesh of various kinds. The common C. attains an average length of about 10 inches, and is coloured a brownish grey with black markings. The last-mentioned species does not afford 'C.'


Civet.

Civid'ale ('the little town'), the ancient *Forum Julii*, a walled town of Udine, N. Italy, on the Natisone, 8 miles E.N.E. of Udine. The cathedral of Santa Maria, built in the 8th c., has several fine paintings and a beautiful altar-screen. Its museum of antiquities and the municipal archives are rich in old and valuable MSS. C. carries on silk, cotton, and linen manufactures. Pop. 8448.

Civ'il Death occurs when a person alive, or possibly alive, is adjudged dead by the law. Those attainted of treason or felony are, with exceptions, held to be civilly dead. In former times, they who entered a monastery or abjured the realm were also held to be civilly dead. A presumption exists in favour of life for a reasonable number of years, so as to throw the *onus probandi* on the party alleging death. But this presumption may be overcome by a counter presumption of death arising from circumstances. No general rule can be given on this point. Neither forfeiture nor escheat is permitted by statute 33 and 34 Vict. c. 23 to follow upon civil death.

Civil Engineer, strictly every engineer not connected with the army—every engineer, that is, not a military engineer—but in common usage a man who makes or designs railways, docks, roads, canals, &c., as distinct from a *mechanical engineer*, a man who makes engines, boilers, and machinery in general. See ENGINEER.

Civil Establishments. Certain public departments of civil organisation, but provided for by the army estimates, are so called.

Civil'ian. This word has three meanings, two of which are legal. In the law, it may denote one versed in the principles and rules which form the basis of civil rights, or it may denote one who has specially studied these principles and rules as they appeared in the laws and government of ancient Rome. In a popular sense, a C. is one whose vocation is neither clerical nor military.

Civil List. Previous to the Restoration in 1660, the civil and military expenses of the state in England were paid out of what was called the royal revenue. This arose from crown lands, and from forced loans, or taxation by the will of the sovereign. (See BENEVOLENCE, SHIP-MONEY, TONNAGE AND POUNDAGE.) At the Restoration the expenditure was divided into two branches, the military and the extraordinary, and the ordinary for maintaining the civil establishments of the country; the revenues appropriated to the latter being called the hereditary or C. L. revenues. They were derived from the crown lands, and from taxes voted by Parliament at the beginning of each reign. In the reign of William III. the C. L. amounted to £680,000 a year. It went on increasing during the reigns of the Georges. In 1812 it amounted to £1,080,000 independent of annuities to members of the royal family paid out of the Consolidated Fund (q.v.). In the reign of William IV. the C. L. charges were confined to the expenses of the King's household, secret-service money, and pensions. These were fixed at £510,000 a year, including a pension list of £75,000. At the beginning of the present reign a C. L. was settled upon Her Majesty for life of £385,000 a year, of which £60,000 is for the privy purse, £131,260 for salaries of the Royal Household, £172,500 for the expenses of the Household, and £13,200 for the Royal Bounty, &c. In return for this grant, it was provided that the hereditary revenue should be carried to the Consolidated Fund. By the C. L. Act, 1 and 2 Vict. c. 2, Her Majesty is empowered to grant new pensions to the amount of £1200 a year, chargeable on the C. L. revenues, to those having fair claims on the royal beneficence, or who, by service or discovery, have earned the gratitude of their country. At the present time the amount so distributed is £24,592.

Civil Service. The paid service of the state which is not military or naval is called the C. S. Appointments in it were formerly under patronage, but now situations in the C. S. are (1) open to competition under regulations framed in pursuance of Clause v. of the Order in Council of 4th June, 1870, by the Civil Service Commissioners, with the approval of the Lords of the Treasury, or (2) open to competition independently of this clause and not subject to the 'General Regulations,' or (3) filled by 'limited competition' among candidates nominated by the heads of the Departments to which they belong, or (4) filled by nomination, subject to a qualifying examination only (sometimes there may be a competition at the discretion of the head of the Department which has the right of nomination), or (5) filled by candidates to whom the Commissioners have granted certificates with or without examination (Clause vii. of the Order in Council). Success in examination is not in itself a guarantee for permanent employment. A six months' probation is necessary, and should the candidate during this time not satisfy the chief of the department in which he has been placed, the appointment will be cancelled. The C. S. Commissioners hold examinations in London, Edinburgh, Dublin, and the provinces, on days which are previously advertised in the principal newspapers. Persons wishing to become candidates must apply to the C. S. Commissioners by letter in their own handwriting, addressed to the office in Cannon Row, Westminster, for permission to attend the preliminary examination, at least ten days before the day named. On receipt of this application, requisite instructions are supplied. Before being allowed to compete, candidates must satisfy the Commissioners that they are natural-born subjects of the Queen, and that, for the first-class examinations, they are not less than twenty-two or more than twenty-four years of age on the first day of the competitive examination. For the second-class examinations the limits of age are seventeen and twenty. Candidates must produce certificates of good health and character. They may compete without reference to any special office vacant, or the competition may be for a special office. Appointments may now be obtained by successful candidates in the Treasury, Privy Council Office, Colonial Office, India Office, War Office, Admiralty, Board of Agriculture, Foreign Office, Local Government Board, Board of Trade, Poor-Law Board, Customs, Inland Revenue, General Post-Office, and a great many other Government offices. There are also competitive examinations for the posts of Abstractor (20-25 years of age), Boy Clerk (15-17), Temporary Boy-Copyist (14-18), Temporary Boy-Messenger (13-15), and Female Typist (18-30). The most important and lucrative department of the C. S. open to competition is that of the C. S. of India, where the candidate must be between 21 and 23 years of age on the 1st April of the year in which the competition takes place. In this the successful candidate will at once, on arrival in India, receive a salary of 3000 rupees or £300 a year; his promotion, with good conduct and practical capability on his part, will probably be rapid, the salaries rising not by tens or twenties, but by hundreds of pounds per annum, until they reach the maximum. In February, 1892, the following return was laid on the table of the House of Commons:—

No. of Officers.	Yearly Salary.	Held by Europeans.	Held by Eurasians and Natives.
27	£5,000 and upwards.	26	1
50	£4,000—£5,000	47	3
125	£3,000—£4,000	125	—
351	£2,000—£3,000	346	5
1,003	£1,000—£2,000	951	52
2,635	£500—£1,000	2,078	557
3,526	£250—£500	1,334	2,192
10,975	£100—£250	2,097	8,878

These figures speak for themselves, and show how lucrative are the appointments which are open to members of the Indian C. S. The salaries of the judges of the Sudder Courts are £5000 a year. In the Forest Service of India there are also valuable appointments open to public competition. The India Public Works Department is one of the most important branches of the Indian C. S. The civilian officers are passed students of Government Civil Engineering Colleges in England and India, and civil engineers in practice of approved qualifications appointed direct by the Secretary of State or Government of India. The Indian Civil Engineering College at Cooper's Hill, Surrey, was established in 1870 for the education of civil engineers for this department. Admission to the college is obtained by competitive examination. In the Colonies also there are valuable

C. S. appointments open to public competition. The more important departments of the C. S. of the United Kingdom, India, and the Colonies are described under their titles in this work. For a description of the nature of the competitive examinations, see article Examinations for the C. S. See *Guide to Employment in the C. S.*, by J. D. Morell, LL.D., London.

Civil Service Estimates include all the ordinary expenses of the state, except those included in the estimates for the army and navy, and the interest on the National Debt. They came to £18,688,219 for the year 1894-5, as against £18,143,561 for the preceding year. Public Works and Buildings absorb £1,737,720. Law and justice cost £3,754,962. The sum of £9,642,180 is spent on Education, Science, and Art. The salaries, &c., of the Civil Departments take £2,039,993; while Foreign and Colonial Services cost the country £635,473. The C. S. E. are voted by the House of Commons in Committee.

Civ'ita, an older and fuller form of Citta (q.v.), and similarly used. The most important towns of whose names it forms part are:—

Civ'ita Castella'na ('the castled town'), a town in the province of Roma, Central Italy, 28 miles N. of Rome, on the site of the ancient *Falerium Vetus*, and containing numerous Etruscan remains. It is built on a steep hill near the Rio Maggiore, here crossed by a bridge 150 feet in height, and has a cathedral (1210) with beautiful mosaics, a very remarkable crypt, and wonderful altar figures of the 15th c., a college, and a citadel, which has been converted into a state prison. Pop. 4521.

Civita de Penn'e ('the city of the summit or pen'), the ancient *Pinna Vestina* (the chief city of the Vestini), a town in the province of Teramo, Central Italy, 29 miles E. by N. of Aquila. The cathedral and diocesan seminary are handsome edifices, but the town is in general ill-built. C. has a manufactory of silk-flowers, a dyework, and a tannery.

Civitano'va Marche ('new town'), a commercial town of Central Italy, province of Macerata, in what was formerly designated the Marches, 12 miles W. of Macerata, with a commodious harbour on the Adriatic, at a short distance from the town. Vines and olives are produced abundantly in the neighbourhood, which also possesses rich pastures. Pop. of town and port, 9988.

Civita, or Citta, San-Angel'o, a town in the province of Teramo, Central Italy, 25 miles S.E. of Teramo, and near the Adriatic. It has considerable trade, and a pop. of 7044.

Civita Vec'chia, a city, fortress, and free port in the Italian province of Roma, on the Mediterranean, 38 miles N.W. of Rome, with which it is connected by railway. Its harbour, which is strongly fortified, is formed by two semicircular moles and an exterior breakwater, has at its southern extremity a lighthouse 74 feet above the sea level, and has depth of water for vessels of 400 and 500 tons. The streets, narrow but regular, are well built. C. V. is the seat of a bishop, has an arsenal, shipyards, and magazines, and a large prison for convicts. It has communication by steam with Marseille, Genoa, Leghorn, Naples, Messina, Malta, Greece, Egypt, and Turkey. Pop. 11,938. C. V. is the ancient *Centumcellæ*. It was enlarged by Trajan, in honour of whom it was called *Portus Trajani*. In the reign of Justinian it became a bone of contention between Greeks and Ostrogoths. Often plundered and destroyed, it always rose again from its ruins. The place obtained its present name ('the old city') after its destruction by the Saracens in 812, when the inhabitants withdrew into the interior and founded a 'new city.'

Civitell'a del Tronto ('a little town of the Tronto'), a strongly fortified town in the province of Teramo, Central Italy, 9 miles N. of Teramo, situated on a rock on an affluent of the Tronto. It is noted historically for two events: the defeat of the forces of Pope Leo IX. and the Emperor Heinrich III. by the Norman Guiscard in 1053, and its successful defence against the Duke of Guise at the head of a French and Papal army in 1557.

Clackmann'an (Gael. *clach* or *clachan Mannan*, 'the stone circle or village of Mannan,' an ancient district of Scotland), the capital of Clackmannanshire, on the Devon, near its junction with the Forth, 29 miles N.W. of Edinburgh. It was formerly a royal burgh, and in 1330 was the residence of King David Bruce. Many objects in the neighbourhood bear testimony to this fact, as 'the King's stone,' &c. Though C. is the county town, the courts are held at Alloa. Pop. 1779.

Clackmann'anshire, the smallest county in Scotland, 16 miles long from E. to W., and 8 broad from N. to S., bounded N. and W. by Perthshire, E. by Perthshire and Fifeshire, and S. by the Forth. The Ochil Hills occupy the N. part of the county, but the remainder, consisting principally of the valley of the N. Devon, is very fertile and produces heavy crops. The Ochils, which are composed principally of trap, rise in Bencleugh to 2352 feet. Wheat and barley are cultivated in nearly equal proportions, in each case to about the third of the quantity of oats sown. Beans are a heavy and favourite crop. The minerals are iron, limestone, and coal, which is found in abundance. The chief manufactures are woollens, especially tartans and tweeds, glass, earthenware, and bricks. The most important town in the county is Alloa (q.v.); but the village of Dollar (q.v.) is also widely known in Scotland as a seat of education. C., which is divided into four parishes, returns one member to Parliament in conjunction with Kinross-shire. Area of C. is 48 sq. miles, and pop. of civ. county is 28,432.

Clad'ium (Gr. *klados*, 'a branch or twig'), a genus of plants of the order *Caperaceæ*. One species (*C. mariscus*) is common on the bogs and marshes of some parts of Britain; for example, Cambridgeshire, where hundreds of acres are covered with it. It is used for thatching and lighting fires. It is the most northerly of its genus, the twenty-one species described (Steudel's *Plantæ Cyperaceæ*) having an extended geographical distribution, though the majority are natives of Australia.

Cladodystrop'ia (Gr. *klados*, 'a branch,' and *dustrophos*, 'hard to rear'), a disease of aged oaks and other trees growing in a light soil, in which the upper branches are more imperfectly nourished than the lower, and therefore sooner decay —in other words, become what is called 'stag-headed.' It has been supposed that this is in consequence of the decay of the tap root, possibly from the attacks of fungi, but Berkley considers this mere conjecture.

Cladopto'sis (Gr. 'a falling away of the twig'), a disease of oaks, willows, and other forest trees, in which the small branches snap off with a regular circular fissure, leaving a cup-shaped scar, somewhat similar to that which takes place when a leaf or fruit separates at the stalk. It appears to be somewhat similar to the disease to which vine branches are subject after a cold summer, and which is known as *Phriganoptosis*. The branches fall off, 'a process facilitated by the peculiar formation of the stem, there being a transverse layer of cellular tissue at each bud' (Berkley).

Claim, in law, is a demand of right in something which is not possessed by the claimant.

Claim of Liberty is a petition to the Queen in the Exchequer Division for confirmation of liberties and franchises. See Liberty, Franchise.

Claim on a Bankrupt Estate.—Every creditor having a claim on such an estate must prove his debt, as soon as may be after the making of the receiving order, by delivering or sending through the post in a prepaid letter to the official receiver or to the trustee, if one has been appointed, an affidavit verifying the debt and stating whether the creditor is secured or not and describing the vouchers, if any, in respect of the debt. Notice from the official receiver or trustee of a payment of dividend is sufficient acknowledgment of proof of debt. To enable a Scotch creditor to prove under a fiat issued against an English trader, he must forward to his agent in England an affidavit setting forth fully the nature of his debt, accompanied by the securities, if any, held by the creditor, and a copy of the account, if any, between the parties. To rank under a Scotch sequestration, the claimant must describe distinctly the ground of his debt, accompanying his C. with an oath of verity, specifying every security which the claimant holds for the debt.

Clair, St., a lake, 30 miles long by 12 broad, between Lakes Huron and Erie, with the former of which it is united by the river St. Clair, which is merely the outlet of Lake Huron.

Clairac′, a town in the department of Lot-et-Garonne, France, on the Lot, 16 miles N.W. of Agen, has some manufactures of paper and leather, and a trade in wine and fruits. C. accepted the Reformation doctrines as early as 1527, and suffered greatly during the religious wars, more especially in the year 1621. Pop. 3562.

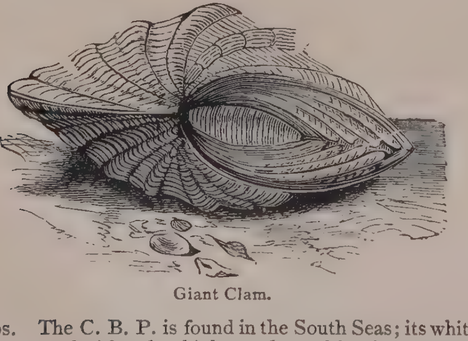
Clairaut, Alexis Claude, a distinguished French mathematician, was born 7th May, 1713, at Paris, where he died 17th May, 1765. At the early age of eighteen he was admitted to the Academy of Sciences, to the scientific journal of which he contributed many elaborate and original papers. His most famous works are his *Théorie sur la Figure de la Terre* (1743), his *Théorie de la Lune* (1752), and his *Théorie du Mouvement des Comètes* (1760). His *Problème des Trois Corps* is to this day one of the most profound specimens of analysis in existence.

Clairvaux′ (Lat. *Clara Vallis*, 'bright valley'), a small village of France, in the department of Aube, on the left bank of the river Aube, 7 miles E. of Bar-sur-Aube, derives its origin and its name from the celebrated Cistercian abbey founded here by St. Bernard in 1115. The abbey had at one time an annual revenue of 120,000 livres. It was suppressed at the Revolution, and its extensive buildings are now used as a house of correction and workhouse.

Clairvoy′ance (Fr. 'clear-seeing') is a term applied to a faculty supposed by some to be possessed by certain parties, in virtue of which they can see in the dark, describe objects they may never have seen with the naked eye, but which they are conjectured to see mentally, and by which also they can describe objects separated from them by any opaque substance or enclosed in a box. It is said to be possessed by spiritual 'mediums,' and by people under mesmeric influences. Of such a faculty there is no scientific proof, for in all cases the pretensions of the clairvoyant break down when submitted to searching inquiry by men who are acquainted with all probable sources of fallacy, and who bring to bear upon them the acumen and caution with which a successful lawyer investigates a case. C. is cleverly imitated by conjurors by means of a language of signs known only to the conjuror and the reputed clairvoyant. See MESMERISM.

Clam, in heraldry, an escalop or cockleshell, indicating that the bearer has been a crusader or has made long voyages at sea.

Clamshell and **Clam Bear's Paw,** the names applied to various genera of Lamellibranchiate molluscs, included in the family *Chamidæ*. (See CHAMA.) The Giant C. attains gigantic dimensions, and in some cases the shell alone may weigh 500 lbs. The C. B. P. is found in the South Seas; its whitish colour, spotted with red or high purple, and its ribbed and triangular form, placing it in high favour for beauty among conchologists.



Giant Clam.

Clan. This Gaelic word, meaning 'children,' inferentially descendants of a common ancestor, has come to be applied almost exclusively to the communities of the Scottish Highlands, as these are divided topographically, and by distinctive surnames. The peculiarities of clanship are well described in a book written about the year 1730, entitled *Letters from an Officer of Engineers to his Friend in London.* 'The Highlanders,' it says, 'are divided into tribes or clans, under chiefs or chieftains, and each C. is again divided into branches from the main stock, who have chieftains over them. These are subdivided into smaller branches of fifty or sixty men, who deduce their origin from their particular chiefs, and rely upon them as their more immediate protectors and defenders. The ordinary Highlanders esteem it a most sublime degree of virtue to love their chief and pay him a blind obedience. . . . Next to this love of their chief is that of the particular branch whence they sprang, and in the third degree to those of the whole C. or name, whom they will assist, right or wrong, against those of any other tribe with whom they are at variance. . . . Lastly, they have an adherence to one another as Highlanders, in opposition to the people of the Low Country, whom they despise as inferior to them in courage, and believe that they have a right to plunder them whenever it is in their power. This last arises from a tradition that the Lowlands in old times were the possessions of their ancestors. The chief exercises an arbitrary authority over his vassals, determines all differences and disputes that happen among them, and levies taxes upon extraordinary occasions. . . . Some of the chiefs have not only personal dislikes and enmity to each other, but there are also hereditary feuds between C. and C., which have been handed down from one generation to another for several ages. These quarrels descend to the meanest vassals, and thus sometimes an innocent person suffers for crimes committed by his tribe at a vast distance of time before his being began.' This description conveys a clear idea of clanship as it existed in the Highlands early in the 18th c., when the system was in full force. It shows a curious mixture of patriarchal and of feudal government, and the customs and feelings of the people tended to keep it unimpaired amid the improvements and diffusion of knowledge which was taking place in other parts of the country. The distinction between the Highland and the feudal chief was, that the former was the hereditary lord of his C., wherever they dwelt or whatever land they occupied, while the latter was entitled to the military service of all who held lands under him. The one dignity was personal, the other territorial; the rights of the chief were inherent, those of the baron were accessory; the one might lose or forfeit his possessions, but could not thereby be divested of his hereditary character and privileges; the other, when divested of his fee, ceased to have any title or claim to the service of those who occupied the lands. It thus often happened in the Highlands that the head of the C. was one man, and the feudal owner of the land which it occupied was another. The following is General Wade's list of the Highland clans and their numbers that fought for King James in 1715:—Islands and clans of Lord Seaforth, 3000; M'Donalds of Slate, 1000; M'Donalds of Glengarry, 800; M'Donalds of Moidart, 800; M'Donalds of Keppoch, 220; Camerons of Lochiel, 800; M'Leods, in all, 1000; Duke of Gordon's men, 1000; Stewarts of Appin, 400; Robertsons of Strowan, 800; M'Intoshes and Farquharsons, 800; M'Ewen in Skye, 150; the Chisholms of Strathglass, 150; M'Phersons, 220; the Atholl men, 2000, and the Breadalbane men, joined without their superiors—total for King James, 14,140. The following, with a total of 8000, supported George I.:—Duke of Argyll, Lords Sutherland and Strathnaven, Lord Lovat's Frasers, the Grants, Rosses, and Munroes, Forbes of Culloden, Rose of Kilravock, and Campbell of Clunes. See *History of the Highlands and Highland Clans*, by John S. Keltie.

Clandestine Mortgage. In England, if any one mortgage his estate a second time, without previously informing the postponed mortgagee in writing of the prior mortgage, or of any judgment or incumbrance he has voluntarily brought upon the estate, the postponed mortgagee is entitled to hold the estate as an absolute purchaser, free from the equity of redemption of the mortgager. In Scotland, C. M. is impossible.

Clan Macduff, Law of. This was a barbarous privilege which formerly belonged to those related within the ninth degree to Macduff, Earl of Fife. If one having the privilege was found guilty of homicide, he was absolved by coming to Macduff's Cross, between Fife and Strathearn, and giving nine *kye* (cows) and a *colpindash*, a young cow.

Clap-Net, a ground-net used by birdcatchers in the S. of England, consisting of two equal sides or parts, each about 12 yards long by 2½ wide, and having a slight frame. The parts are placed parallel to each other about 4 yards apart, and are closed upon one another by the pulling of a string, so as to cover the space between them. Call-birds are used as decoys for the wild birds the netters wish to catch.

Clapp'erton, Hugh, an African traveller, was born at Annan, in Dumfriesshire, in 1788, was sent to sea at the age of thirteen, and entering the navy, rose to the rank of lieutenant in 1814. He accompanied Denham and Oudney (1822) on a Government expedition to Central Africa, with the view of ascertaining the length and course of the Niger. Oudney died at an early stage of this enterprise, which only resulted in determining the exact position of Bornu, Houssa, and Mandara. In 1825 C., along with Pearce, Morrison, and Dickson, again set out for the same purpose. The party started from the Bight of Benin, but were almost immediately attacked by severe illness, which C. alone survived. Pushing into the interior, he reached Sakkatu, where he was detained by the Sultan Bello. Here his health gave way, and he died at the village of Changary, 4 miles from Sakkatu, 13th April, 1827. See *Narrative of Travels and Discoveries in N. and Central Africa in* 1822-24, *by Denham, C., and Oudney* (Lond. 1826), *Journal of a Second Expedition into the Interior of Africa, &c.* (Lond. 1829), and Lander's *Record of C.'s Last Expedition to Africa* (Lond. 1830).

Claque (Fr. 'a clap or slap with the hand'). A theatrical C., a distinct and acknowledged feature of the Paris theatres, is a body of individuals retained at a salary to applaud a special actor, and thus, so far, to secure the success of his engagement.

Cla'ra, Santa, or **St. Claire,** was born at Assisi, in the Duchy of Spoleto, Italy, about 1193. At the age of eighteen she left the house of her father, a wealthy nobleman, and betook herself to the convent of Portioncula, under the auspices of St. Francis of Assisi. She founded the order which bears her name in 1212, and was soon after joined by her sister Agnes, her mother, and several other ladies of high rank. After twenty-nine years of infirm health, occasioned by her excessive austerities, C. died, 11th August, 1253, and was canonised, two years after her death, by Pope Alexander IV. The *Order of St. C.* is divided into 'Urbanists,' those that follow the mitigated rule drawn up by Pope Urban IV. in 1264, and 'Damianists,' a severer sect of the sisterhood. The convents of the order are numerous in Catholic Europe and in America.

Clare, a western maritime county of Ireland, in the province of Munster, N. of the estuary of the Shannon. It is hilly in the E. and W., but an extensive and fertile plain occupies the centre, while on the mountain-sides and river-banks there are fine pastures or 'corcasses.' Besides the Shannon, which bounds it on the S. and E., C. is watered by the Fergus, with its great estuary, the Ardsallas, Graney, Forsett, Dumbeg, &c., and has as many as 100 miniature lakes. The loftiest mountains are in the Slieve Baughta and Barnagh ranges, which reach a height of 1312 and 1758 feet respectively. C. has a wild and precipitous sea-line of over 100 miles. Where the Shannon merges in the Atlantic, the land runs out into the long tapering promontory of Loop Head. C. is mostly formed of carboniferous limestone, and there are mines of coal, lead, manganese, copper pyrites, &c., and quarries of slate, flag, and black marble. The chief crops are oats, potatoes, wheat, and barley, and the manufactures include coarse linens, flannels, and friezes. There is a good coasting trade and active fisheries. Ennis is the capital, and communicates with Limerick by railway. A local line, 10 miles long, also connects Kilrush and Kilkee. C. has round towers, cromlechs, and other antiquities. Area 1294 sq. miles; pop. 124,483, or 12·0 per cent. less than in 1881. There are 48,066 acres under tillage, 7,294 acres under plantations, 90,525 acres under meadow and clover, and 463,061 under pasture. Turf, bog, marsh, and barren mountain occupy 16·5 per cent. of the area. C. is divided into two parl. districts, each of which returns one member—East C. 61,196; and West C. 63,287.

Clare College, Cambridge, founded in 1326 by Elizabeth, sister and coheir of Gilbert, Earl of Clare. Its buildings, which are in the style of the Renaissance, are much admired. The chapel was built in 1535. The college contains eight senior and seven junior fellows, who elect the 'master.' The fellowships are open to Bachelors of Arts, or persons of a higher degree, without restriction as to marriage. C. C. has thirty-two scholarships, 12 at £60 per annum, 4 at £50, 8 at £40, and 8 at £20. There are six minor scholarships at £80 to £40 per annum (classics, mathematics, and science), and seven exhibitions, 2 at £50, 1 at £40, and 4 at £20. The college is patron of 17 livings. In 1894 the number of undergraduates was 170.

Clare Constat, Precept of, in Scotch law, is a deed executed by a subject-superior to complete the title of his vassal's heir to the lands held by the deceased vassal under the granter of the precept. As no heir can be declared an heir by such or any private authority, a P. of C. C. cannot bar the true heir from entering after twenty years as an entry, authorised by the law, would have done. Of course a P. of C. C. holds good against the grantor and his heirs and successors.

Clare Island, at the entrance to Clew Bay, forms part of County Mayo, Ireland. It is 4½ miles long and 2 broad, and supports a lofty lighthouse. Area 8⅔ sq. miles; pop. 557.

Clar'encieux, one of the three kings-of-arms of the Heralds' College of England—Garter, C., and Norroy. The two latter are provincial, and C. ranks first. His jurisdiction embraces all England S. of the Trent, and his duty is to survey all the coat-armour within his province, to register descents and marriages, and to marshal the funerals of all his subjects who are not under Garter (q.v.). C. also grants arms within his province, subject to the approval of the Earl Marshal (q.v.).

Clar'endon, Constitutions of, is the name given to the concordat between Church and state in England, drawn up at a council of nobility and clergy held at the village of Clarendon, in Wiltshire, in 1164, in the reign of Henry II. These constitutions or laws were sixteen in number, and their main object was to restrict the power of the Church in England, and to give the crown the right to interfere in the election to all vacant offices in the Church. 'Many of the clauses,' says Green (*Short History of the English People*, p. 103), 'were simply a re-enactment of the system established by the Conqueror.' This is no doubt true, but it is impossible to doubt that the sharp separation between the civil and ecclesiastical jurisdictions introduced into England by William was the real cause of the conflict between the two. Although the primate, Thomas à Becket, signed them, they were rejected by the Pope of the period, Alexander III., and Becket himself vehemently retracted his consent. This led to his assassination, and subsequently to the penance of Henry II.; but in spite of the latter event, the C. of C. remained on the statute book, and may be regarded as the germ of the ecclesiastical revolution accomplished in the reign of Henry VIII. In Professor Stubbs's *Select Charters Illustrative of English Constitutional History*, the reader will find (pp. 137-140) the C. of C. 'in probably the exact form in which they were reported to the King, and confirmed by the bishops and barons.'

Clarendon, Edward Hyde, Earl of, an English politician and historian, was the son of a private gentleman, and was born at Dinton, in the county of Wilts, 18th February, 1608. He studied first at Oxford and then at the Middle Temple. Entering Parliament in 1640 as member for Wootton Bassett, he took the side of those who insisted on a redress of grievances, but was at no time a Puritan—always strenuously upholding the cause both of the Church and the crown. When the civil war broke out, he left the House, joined the King at York, was made Chancellor of the Exchequer, and received the honour of knighthood. When fortune deserted the royal cause, he accompanied Prince Charles to Jersey, where he began to write his *History of the Rebellion*. Called to Paris in 1648, he was sent to Spain in the following year to solicit help from the Spanish court, but returned without success in 1651. He then went to Antwerp; was made 'High Chancellor of England' in 1657 by his exiled monarch, and was confirmed in the office at the Restoration. He was also created Baron Hyde, and subsequently Viscount Cornbury and Earl of C., and, in fact, was for a time Premier. Court intrigues, however, and popular indignation at the failure of the war with Holland and the selling of Dunkirk to France, brought about his fall; he was deprived of his employments (1667), and retired to France. He died at Rouen, 9th December, 1674. He was buried in Westminster Abbey. C. was a well-intentioned and virtuous man, and an honest and moderate politician, though lacking in firmness of purpose. His *History*, marred though it is by numerous inaccuracies and prejudices—one may even go further, and say, with deliberate perversions of fact—is still, from a literary point of view, an admirable work. Its 'portraits' are superbly executed, even when the likeness is not true. C. wrote several other works, of which the most interesting is an account of his own life. His state papers have been published in three folio volumes. C.'s daughter, Anne Hyde, married the Duke of York, afterwards James II., and was the mother of Queens Mary and Anne. His son, **Henry, Earl of C.** (1638-1709), was for a time Lord-Lieutenant of Ireland under James II., and wrote a *History of the Irish Rebellion*. His state letters and diary were published at Oxford in 2 vols., 1763.

Clarendon, George William Frederick Villiers, Earl of, an English statesman and diplomatist, was born 12th January, 1800. He was descended from Thomas Villiers, who married the heiress of the last Earl of C. of the Hyde family and was made Earl of C. himself in 1776. From early life C. was trained to be a diplomatist, being appointed ambassador at Madrid in the year 1833, in which office he helped to establish the Spanish Government on a constitutional basis. Succeeding to the earldom on the death of his uncle (1838), he took his place in the House of Peers as a Whig, and supported Sir Robert Peel in his free-trade policy. After being Keeper of the Great Seal, he was, under Lord Russell's premiership in 1846, made first President of the Board of Trade, and subsequently Lord-Lieutenant of Ireland. In the subsequent Liberal administrations of Lord Aberdeen, Lord Palmerston, and Mr. Gladstone, C. held the office of Foreign Secretary, and few British statesmen have been more respected on the Continent. He died June, 1870.

Clar'et. The red varieties of French wines imported into this country pass under the general name of C. They vary extremely in their qualities and value, the bulk being cheap light wines. Others, such as Château Lafitte, are of a very high class, and held in great repute.

Clarifica'tion, the process of removing suspended matters from liquids, accomplished either by filtration, by allowing the matter to deposit, or by adding albumen or a similar substance, whereby the suspended body is mechanically dragged down. It is a process of great importance in many departments of manufacturing chemistry.

Clar'inet, or **Clar'ionet,** a wooden reed instrument which occupies the place in military bands that the violin has in orchestras. The peculiar quality of its tone is caused both by its shape and by the nature of the reed through which—held between the performer's lips—the air is blown into it. Its compass is about three octaves, but as it cannot be played conveniently in keys very distant from its natural key, each performer has always three instruments, of which the natural keys are A, B♭, and C, so that he may be able to play easily the varied keys of orchestral music. In military bands some higher clarionets are often used, and in orchestras occasionally a bass and a contra-bass C.

Clar'ion, a form of trumpet of high pitch, not now used. It is also the name of a four-feet reed organ-stop.

Clark, Sir James, M.D., Bart., a British physician, was born at Cullen, Banffshire, 14th December, 1788. Educated at the grammar-school of Fordyce and at King's College, Aberdeen, he studied medicine at Edinburgh and London, held for some years the position of navy surgeon, took the degree of M.D. at Edinburgh in 1817, and after travelling on the Continent, and practising as a physician for eight years in Rome, he settled in London in 1826. He soon acquired a high reputation, became physician to the Duchess of Kent, and, on the accession of Queen Victoria, her physician in ordinary. C. was made a baronet in 1838. He died 29th June, 1870. Among his many contributions to medical science deserving of notice is his *Treatise on Pulmonary Consumption*, which he considered might be arrested by proper regulation of food, air, and exercise. He was a zealous advocate of the study, at an early age, of the laws of health.

Clarke, Adam, a Wesleyan divine, was born at Magherafelt, in the N. of Ireland, in 1760. He became a 'circuit' preacher in Wiltshire in 1782, but settled in London in 1805; was appointed a sub-commissioner of the public records in 1807, and after a laborious literary life, died at Bayswater, 26th August, 1832. The chief fruits of his studies are his *Biographical Dictionary*, published in 1802, and his edition of the Bible in English (8 vols. 1810-26), illustrated with a commentary and critical notes. For his attainments in Oriental literature and biblical knowledge, the University of St. Andrews conferred upon him the degree of LL.D.

Clarke, Edward Daniel, a traveller and savant, was born 5th June, 1769, at Willingdon in Sussex. He studied at Jesus College, Cambridge, and acted as travelling tutor and companion to a number of noblemen and gentlemen, including Mr. Hill (afterwards Lord Berwick) and Mr. Cripps. His tour with the latter lasted from 1799 to 1802, and embraced the whole of Scandinavia, Russia, Circassia, Turkey, Asia Minor, Syria, Palestine, Egypt, and Greece. His travels were a source of great profit to his university and to his country. For the library of the former he secured a number of valuable marbles and MSS., and the colossal statue of the Eleusinian Ceres; and for the latter the celebrated sarcophagus of Alexander, now in the British Museum, and upon which he published a dissertation. Cambridge University conferred upon C., who had been instituted to the rectory of Harlton, the degree of LL.D., and a professorship of mineralogy was in 1808 created for him. His *Travels*, published during his life in 5 vols. (1810-19), and after his death in 11 (1819-24), were received with much favour, and his experiments with the oxyhydrogen blowpipe have been productive of valuable scientific results. After his death, which took place 9th March, 1822, his university purchased his Greek and Oriental MSS., including a Codex of Plato, discovered by him in the island of Patmos.

Clarke, Dr. Samuel, a distinguished scholar, philosopher, and theologian, was the son of an alderman at Norwich, where he was born 11th October, 1675. Educated at Caius College, Cambridge, he there pursued with special zeal philosophical studies, and became an adherent of the system of Newton. C. filled various posts in the Church, and was ultimately made one of Queen Anne's chaplains and rector of St. James's. Although his views on the Trinity (in his *Scripture Doctrine of the Trinity*, 1712) were considered semi-Arian, and censured by Convocation, he was a keen assailant of the freethinkers of his time, and among the best-known of his works is his *Demonstration of the Being and Attributes of God* (Boyle Lecture, 1704). The basis of his ethical system is the famous 'eternal fitness of things,' or the relations of things established from eternity by God. Among the proofs of his scholarship are his editions of Cæsar (1712) and of Homer (1729-32), the latter of which was finished by his son. C. was offered the mastership of the Mint on the death of his friend Newton, but declined it. He died 17th May, 1729. C. was a man of amiable disposition and irreproachable character. A collected edition of his philosophical works, among the most interesting of which are his letters to Leibnitz on Space and Time, was published in 4 vols. 1738-42.

Clarkson, Thomas, one of the most eminent of English philanthropists, was born at Wisbech, Cambridgeshire, 28th March, 1760, and studied at St. John's College, Cambridge. He is said to have been led into the agitation against slavery in Africa by writing a prize essay on the question 'Is it right to make slaves of others against their will?' After this he became the leader in, and devoted himself to, the agitation, secured the co-operation in Parliament of Wilberforce, wrote pamphlets innumerable on the subject, and, after the bill for suppressing the slave trade was passed in 1807, wrote a history of it (2 vols. 1808). C. lived to see the abolition of slavery in the W. Indies in 1833. He died at Playford, Suffolk, 26th September, 1846, having spent the last years of his life in promoting various benevolent schemes. See Thomas Taylor's *Biographical Sketch of T. C.* in the *Gentleman's Magazine.*

Clar'y, a plant, a native of Italy, and the S. of Europe generally, but long cultivated in our gardens for the sake of its aromatic and medicinal properties. It is antispasmodic and stimulant, and is used for flavouring soups and confectionery with its characteristic odour of the balsam of Tolu. Its flowers are used in making a fermented wine. Wild C. and Hormenium C. are members of the same family, but Wild C. is a name also applied to the Indian Heliotrope.

Class'ics. The name *classici* was applied to the highest of the six classes into which Servius Tullius divided the Roman citizens; and hence authors of pre-eminent worth have been termed *classic authors;* thus Aulus Gellius says—'Classicus scriptor non proletarius.' At the Renaissance, scholars, struck with the superiority of Greek and Latin to contemporary literature, distinguished the ancient from the modern writers by the word *C.*, but this restricted signification is no longer maintained. The Germans, and afterwards the French and English, extended the word to modern as well as ancient writers of eminence; and by the *C.* of a nation we now understand its leading authors, whose merits have been sufficiently proved by time and criticism to assure them of a permanent place in its literature. 'I call the classic,' said Goethe, 'the healthy. The *Nibelungen* is as classic as the *Iliad*, for both are healthy. The antique is classic, not because it is old, but because it is strong, fresh, joyous, and healthy.' The word is, however, still used in the narrower sense of the Greek and Latin authors; a *classical* education refers to the study of Greek and Latin writers alone, not to the study of the more recent authors of other nations, whose beauties of thought and form have entitled them to the epithet *classic*, which was formerly monopolised by the ancients, as almost the sole examples of established fame and perfection of style in literature. 'Classic' and 'Romantic' are occasionally used to distinguish Southern Romantic from Northern Teutonic art; and again they are frequently opposed in regard to French writers—'Classic' being applied to the school of Racine, and 'Romantic' to that of Hugo. But these partisan uses of the word are only the perversions of prejudice.

Classifica'tion of Animals. Two principles may be employed in classifying animals. One of these, forming the *artificial* method, has for its essential feature that of founding its characters upon resemblances between animals of a more or less external and superficial kind. Thus the savage employs an artificial method of classification when he classifies together fishes and whales from their outward appearance, or birds and bats because both fly. In opposition to this artificial method, which characterised the earlier history of zoology, we have the *natural* method. By means of this latter we group together only animals that are like in the *details of their structure*, and this method, therefore, is the expression of a true structural relationship between the organisms which it brings together. It is, in other words, a convenient expression of the facts and laws of morphology and physiology. The whale would, therefore, in this classification, be placed among the mammals, from a consideration of its structure, and not with the fishes, which it somewhat resembles in outward appearance. The animal kingdom is divided through the consideration of the morphological *type*, or broad features of structure, into five or six sub-kingdoms, which, beginning with the highest, are named respectively *Vertebrata* (q.v.), *Mollusca* (q.v.), *Annulosa* (q.v.), *Annuloida* (q.v.), *Echinozoa* (q.v.), *Cœlenterata* (q.v.), and *Protozoa* (q.v.). Each sub-kingdom admits of division into *classes*, the classes are divided into *orders*, the latter into *families* and *genera*, and the genera into *species*. See also SPECIES, &c.

Claude, St., a town in the department of Jura, France, 25 miles S. of Lons-le-Saulnier, at the confluence of the Bienne and Tacon. It owes its origin to a Benedictine abbey, founded here in the 5th c. St. C. has tanneries, potteries, and paperworks, and manufactures of turnery-ware on a large scale, consisting of articles in ivory, bone, horn, shell, boxwood, &c. Pop. 9782.

Claude Gelée, usually called **Claude Lorraine,** was born of humble parentage at Champagne, in Lorraine, in 1600, went in youth to Rome, in company with some adventurers of his district, and entered into the service of Tassi, a painter, for whom he acted as cook, groom, and colourman, and by whom he was taught the principles of art. He was an earnest and conscientious student of nature, and delighted in observing the varying phases of light and colour under which the same view presents itself at different seasons. This constant habit, together with his unwearying practice at the easel, raised him to the highest rank as a landscape painter. He settled finally at Rome in 1627, painted assiduously, and, after enjoying the patronage of Popes Urban VIII., Clement IX., and Alexander VII., died at Rome, 1678. C.'s works are to be found in every great gallery in Europe. England is particularly rich in specimens—Waagen counting fifty-four in all. The picture which C. himself considered his best is the 'Villa Madama.' Four exquisite pieces, 'Morning,' 'Noon,' 'Evening,' and 'Twilight,' are in the St. Petersburg Gallery. C.'s landscapes combine beauty of scene with truth in the highest degree. No painter has rendered the foliage of trees, and the character of their different species, with greater fidelity combined with high picturesque effect. It was the wish of Turner to be considered his rival, and the greatest of landscape-painters presented one of his finest works to the English nation on the condition that it should hang in the National Gallery side by side with one of the acknowledged masterpieces of the greatest landscape-painter born in France.

Claudia'nus, Clau'dius, born at Alexandria, flourished at the close of the 4th c. and the commencement of the 5th. He wrote at first in Greek, but the success of his panegyric on the consulate of Probinus and Olybrius in Latin verse induced him to abandon the language in which he had been educated. C.'s extant works consist chiefly of idylls and epigrams, and of panegyrics on the Emperor Honorius and his powerful minister Stilicho, the patron of C., and 'the perpetual theme' of his verse and of invectives against their enemies. The most important of his works is the very fragmentary epic poem the *Rape of Proserpine.* C.'s poetry is characterised by an 'absolute command of the Latin language,' splendid powers of description, and a brilliant, if somewhat ill-regulated, fancy.

Clau'dius I., more fully **Tibe'rius Clau'dius Dru'sus Nero,** Roman Emperor, was born 1st August, B.C. 10, at Lyon, in Gaul. He was the son of Drusus, step-son of Augustus, and succeeded to the purple on the murder of his uncle Caligula, in A.D. 41. C. in early life suffered much ill-treatment and neglect, being considered by his family little better than an imbecile. His natural stupidity, however, was strangely combined with an eager desire for knowledge, which led him to study with secret industry both science and literature; but his cowardice and weakness of character unfitted him for a public career. He was fifty years of age when proclaimed Emperor by the Prætorian Guards, who found him hiding in terror in a corner of the palace. Though he set an evil precedent by granting a donation to the Prætorians, C. began his reign with a just and moderate policy, but speedily fell under the dominion of others, who abused the imperial power. He was uxorious and fond of favourites; so that his wife Messalina, and his freedmen Narcissus and Pallas, found it easy to govern or plunder and torture in his name. The union of C. with his niece Agrippina, after the execution of his former consort (A.D. 48), was not more fortunate; for, having persuaded him to adopt her son Nero, she afterwards poisoned him (A.D. 54) in order to secure the succession. C. was endowed with abilities which might have gained him eminence in an obscurer sphere; he composed several historical works, among them a *History of Etruria*. The wars of his reign were, on the whole, victorious. C. himself undertook an expedition to Britain, and Mauritania was made a Roman province. Several public works, on a large scale and of great utility, were executed by C. Among these were the *Aqua Claudia*, the vast aqueduct which supplied Rome with water all through the Middle Ages; the port of Ostia, and the canal between Lake Fucinus and the river Liris.

Clause of a Deed is, in law, one of its subdivisions.

Clause of Pre-emption, in Scotch law, is a clause sometimes inserted in a feu-right, stipulating that the vassal shall not sell the lands without first offering them to the superior, or that the superior shall have the lands at a certain price fixed in the clause.

Clause of Devolution, in a Scotch deed, is a clause devolving some office or duty on some one on a stated event.

Clause of Return, in a Scotch deed, is a clause by which the grantor of a right makes a particular destination of it, and provides that in a certain event it shall return to himself. Of course, when the right is granted, as a bond for borrowed money, the creditor may defeat the C. of R. even gratuitously, because the presumption is in favour of the fact that the clause is dependent upon his, the creditor's, good will.

Clauses, Irritant and Resolutive, in a Scotch deed. These are two clauses which limit the right of an otherwise absolute proprietor, and which make the conditions imposed—without these clauses only a personal obligation—effective against creditors and singular successors. See SINGULAR SUCCESSOR.

Claus′el, Ber′trand, a French marshal, was the son of Jean-Baptiste C., a French Revolutionist of some mark, and was born at Mirepoix, in the department of the Ariège, 12th December, 1772. Entering the army at an early age, he distinguished himself in Holland, Italy, Austria, and Spain. After the defeat of Marmont at Salamanca, 22nd July, 1812, he obtained the command of the French army, and conducted its retreat into Portugal with much ability. On the restoration of the Bourbons C. was declared a traitor, and even condemned to death, but he was ultimately allowed to return from America, whither he had escaped. In 1830 he was appointed to the command of an expedition to Algiers, and being successful, was made a marshal of France. In 1835 he was appointed governor-general of Algeria, but being blamed for the disasters that befell the French army under the walls of Constantine in the following year he returned to France. C. died at Secourrieu (Haute Garonne), 21st April, 1842.

Clavagell′a, or **Clubshell,** a genus of Lamellibranchiate mollusca, belonging to the family *Gastrochænidæ*. The shell in C. is club-shaped and oblong, and one of the valves or halves of the shell is free, whilst the other is attached to an elongated tube, frequently divided by a longitudinal partition. This tube terminates like that of Aspergillum, or the 'Watering-pot Shell,' which belongs to the same family as C. *C. aperta* and *C. lata* are familiar species. *C. cretacea* occurs as a fossil in the Chalk rocks, and the genus commences as a fossil state in the Upper Greensand. Several living species exist as above named.

Clavi′chord, or **Clav′ecin,** one of the older forms of the piano, used frequently until about a century ago. Its strings were struck by pins attached to the ends of the keys, and were damped by pieces of cloth so as to produce a very soft sound.

Clav′icle. This is a bone familiarly known as the collar-bone. It passes from the summit of the breastbone, or sternum to the acromion process of the scapula, and it connects the superior extremity with the trunk. It has a curved form. To it are attached various muscles of the neck, trunk, and arms, and it acts as a fulcrum for the action of these muscles. It is absent in all pachydermata, ruminants, and solidungula, because in these animals there is no lateral movement of the fore extremity. In birds the two clavicles are very large, and unite to form a single bone known as the furculum, or 'merry-thought.' This arrangement in birds is probably for preventing the powerful pectoral muscles from approximating the shoulders. The C. is the first bone in the body to ossify. The first ossific nucleus makes its appearance about the sixth week. Two other nuclei make their appearance; that of the sternal end joins the body of the bone from the 18th to the 25th year. See SKELETON.

Dislocations of Clavicle.—Either end of the C. may be dislocated. Surgeons describe three dislocations of the *sternal* end of this bone—*forwards*, *upwards*, and *backwards*—according to the position of the displaced end. Of these three, the dislocation *forwards*, though a rare injury, is the most common. This dislocation is easily recognised by feeling the displaced end of the bone projecting in front of the upper part of the Sternum (q.v.). There is also depression of the shoulder.

The dislocation *upwards* is very rare. It is easily recognised by the end of the bone being felt to be elevated into the neck, with depression of the shoulder.

The dislocation *backwards* is very rare, and is generally caused by direct violence to the parts. It has also been caused by curvature of the spine. When due to this latter cause little relief can be obtained. In this dislocation the shoulder is elevated, and there is generally more or less interference with the circulation and respiration, on account of the displaced end of the bone pressing on the nerves and blood-vessels of the neck.

When the *acromial* end of the C. is displaced (which is not uncommon), it is generally, if not always, *upwards*, and is the result of a fall on the shoulder. This dislocation is easily recognised by the end of the C. being felt to be projecting upwards whilst the shoulder is depressed. The bone is easily replaced, but some little care is necessary afterwards to retain it in position.

Fracture of Clavicle.—Fracture of the C. is much more frequent than dislocation. It is generally due to violence; the fracture is oblique, and occurs most frequently near the middle of the bone. The shoulder is depressed and drawn forwards.

Clavicor′nes, the name given to a tribe of Beetles, distinguished by the clubbed tips of their antennæ or feelers, which exceed the palpi of the maxillæ (or lesser pair of jaws) in length. Of this group the Burying Beetles (q.v.) form typical examples, and the genus of Bacon Beetles also present a familiar group.

Clavig′ero, Francesco Severio, a historian of Mexico, was born about 1720, and sent by the Jesuits as a missionary to the Mexican Indians, among whom he laboured for thirty-six years. While thus engaged, he collected materials for the history of the country, both before and after its conquest by the Spaniards. On the suppression of his order in 1767, he withdrew to Cesena, in Italy, where, in 1780-81, he published his history of Mexico. C. died at Cesena, October, 1793.

Clavija, a genus of *Myrsinaceous* plants, of tropical S. America, named in honour of J. Clavijo Faxardo, a Spanish botanist. The fruits of some of them are eatable, and the roots of others are emetic.

Clay (Old Eng. *clæg*, the 'g' is still retained in the Lowland Sc. 'clag' and 'claggy'), a natural earthy compound, in a state of minute division, which with water acquires plasticity, and may be kneaded or moulded into a particular form, and hardened by heat. Typical or pure C. is composed of silica, alumina, and water, forming, in chemical language, a hydrous-silicate of alumina; but as natural clays are the result of the disintegration of primary rocks, they are never absolutely free from the admixture of other substances, such as lime, sand, magnesia, mica, and oxide of iron. The impurities give different colours to the numerous varieties of C., and so it occurs of all shades, from white, when nearly pure, to grey, red, blue, brown, and even deep black, from the presence of carbon. The purest clays are the most plastic, and as they burn white in the kiln, they are highly valued for the manufacture of fine earthenware, and are known by the names of Kaolin or China-C., Potter's-C., and Pipe-C. (q.v.). Fire-Clays (q.v.), of which *Stourbridge C.* is the most famous, contain much silica, and are very infusible. Common C. or loam is abundantly distributed over the earth's surface, and is largely employed in the manufacture of bricks, tiles, and coarse earthenware, which assume a red colour on firing, because of the oxide of iron present in the C. Brick-C. should contain much sand and little potash, soda, lime, or iron; indeed, any C. that is to be exposed to a high temperature should be almost free from the alkaline earths, as they give fusibility. C. constitutes an important part of all fertile soils, and possesses the highest agricultural value on account of its absorbent action on moisture, ammonia, and other fertilising agents. C. soil is difficult to work; still the excellence and luxuriance of the crops, which it produces, amply repays the extra labour entailed.

Clay, Cassius Marcellus, a Southern Abolitionist, was born in Kentucky, 19th October, 1810, and graduated at Yale College in 1832. He early entered the field of politics, and gained much *éclat* by taking what in his state was the unpopular side of 'abolitionism,' and displaying in his speeches considerable audacity. He supported Lincoln, and was sent as U.S. minister to Russia in 1862, where he remained. After his return, he took a prominent part in politics. A volume of his *Speeches* was published in 1848. C. permitted himself to use very strong expressions regarding England.

Clay, Henry, an eloquent American orator and statesman, was born in Hanover county, Virginia, 12th April, 1777. He studied law, was licensed in 1797, and commenced in Lexington, Kentucky, where he soon gained a lucrative practice. In 1806 he was elected to Congress, and in 1811 was chosen speaker of the House of Representatives. C. strongly repudiated the British claim to 'right of search' at sea, advocated the war of 1812, and was sent to Ghent in 1814 as U.S. commissioner to sign the treaty of peace. On his return he espoused the cause of South American independence, and also introduced what he called 'the American system,' which was a heavy protective tariff to promote home manufactures. C. laboured for the compromises with slavery in 1820 and 1850, and was three times a candidate for the presidency, but was defeated each time; yet he was undoubtedly one of the most popular leaders that America has ever had. He died at Washington, 29th June, 1852. See Colton's *H. C., Life, Letters, and Speeches.*

Claymore' (Gael. *claidheamh-mor;* lit. 'big sword'), a formidable weapon used by the Scottish Highlander. It was double-edged and two-handed; the length of its blade was sometimes nearly 4 feet.

Clazom'enæ, one of the cities of Ionia, on the S. side of the Hermæan Gulf (mod. Bay of Smyrna), at first built on the mainland, from which the people, through fear of the Persians, passed over to an adjacent island, which Alexander made a peninsula by uniting it to the mainland. Its site is now occupied by Vurla.

Clean'thes, a Greek philosopher, born at Assos, in the Troad, about 300 B.C., came to Athens in his manhood, and received instruction from Zeno for fifteen years. Poverty obliged him to draw water for a gardener during the night, and to write his lecture-notes on bits of potsherd and ox-bones. He nevertheless refused the proffered gift of the Areopagus (10 *minæ*). Slow in apprehension, he was at first called the Ass, but latterly the second Hercules. In 263 C. succeeded Zeno in the Stoa. There he taught the immortality of the soul, varying in intensity with the soul's life here. He repeated that man's duty was to live harmoniously with universal nature, *i.e.*, with the Divine Reason, which impresses laws upon passive matter. In metaphysics he maintained that in sense-perception the soul was affected as wax by a seal, but that the soul could distinguish the cataleptic phantasm, or true perception, from the acataleptic, or perception produced by dreams or insanity. His morality resulted in the starvation of all bodily desires, and his death proves his consistent faith, for it was either occasioned or accelerated by voluntary abstinence from food. Only a few fragments of C.'s works (of which Diogenes Laertius gives a list) have reached us—the finest being a *Hymn to Zeus* preserved in Stobæus.

Clear'ance, a term of the mercantile marine, denoting the custom-house or emigration-office licence for a ship to leave the port. All dues must be paid and all proper formalities observed before the C. can be got. A foreign vessel must be certified by the consul of the nation to which she belongs.

Clear, Cape, on an island (pop. 584) of the same name, forming part of County Cork, is the extremest S.W. point of Ireland. It is a lofty headland, 400 feet high, with a lighthouse and revolving light, 455 feet above the sea.

Clear Days, an English law term. In a lawsuit there are several steps in the proceedings which must be taken within a specified number of C. D. In reckoning these, the day on which the process is served and the day of hearing are not counted.

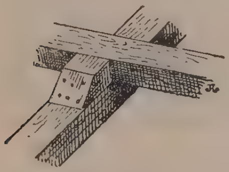
Clear'ing-House, in banking. Formerly the London bankers used to exchange cheques and settle accounts by a daily meeting of their clerks at one of the banks. But in 1775 a building, now called the C.-H., in Lombard Street, was acquired for the purpose. The arrangements are directed by a committee appointed by the banks. During the day each house transmits the cheques and bills which it receives on the others, and keeps a note of the obligations coming against itself. Accounts are closed at four o'clock. Three-quarters of an hour is allowed for the banks to consider drafts upon it, and to decide whether they are to be honoured. Meanwhile the bills and cheques have been classified at the C.-H., and by half-past five accounts are adjusted, each bank paying or receiving the balance due by or to it; the settlement being made not as formerly between the banks themselves, but with the C.-H., which is a depositor with the Bank of England. In addition to the London C.-H., there are also Clearing-Houses in England, at Birmingham, Leeds, Leicester, Liverpool, Manchester, and Newcastle-on-Tyne; in Scotland, at Aberdeen, Dundee, Edinburgh, Glasgow, Greenock, Inverness, Leith, and Paisley; and, in Ireland, at Dublin. In 1890, £7,801,048,000 passed through the London C.H.; in 1892, £6,481,562,000; and in 1893, £6,478,000,000.

Clearing-House, The Railway.—This is an ingeniously devised institution for regulating the complicated accounting between the railways of Great Britain. Plainly the equitable adjustment of the expense and receipts of the *through* traffic must be a work of much labour and difficulty; nevertheless, by means of the staff of the C.-H., these tangled accounts are, month by month, unravelled and a balance struck. The office of the institution is in London, near the Euston Station. It is regulated by the 'Railway Clearing Act, 1850' (13 and 14 Vict. c. 33, local and personal). There is a similar institution in Ireland, having its office in Dublin. The expenses are defrayed rateably by the companies forming the association, each company appointing a member to sit on the committee, which manages the C.-H., and whose decision is final in respect of any dispute between the companies which belong to the association. Officials of the C.-H. attend at each railway junction. They note the number of each carriage, van, waggon, or other vehicle which quits the original line. They also take a note of damaged stock. They make weekly returns to headquarters; these, with the collected passenger tickets, supply dates which form the basis of the accounting. A balance due by one railway to another on passenger or stock traffic, must be paid within five days after the date of the

C.-H. advice. Balances arising otherwise are payable within twenty-three days. Interest is charged on over-due balances. Cases of disputed liability are considered and decided by the committee.

Clearing-Nut, an Indian name for the nut of *Strychnos potatorum*, a plant belonging to the same genus as that which yields *Nux Vomica* (q.v.). It is commonly sold in the Indian bazaars for the purpose of clearing water. If the seeds are rubbed on the inside of a vessel, muddy water put into it soon becomes clear by the deposition of impurities. Their efficacy is due 'to the presence of albumen and casein, which act as fining agents, in a similar manner to analogous agents employed for beer and wine.' The seeds are also emetic, but devoid of poisonous qualities, while the pulp of the fruit is eatable. It may be also noted that this is likewise true of *S. Pseudo-Quina*, and that birds eat greedily of that of *S. Nux Vomica*, which yields strychnine (Roxburgh).

Clear-Story, or **Clere-Story,** is the name given to the upper story or wall of a church immediately above the roof of the side aisle, pierced with windows, through which light is admitted to the centre aisle. It is so called in opposition to the blind story or Triforium, which, opening from the centre aisle into the space covered in by the roof of the side aisle, is consequently blind or dark. C.-S. windows are to be found in the Basilicas, and in all the various periods of Gothic architecture; and till about the middle of the 14th c. they were generally small in size and wide apart. About this time they began to be greatly enlarged, in many instances the masonry being reduced to a minimum consistent with strength. A narrow passage is often found in the thickness of the wall at the C.-S. level, and leading all round the church, thus giving access to close the shutters or louvres when required, as well as for repairs.



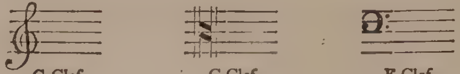
Cleat.

Cleats, on ship-board, are projecting pieces of wood or iron, formed so that ropes may be secured to them. C., in architecture, are small pieces of wood nailed to rafters in a roof to act as supports to the horizontal beams on which the common rafters rest. See *Art. Dict.*

Cleav'age, the name given in geological science to that condition or state of rock-particles, in virtue of which a rock can be readily split up into thin *laminæ* or plates, independently of any original lamination (or division into layers) which may have existed in the rocks. C.—'transverse' or 'slaty C.,' as it is termed—is best seen in *clay-slates*, but also occurs in sandstones and limestones, and in some trap rocks. It is best seen in purely-grained rocks, and splits such into very thin plates, lying smooth and parallel to each other. Of the origin of C., theories of *compression* are those most in vogue to explain the phenomena. Tyndall has shown that, if clay or white wax be subjected to pressure, allowing of expansion in directions at right angles to the pressure, slaty C. may be thus produced in these substances. This 'C.' of slate gives to that deposit valuable features in rendering it useful, in the form of thin plates, for many industrial purposes. C. tends to alter or destroy the presence of fossils in rocks, and its action is therefore to be taken into important account by the palæontologist.

Cleav'ers, or **Cliv'ers,** a species of Bedstraw (q.v.) very common in hedgerows and similar situations in Britain, &c., so called from clinging to clothing coming in contact with the leaves, which are covered with reflexed stiff-pointed hairs or bristles. At one time it was believed to be a specific in many cutaneous diseases, but its efficacy in these affections has not yet been fully determined.

Clef, in music, a sign placed upon the staff to indicate the absolute pitch of all the notes upon one particular line or space, and thus to fix indirectly the absolute pitch of all the other notes upon the same staff. Clefs are used, the forms of which are shown below, to indicate the positions of G, C, and F respectively in the staff.



G Clef. C Clef. F Clef.

The G (or soprano) C. is in modern music invariably placed, as in the figure, upon the second line; the C C. is generally, but not always, upon the middle line, and the F (or bass) C., always upon the fourth line.

Cleg, a popular name applied to some Flies belonging to the family *Tabanidæ*, or to that of the Breeze and Gad-flies. The English C. averages one-third of an inch in length, and is coloured black with yellow abdominal markings. The eyes are large. The C. of Scotland is a smaller species, and is known as 'Stout' in England. These flies possess a mouth adapted for piercing the skin of animals, and annoy horses, cattle, and domestic animals in summer especially, whilst they also attack man.

Clem'atis, a large genus of twining shrubs belonging to the natural order *Ranunculaceæ*, and easily distinguished by the long feathery style attached to their one-seeded carpels. There is only one English species, *C. vitalba*, the Virgin's Bower, the Traveller's Joy, or the Old Man's Beard. *C. flammula* is a sweet-scented species, a native of Southern Europe and Northern Africa, now common in our gardens. *C. florida* is accounted one of the most beautiful of all the species, and is that which remains longest in bloom; but *C. azurea*, *C. lanuginosa* (a fine blue-flowered Japanese species), and *C. tubulosa*, in addition to numerous hybrids such as *C. Jackmanni*, must also be classed among the favourite cultivated species of C.

Clematis (Virgin's Bower).

Clem'ens, Samuel Langhorne, better known by his *nom de plume* of 'Mark Twain,' an American humourist, was born in Florida, Missouri, U.S., 30th November, 1835. He worked first as a printer, but afterwards, in Nevada, as a journalist, when he developed a fresh phase of American humour, extravagant, surprising, and grotesque. In 1867 C. published *The Jumping Frog*, and in 1869, as the results of his travels in Egypt and the Holy Land, *The Innocents Abroad*, an amusing travesty of lofty and serious things—*e.g.*, in his weeping over the tomb of Adam, his blood-relation, in the church of the Holy Sepulchre. Among his other works are his *Autobiography* (1871), *Roughing It* (1872), *The Gilded Age* (1873). His best work, *A Yankee at the Court of King Arthur*, was published in 1890.

Clemens, Titus Flavius, surnamed *Alexandrinus*, in distinction from *C. Romanus*, a philosopher and theologian of the 2nd and 3rd centuries, was born either at Alexandria or Athens. Versed in all the science of the Greeks, at the age of manhood he convinced himself, by free inquiry, of the truth of Christianity. He now travelled over Greece, Italy, Egypt, Palestine, and the East in search of instruction from the great exponents of the new religion; but the only one whom he expressly names is Pantænus, the catechist or head of the Christian school at Alexandria. C. finally settled there, succeeded Pantænus as catechist and bishop (180), and died between 212 and 220. His peculiarity was that he did not cast aside his philosophy when he became a Christian, but held the eclectic system, afterwards called Neo-Platonism, and always sought to illustrate his teaching by the light which could be thrown on the doctrines of the Church from heathen antiquities. C.'s three great works are *The Exhortation to the Heathen*, *The Instructor* or *Pædagogus*, and the *Stromata* or *Miscellanies*. The object of the first is to win over heathens to Christianity; of the second, to build up converts in righteousness; of the third, to furnish the materials for a true gnosis on the basis of Christian faith. See Clarke's *Ante-Nicene Library*.

Clemens, surnamed *Romanus*, and, according to the ancient Church, the fellow-labourer of Paul (Phil. iv. 3), was one of the earliest Bishops of Rome, and is one of the 'Apostolic Fathers.' His (First) Epistle to the Corinthians is of dogmatic importance in relation to the doctrine of the Resurrection. The other writings attributed to him, a Second Epistle to the Corinthians, Two Letters on Virginity, the Apostolic Constitutions, the Apostolic Canons, and the Clementines, are unquestionably spurious. The two Epistles of C. to the Corinthians were found at the end of the *Codex Alexandrinus*. Both were defective; a leaf had been torn out of the first, and the end of the second was wanting. No other MS. of these was known to exist until Philotheos Bryennios, Metropolitan of Serræ in Macedonia, discovered one in the library of the Holy Sepulchre at Constantinople, and published an edition of them in 1875. His MS. contains both of the Epistles in a complete form.

Clem'ent is the name of seventeen Popes, of whom the most notable are—**Clement VII.** (Giulio de' Medici), who, as cardinal under Popes Leo X. and Adrian VI., had devoted himself to the Spanish cause in Naples and Milan. On his election as Pope in 1523, however, C. attempted to organise a national Italian party against Karl V., whose increasing power he dreaded. This led to the capture of Rome in 1527 by 'Bourbon's black banditti.' The growth of the Reformation after the Diet of Spires and the peace of Kadan were equally alarming to C., who sought the help of François I. and Henry VIII. He died in 1534, having by a secular policy reduced the influence of the Church to the lowest point. He founded the 'Monte della Fede,' or system of public credit, in which the creditors were associated in the management (*dogana*).—**Clement VIII.** (Cardinal Ippolito Aldobrandini) was elected 20th January, 1592. Although belonging to the Ecclesiastico-Spanish party, he is chiefly remembered in connection with the return of Henri IV. to the Church (which enabled C. to wrest Ferrara from Cesare d'Este), the readmission of the Jesuits to France, and the peace of Vervins. He died in 1605.—**Clement XI.** (Cardinal Gian Francesco Albani), was elected 16th November, 1700. At first a warm supporter of the French claim to the Spanish succession, he was compelled after the victories of Marlborough to acknowledge Charles III. as the Catholic King. By the peace of Utrecht, Sicily and Sardinia, which C. regarded as his own fief, were bestowed on the House of Savoy, with whom he soon had a bitter dispute as to *Di Monarchi* (a Sicilian tribunal which encroached on Papal privileges). In 1713 C. published the Bull 'Unigenitus,' condemning the 101 propositions in Father Quesnel's book; this irritated the French Jansenists and Nationalist clergy against Rome. C. was also connected with the great Jesuit missionary movement in China, the Stuart rebellion of 1715, and the expedition of Prince Eugène against the Turks in 1716. He died in March, 1721.—**Clement XII.** (1758-69). His rule is marked by the suppression of the Jesuits by Choiseul in France, Wall and Squillace in Spain, Fanuci in Naples, and Carvalho in Portugal. C. refused to abolish the order, and thus lost nearly all influence in Europe.—**Clement XIV.** (Cardinal Giovanni Vincenzo Antonio Ganganelli), was elected through Bourbon influence, 19th May, 1769. He was of a mild, religious disposition, and anxious to establish peace in the Church. The Curia was then divided into the *Zelanti*, or upholders of the ancient privileges of the Church, and the *Regulisti*, or party of concession to the crowned heads. C. belonged to the latter. He discontinued the reading of the Bull *In Cæna Domini*, allowed the claims of Sardinia and Parma, and on 21st July, 1733, abolished 'the Society of Jesus, its offices, houses, and institutions.' This act greatly assisted the Cismontane movement in Austria under Maria Theresa and Joseph II. C. died 22nd September, 1774.

Clemen'ti, Mu'zio, one of the earliest composers and performers of the modern pianoforte school, was born at Rome in 1752. He came to England as a boy, and for some time devoted himself to composing and teaching, but later on took up a music-publishing and pianoforte-making business, which he carried on successfully until his death, 10th March, 1832. Most of his compositions (over 600 in number) are for the pianoforte. Two of his works are considered authorities, *Practical Harmony*, and the *Gradus ad Parnassum*.

Cleome, a genus of plants of the order *Capparidaceæ*, found in the tropical regions of America. Most of the species are annuals—one, *C. pungens*, attaining the height of 4 or 5 feet. Among other species may be mentioned *C. spinosa* and *C. speciossima*, one of the handsomest of the genus, several of which are cultivated for the sake of their beautiful flowers.

Cleome'des, an ancient Greek astronomer, of whose life absolutely nothing is known. His treatise, *The Circular Theory of the Heavenly Bodies*, is a work in which truth is strangely mixed up with error. He held that the earth was spherical, and was a mere point in relation to the stellar sphere; that the moon rotated on its axis; that the fixed stars were as large, if not larger than the sun, and he also discussed the refraction of light. The two latest editions of this work are by Bake and Schmidt.

Cle'on, a famous popular leader of the Athenians, the son of Cleænetus, was brought up as a tanner. Even before the death of Pericles, however, he had achieved success in the more profitable trade of demagogue. In 427 B.C. he urged the Athenians to put to death all the adult males in Mitylene (about 6000), and to sell the women and children into slavery, and he so far attained his object. In 425 he succeeded, along with Demosthenes, in taking captive the Spartans who garrisoned the island of Sphacteria. In 422 he took the field against Brasidas, the famous Spartan general, in Chalcidice. He captured Torone, but in an attack on Amphipolis, the Athenians were defeated, and C. fled and fell. Thucydides and Aristophanes represent C. as the impersonation of violence, dishonesty, rapacity, and venality. Apart from the inconsistencies involved in this representation of his character, Grote forcibly argues in proof of its extravagance, that C. had proposed the banishment of Thucydides, and that Aristophanes himself admits that he had a grudge against him.

Cleopat'ra, the beautiful and accomplished, but ambitious and voluptuous Queen of Egypt, the last of the dynasty of the Ptolemies, was born B.C. 69. By the will of her father, Ptolemy Auletes, C. succeeded to the kingdom, along with her brother Ptolemy, but was expelled by him, B.C. 49. She was, however, reinstated by Cæsar, who was conquered by her charms, and to whom she bore a son, named Cæsarion, afterwards put to death by Augustus. In the war that ensued, young Ptolemy was killed, but a younger brother of the same name, whom she eventually poisoned, was associated with her in the government. On Cæsar's return to Rome, C. followed him, and there lived in his house, and received from him many gifts. On his death, B.C. 44, she fled to Egypt, and materially aided the triumvirate against the murderers of Cæsar. After the battle of Philippi, Antony summoned her to attend him at Tarsus, and her beauty so completely bewitched the Roman, that he remained her slave through life, and returned to her even after his marriage with Octavia, sister of Augustus. The infatuation of Antony in paying extravagant honours to C., and in assigning extensive territories to her and her children, so incensed and disgusted the Romans, that they declared war against her, and the great victory of Actium, B.C. 31, decided the fate of Antony and C. Augustus pursued them to Alexandria, where Antony, misled by a false rumour of C.'s death, fell on his sword. C., after vainly endeavouring to captivate Augustus, put an end to her life by the poison of an asp, B.C. 30.

Clepsyd'ra (Gr. *klepto*, 'I conceal,' and *hudōr*, 'water'), a kind of organ, used by the ancient Greeks, and described by Athenæus. The air was forced through the pipes by the action of water, giving rise to a soft musical sound.

Clepsydra, also an instrument used, before the discovery of the pendulum, for measuring intervals of time by means of the flow of water through a small orifice. The rate of flow varied with the temperature, barometric pressure, and generally with the height of the column of water above the orifice. This last source of variation is of the greatest importance, and is sometimes got rid of by keeping the vessel always full. In order that the rate may be the same at whatever height the surface of the fluid is, the vessel must be the surface of revolution of a cubical parabola.

Clerc, Jean le, a French theologian, was born at Geneva, 29th March, 1657. Having adopted the tenets of the Arminians, he settled in Holland in 1683, joined the Remonstrants in Amsterdam, and being interdicted by the Walloon ministers from preaching, was elected Professor of Hebrew, Philosophy, Classical Literature, and afterwards of Church History in the Arminian College there, a post which he held till his death, 8th January, 1736. Besides an extraordinary number of other works, he wrote commentaries on the whole of the books of the Old Testament, of which those on the historical books, especially the Pentateuch, have a permanent value. They may be regarded as the early dawn of the Rationalistic movement. C. is perhaps most likely to be remembered by his *Bibliothèque Universelle et Historique*, his *Bibliothèque Choisie* and his *Bibliothèque Ancienne et Moderne*.

Clergy (Gr. *klērikoi*, from *klēros*, 'a lot'), were so called, according to an early Christian writer, 'either because they are the heritage of the Lord, or because the Lord is their heritage.' The name was applied first to the three orders of bishops, priests, and deacons, but in the 3rd c. also to the inferior orders which were then introduced—sub-deacons, readers, acolytes, exorcists, doorkeepers. In the New Testament all Christians are God's heritage (*klēros*, 1 Pet. v. 3). The idea of a sacerdotal caste, a class of persons peculiarly consecrated to God, employed on the affairs of religion to the exclusion of all worldly concerns, and to be supported by the laity, was imported from the Jewish Church with its priests and Levites. Many privileges were claimed by and conceded to the C., especially during the Middle Ages. At the present day the C. cannot be summoned to serve as jurymen, cannot be arrested while officiating, may not farm more than 80 acres unless the bishop of their diocese permits it, and are not allowed to trade. In the Church of Rome, 'secular' C. are those whose duty lies in the outer world, *e.g.*, the parish priests, and those who do not belong to any religious order, like the 'regular' C., so called from Lat. *regula*, a monastic 'rule.'

Clerical Error is, in law, an error accidentally committed in the transcription of a deed or other instrument. Where the error is not *in substantialibus* it is not fatal to validity.

Clerk, is strictly a person in holy orders; but the term is now generally applied to any one whose chief occupation is writing as a subordinate. In English law, a C. is regarded as a superior servant.

Clerk, Parish.—An official of the Church of England. Formerly he led the responses, and otherwise assisted in the service of public worship, but now his duties no longer lie in that direction. He ranks next to the clergy in connection with the church to which he is attached. In many churches he is the officer who looks after the letting and rents of the pews. The incumbent generally appoints him, though in some places a custom prevails by which the parishioners choose their own clerk. He is paid according to the custom of the parish and can be removed or suspended by the archdeacon only. The City of London possesses a company of P. Clerks; but it has no privileges and no livery. In cathedrals and collegiate churches there are several clerks, sometimes forming a corporate body.

Clerk of the Assize is he that records all things judicially done by the judges of the circuits.

Clerk of the Crown is an officer in the Lord Chancellor's office, whose function it is to attend on the Lord Chancellor. He makes out writs for the election of members of Parliament. All returns are made to him. These he cannot alter, except by order of the House, under a penalty of £500—*toties quoties*.

Clerk of the Parliament Rolls is the name of an officer in each House of Parliament, who recorded the proceedings, and engrossed them on rolls for preservation. There are now a Clerk of Parliaments in the House of Peers, and a Clerk of the House of Commons; a large and competent staff of officers, including a Clerk of the Journals, is under each clerk.

Clerk of the Peace is an officer belonging to the Sessions (q.v.), whose duty it is to read the indictments, enrol the proceedings, draw the processes, and transact other business incident to the Sessions.

Clerk of Session.—The clerks of the Court of Session (see COURT OF SESSION) in Scotland are so called. There are two principal clerks and five depute clerks; besides these, there are two Inner House deputes and five assistants. The duty of these officers is to attend upon and assist the Lord President, the Lord Justice Clerk, and the eleven other Lords of the Session; five of these form the Outer House. No fees are allowed to the clerical staff, but each of the principal clerks receives £1000 per annum; each of the depute clerks, £550; each of the Inner House deputes £1425; and each assistant, £475.

Clerk to the Court of Teinds.—There are one principal and one depute C. of the Teind Court in Scotland.

Clerk of Justiciary.—There are one principal clerk (£700) and four deputes attached to the High Court of Justiciary.

Clerks to the Signet. See WRITER TO THE SIGNET.

Every court of law has necessarily a C. or Registrar, whose duty it is to write out the judgments and extract the decrees of the court.

Clerk, John, of Eldin, Mid-Lothian, Scotland, the sixth son of Sir John Clerk of Penicuik, obtained for himself, in 1779, a considerable reputation by the invention of the modern naval tactics of 'breaking the enemy's line'—an invention all the more remarkable that C. was not in any sense a naval man. This invention, being communicated to various naval officers, was adopted by Admiral Lord Rodney, 12th April, 1782, when he obtained his great victory over De Grasse in the W. Indies, and subsequently the manœuvre was systematically employed by the other great British admirals, such as Howe and Nelson. C. published various editions of his *Essay on Naval Tactics*—the latest and most complete in 1804. An unsuccessful attempt was made by General Sir Howard Douglas, son of the captain who, under Rodney, tried the manœuvre, to prove that it was suggested to his father, not by C., but merely by the chance position of the British and French Fleets. C. died 10th May, 1812.—His son, **John Clerk**, born in 1757, was educated for the law, passed advocate in 1785, and soon obtained the largest practice of his time. He was raised to the bench in 1823, taking the title of Lord Eldin. C. died in 1832. He is still remembered in Edinburgh society for his social qualities and his quaint, coarse humour.

Cler'mont (the *Clarus Mons* or *Clarimontium* of the Middle Ages), the name of several towns in France, the most important of which is **C.-Ferrand** (the *Augustonemetum* of Ptolemy), the capital of the department of Puy-de-Dôme, on an affluent of the Allier, and connected with Paris and Lyon by railway. It is beautifully situated at the foot of a range of extinct volcanoes, surmounted by the Puy-de-Dôme. The principal buildings are the cathedral (1248), the Romanesque church of Notre Dame du Port, said to date from 853, the Hôtel de Ville, Hôtel Dieu, linen-market, grain-market, the hospital, the theatre, and Palace of Justice. C. has a valuable public library, museums of natural history and antiquities, and a college. It has iron-foundries and machine-works, considerable traffic in grain, wine, oil, and cheese, and a large transit trade. In the suburb of St. Alyre is a fine mineral spring. Pop. 50,119. Pope Urban II. presided here in 1095 at the council in which the first Crusade was resolved on. Pascal was a native of C., and a statue has been erected in his honour. Other distinguished natives were Gregory of Tours and General Desaix.—**C.-l'Hérault,** a town in the department of Hérault, France, on an affluent of the Lergue, 23 miles N. of Agde by railway. It has manufactures of woollens, linens, verdigris, candles, &c., and an active trade in cattle and millstones. Pop. 5079.

Cathedral, Clermont.

Cleroden'dron, a genus of plants of the natural order *Verbenaceæ*, one of which *C. Thomsoni*, of W. Africa, is cultivated for the beauty of its flowers. *C. infortunatum*, an Indian species, is bitter and sub-astringent, and possesses tonic properties. These plants are chiefly natives of tropical Asia, but they are also found in Africa and America.

Cler'us, a Beetle genus, included in the Pentamerous section of the *Coleoptera*, and in the family *Serricornes*. *C. apiarus* is common on the continent of Europe, and is found in a larval state on the young of the hive-bee. It averages about half an inch in length, and is of green colour, the *elytræ* or wing-covers being red with purple markings. The adult beetles inhabit flowers, and particularly umbelliferous plants.

Cleve'land ('the Forest City'), in Ohio, U.S., on Lake Erie, at the mouth of the Cuyahoga river. It stands on a bluff 80 feet above the lake, and is beautiful and well laid out; the streets adorned with shady trees and fine public buildings. C. has a good harbour, and carries on an extensive trade with the lakes and with the mineral fields of Pennsylvania, especially in coal, iron, and copper. It has also communication with the Ohio river by the Ohio Canal, besides having railways to all parts of the country. Shipbuilding, copper-smelting, iron-rolling, and oil-refining are large and important industries. Iron and steel work—foundry and machine shop—products are annually valued at 30 millions of dollars, while petroleum refining is put at 10½ millions, meat slaughtering, packing, &c., at 4⅘ millions, and shipbuilding reaches close on 3 millions. The city is supplied with water from Lake Erie by works which cost $400,000. C. was founded in 1796, but in 1830 was only a village of 1100 inhabitants. In 1850 its population had risen to 17,034; in 1870 to 92,829; and in 1890 to 261,353.

Cleves, the French spelling of KLEVE or CLEVE (q.v.).

Clew, in ships, the lower corner of a sail. *C.-lines* are the ropes by which the C. is worked.

Clew Bay, an inlet on the coast of Mayo county in the W. of Ireland, 15 miles deep, with an average breadth of 8 miles, containing numerous indentations which form excellent harbours, and having at its upper end an archipelago of 300 fertile islets. It has valuable fishings. Clare Island lies at the mouth of the bay.

Cli'ché (Fr.), a process by which a sharp impression is obtained from a medal die. A quantity of semi-fused metallic-alloy is placed in a box under the die, which then descends forcibly upon it, causing the metal to take the finest lines of the die, which from its coldness, immediately solidifies the whole impression. 'C.' is also applied to the formation of stereotype plates.

Cli'chy, a town in the department of Seine, France, on a plain near the right bank of the Seine, and 4 miles N.W. of Paris, of which it forms a suburb. It has manufactures of white lead, chemical products, glue, and varnish. The parish church was erected in 1612 by Vincent de Paul, who was then curate of C. Pop. 30,698.

Click-Beetles, a popular name given to beetles belonging to the family *Elateridæ*, the larvæ of some species of which are the destructive 'Wire-Worms' (q.v.) of the agriculturist. The name 'C. B.' is derived from the noise they make on regaining their natural position after being laid on their backs; a spine arising from the front of the body, by means of a spring-action, enabling these insects to execute leaps, and to make the peculiar sound referred to. One familiar species of C. B. is the *Elater* or *Agriotes lineatus*—the striped species—found in hedges in summer, the larva of which is destructive to turnips and other plants.

Cliffor'tia, a genus of S. African bushes, belonging to the natural order *Rosaceæ*. The holly-like leaves of *C. illicifolia* are used by the Cape Boers (farmers) as an emollient and expectorant in coughs. The name *Cliffortiaceæ* is sometimes given to the *Rosaceæ* proper (including *Sanguisorbeæ*, as distinguished from *Amygdaleæ* and *Pomaceæ*).

Clif'ton, a suburb, and part of the parliamentary and municipal borough of Bristol, is built on the sides and summit of lofty cliffs (hence its name) of carboniferous limestone overhanging the Avon, and rising in St. Vincent's Rocks to the height of 308 feet. The river, which is here navigable, is spanned by a suspension bridge 702 feet in length, and having an elevation above low water of 275 feet. Its mineral springs and the beauty of its scenery made it, as early as the beginning of the 18th c., a favourite watering-place, which it continues to be, though its spa has declined in favour. C. has some fine public buildings, is a favourite residence of wealthy Bristowans, and has a proprietary grammar-school, *C. College*, which at present ranks among the foremost educational institutions in England. Traces of a large Roman camp are visible on C. Down. Pop. reg. sub-dist. and civ. par. (each) 29,345.

Climac'teric Year, a period of human life superstitiously supposed to be a turning-point in health or fortune, and thought to recur at the years produced by multiplying 7 by the odd numbers 1, 3, 5, 7, 9—to which some added the 81st year. The 63rd year was called the *grand C.*, and was supposed to be well-nigh impassable by most men, being the product of the two largest odd numbers, 7 and 9.

Cli'mate, in meteorology, is the sum of all the atmospheric variations at the locality under consideration, viewed especially in their relation to, and effect upon, animal and vegetable life. It depends first and chiefly upon the latitude and the mean annual temperature of the latitude, receiving from this consideration its usual subdivision into tropical, subtropical, temperate, and polar climates. Now, as a rule, the higher the latitude the lower the temperature, because the sun's rays, striking more obliquely on the surface, supply the same heat to a larger area, and therefore less to each unit of area. There are many conditions, however, which go to modify this general fact, but most, if not all of these, are due to the particular configuration of the land and sea. Thus, in the southern hemisphere, the *isothermal* lines, or lines drawn through localities whose mean annual temperatures are the same, approximate more or less to the parallels of latitude having their greatest contortions where the presence of land interferes most with the homogeneity of the surface. In the northern hemisphere, again, where the configuration of land and sea is much more irregular, the isotherms are extremely contorted. For instance, the isotherm representing a mean annual temperature of 0° C. corresponds, S. of the equator, almost exactly with the 60th parallel of latitude, suffering a slight disturbance just S. of Cape Horn; while, N. of the equator, it is traceable from the Aleutian Islands E. and S.E. over the American continent to the southerly extremity of the Labrador coast, then N.E. to Cape Farewell and to the North Cape, touching the N.W. of Iceland in its passage, then doubling southwards to the northern end of the Baltic, continuing E. and S.E. through the northern coasts of Russia and the southern districts of Siberia, undergoing a slightly northward flexure as it leaves Japan, and finally cutting through the S. of Kamchatka and across the N. Pacific.

All influences which are commonly enumerated as modifying C. may be said to depend on these four fundamental conditions: (1) the solar heat, (2) the earth's annual and diurnal motions, (3) the configuration of land and water, and (4) the character (physical and geological) of the country. It may be desirable to consider briefly the more important of these influences. The presence of aqueous vapour especially has a marked effect; for on account of its high specific heat, it tends to lower the temperature in summer and raise it in winter, thus equalising the C. Ocean currents, originating in the equatorial regions, and flowing towards higher latitudes, have the same equalising effect, as is well shown in the case of N.W. Europe, whose C., under the ameliorating action of the Gulf Stream, is much more equable than that of the corresponding latitudes on the American continent. In this connection also may be mentioned the similar influence of vegetation, and more particularly of forests. The elevation above the sea level is another important element in the adjustment of the C.—places situated in equatorial regions (*e.g.*, Quito, the capital of Ecuador, in S. America) enjoying a fine temperate, or even, as shown by the snow-capped peaks of the Andes and Himalayas, a veritable polar C. The nature of the soil too has a very significant influence—a damp clayey soil being very much colder, because a much better conductor of heat than a dry, sandy one. By more thorough drainage in various parts of England the mean annual temperature has been raised by several degrees, and statistics show a corresponding decrease in the death-rate arising from consumption, ague, rheumatism, and other maladies depending chiefly upon damp for their prevalence. Again, the slope and position of the land with reference to the sun and surrounding hills, and the consequent protection from certain winds, must also be taken into account. The more equable a C. is, the better, as a rule, is it suited for life; and the character of a C. is perhaps best judged of from a knowledge of the fauna and flora which flourish under its influence. From fossil testimony, we gather that in former geological epochs the C. of Europe was very different from what it is now. The rocks of the Tertiary formations indicate a sub-tropical development, even as far N. as Iceland; while the absence of organic remains in certain Post-tertiary deposits, and the occurrence of ice-markings, are unmistakable signs that Britain and France were then visited with a C. as bleak and polar as that of Greenland at the present day. In all works of any consequence on Physical Geography, Meteorology, and Geology, the conditions on which C. depends are fully discussed, and to these the reader is referred, as well as to articles GLACIERS, RAIN, SEASONS, &c., which, as parts of the Science of Meteorology, all bear to a greater or less extent upon this subject.

Cli'max (Gr. 'a ladder,' from *klino*, 'I bend,' because a ladder leans aslant), a figure in rhetoric denoting that artifice by which objects or propositions are, for the sake of impressiveness, presented to the mind of the hearer or reader in a gradually ascending series from weaker to stronger. The corresponding Latin term is *gradatio*. The converse figure is *anti-C.*, in which the ideas gradually or suddenly sink. It forms the main element in what is known as *Bathos* (q.v.).

Climb'ing Perch, the name given to a peculiar species of Teleostean fishes belonging to the family *Anabatidæ*, inhabiting the Ganges and other fresh waters in the E. Indies, and which have the power of leaving the water for considerable periods, and of making their way on the land, supporting themselves on their stiff spiny fins. The dorsal fin is single and elongated. The upper pharyngeal bones are divided into a number of curious labyrinthine chambers, in which moisture can be retained, for the purpose of keeping the gills moist, and of enabling them to breathe in their overland journeys. They migrate overland from their pools, when these are being dried up, in search of a fresh water supply. The name 'C. P.' has been given to this species of fish from the assertion that it is able to climb trees—the Tamil name of the creature being *Paneiri* or 'Climber of trees.' But this latter statement has not been satisfactorily determined, although there is no doubt of its land-loving habits, and of its ability to live out of water for days together. Another species allied to the C. P. is the Gourami of China. C. P. is on the average 6 inches in length. These fish are allied to the Mullets.

Climbing Plants, or **Climbers.** Some plants have such weak stems that, in order to rise from the ground, they must twine round other plants, or seek support for the same purpose from other objects. They may be divided, according to the means by which they attach themselves to the objects around which they twine, into:—(1) those which specially twine around a support; (2) those which ascend by the movement of the petiole or by the tops of their leaves; (3) those which ascend by true tendrils; (4) those which are furnished with hooks; and (5) those which are furnished with rootlets. Some twine round the support from right to left (*sinuirorsal*), as in the case of the hop and honeysuckle; while in others, as in the case of the Chinese yam, the haricot bean, the great hedge bearbine, &c., the twisting is from left to right (*dextrorsal*). The first form of twining is expressed in systematic works by the sign ☾, the latter by the sign ☽. Since the observations of Darwin, Unger, and others have called attention to the remarkable phenomena displayed by C. P., facts have been noted in regard to them which would almost incline us to designate some of these movements by a higher term than the mere phrase 'vegetable irritability' would denote. For a full account of these curious 'instincts' of plants, see Darwin *On the Movements and Habits of C. P.*; also *Journ. Linnean Society*; and Brown's *Manual*, pp. 78, 79, 579-583.

Clin'ic Baptism (Gr. *klinikos*, from *klinē*, 'a couch'), in the early Church was private baptism administered to the sick. It was done by sprinkling instead of immersion, which was the regular mode when done in the Baptistery (q.v.).

Clink'er, a firm mass of ash and other matters which is apt to form upon the bars of a furnace in which strongly caking coal is burnt, and which in this case, by impeding the access of air to the fuel, impairs the combustion, and allows the bars to be destroyed.

Clinker or **Clincher-Built,** a term applied to boats so made that each strake of planking overlaps at its edge the strake next below it, like the slates of a roof. If the planking be made flush throughout, the boat is said to be *carvel-built*.

Clink'stone, or **Phon'olite,** a compact felspathic rock, greenish-grey in colour, and somewhat slaty in texture, which emits a clear metallic sound when struck with a hammer.

Clinom'eter (Gr. *klinein* 'to incline,' and *métron*, 'a measure'), a small instrument used by surveyors for finding the slope of ground, and by geologists and others for finding the dip and strike of strata. There are various kinds of clinometers. Some depend upon the movements of a spirit level, while in others the swing of a pocket compass indicates the vertical line. Another kind of C. is used by French mariners to determine the exact inclination of the keel of their ship, and they are accordingly enabled to trim the vessel to suit its sailing powers.

Clinton, De Witt, son of James Clinton, U.S. general, was born in Orange county, New York, 2nd March, 1769. After his admission to the bar he was appointed secretary to his uncle, General George Clinton, and signalised himself as a political rival of Aaron Burr (q.v.). In 1802 he was appointed U.S. senator, and in 1803 Mayor of New York city. He was several times elected by the Democrats as Mayor of New York; and was Governor of the state from 1817 to 1822, and again in 1824. C. founded many valuable institutions; but his greatest work was the Erie Canal, connecting the waters of the lakes with the Hudson. He suggested the idea, and was mainly instrumental in carrying the work to its completion. He died 11th February, 1828. See Hosack's *Life of C.*, and Renwick's *Life of C.*

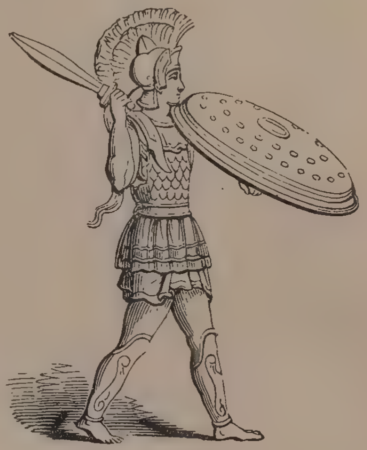
Clinton, Henry Fynes, a most distinguished classical scholar, was born in 1781, and educated at Westminster School, and Christ Church, Oxford. He inherited a large fortune, and for twenty years (1806-26) sat in Parliament for Aldborough. His great works are his *Fasti Hellenici* and *Fasti Romani*, containing respectively a most learned and exhaustive account of the chronology of ancient Greece and Rome. Both of these works were epitomised by the author. C. died at Welwyn, Hertfordshire, 24th October, 1852.

Cli'o (Gr. *Kleiō*, the 'proclaimer' or 'fame-giver'), in the Greek mythology, is the daughter of Zeus and Mnemosyne. She is the Muse of History, and is represented in a sitting attitude, wearing a laurel wreath, holding in her left hand a half-open inscribed roll of parchment, and beside her an open cylindrical chest, containing more rolls of manuscript. Sometimes she has a parchment roll in one hand and a stylus in the other. See MUSES.

Clio.

Clio, a genus of Pteropodous mollusca, the familiar species of which is named 'Whales' Food,' from the fact that the cetaceans of the Arctic seas feed chiefly upon the immense myriads of these minute forms, which they draw into their mouths. W. F. averages about three-quarters of an inch in length. No mantle or shell is developed. A distinct head exists, and the gills are rudimentary. The fins by which it swims are attached to the sides of the neck. The head bears numerous tentacles. Another species is found in the S. Seas. These animals are nocturnal in habits.

Clipeus, a circular shield used by Greek and Roman foot soldiers. It was made of wicker-work covered with ox-hides or of wrought bronze, and was large enough to protect the whole trunk of the warrior.



Clipeus.

Clipp'er, a term applied generally to any sailing ship built with the object of attaining considerable speed.

Clith'eroe (formerly *Cliderhow*; perhaps the Cymric *Cleddwr*, 'the rock by the water,' to which has been added the Old Eng. *hou*, 'a hill'), a manufacturing town in the W. of Lancashire, on the Ribble, 28 miles N. of Manchester by railway. It lies at the base of Pendle Hill, which rises to a height of 1803 feet, and in the vicinity is the famous Pendle Forest, a favourite haunt of the Lancashire witches. C. has extensive cotton and print industries. Its castle (now a ruin) was founded by the Lacys in the 12th c. Up to 1885 C. returned one member to Parliament. About 5 miles W. of C. is situated the Jesuit College of Stonyhurst. Pop. parl. div. of county, 89,450; reg. sub-dist. 13,709; mun. bor. and civ. par. (each) 10,815.

Clito'ria, a large genus of plants of the order *Leguminosæ* (sub-order *Papilionaceæ*), widely distributed over tropical Asia, Africa, and America, but more particularly in the latter country on the eastern side of the Andes. *C. Ternatea* is originally from the island of Ternata, one of the Moluccas, but now common in most tropical countries and in European conservatories. The corollas of the blue variety yield a dye which is used in Cochin-China, though it is not permanent, and in Amboyna it is employed to colour boiled rice. The butterfly-pea, another C., is found in the southern American states and Mexico, and in the Khassia Hills in India, without being found in any intermediate place.

Clive, Robert, Lord, born near Market Drayton, Shropshire, 29th September, 1725, was the eldest son of a lawyer of very ancient family. After a turbulent and idle boyhood, he obtained, at the age of eighteen, a writership in the East India Company's service at Madras. C. was disgusted with mercantile employment, and twice attempted suicide while in the 'Writers' Buildings.' He obtained means of study in the the Governor's library. When Labourdonnais, the French Governor of Mauritius, captured Madras, C. escaped to Fort St. David and obtained an ensign's commission in the Company's army. Two years later the French Governor of Pondicherry, Dupleix, took advantage of the disputed claims to the viceroyalty of the Deccan and the rule of the Carnatic to get himself recognised as Governor of India from the river Kristna to Cape Comorin, and the war between the English and French Companies began. It was then that C., now a commissary with the rank of captain, raised the siege of Trichinopoly by the capture of Arcot (1751), the capital of the Carnatic, which he defended for fifty days with a handful of English and Sepoys against the large army of Rajah Sahib, who was not only compelled to raise the siege with great loss, but was twice defeated in open field. Under the command of Major Lawrence, C. added to these triumphs the storming of Covelong and Chingleput. He then married Miss Martelyne and returned in 1752 to England, where he was a good deal lionised. In 1755 he was appointed by the Company Governor of Fort St. George, with a commission as lieutenant-colonel in the British army. Surajah Dowlah, the viceroy in Bengal of the court of Delhi, had just, on a frivolous pretext, attacked the English factory of Fort William, the modern Calcutta. The tragedy of the Black Hole (q.v.) roused the Madras settlement to fury, and C. was despatched with 2400 men to Bengal. Hoogly and Calcutta rapidly fell, and, assisted by Admiral Watson, C., distrusting the proposals of the Rajah, stormed the French factory of Chandernagore. A conspiracy against Dowlah, which C. carried on with the grossest deceptions, was played out on the field of Plassey, where an army of 55,000 well-appointed natives was dispersed, only 500 being slain. C. accepted from the new viceroy, Meer Jaffier, between £200,000 and £300,000. Although the act was much blamed, he was appointed by the Company Governor of the Bengal settlements, which he greatly strengthened by the defeat at Patna of Shah Alum, a prince of the Delhi family, who was threatening Bengal. The grateful Meer Jaffier gave C. the rent paid by the Company for the Bengal settlements; but soon commenced an intrigue with the Dutch factory of Chinsurah. This was promptly suppressed by the defeat of the Dutch fleet on the Hoogly, and the imposition of conditions on the Dutch factory. In 1760 C. returned to England, where he received an Irish peerage, and entered the House of Commons, where he attached himself to the Grenville party. His chief interest was still in Indian affairs; he opposed Sullivan in the Court of Proprietors, and was obliged to take his former employers into Chancery, as they had rescinded Meer Jaffier's grant of rent. Frequent revolutions and the corrupt administration of the Company's servants led to C.'s return to Calcutta in May, 1765. In less than two years he succeeded in abolishing the private trade of the Company's servants, and in prohibiting the receipt of presents. Their salaries he supplemented out of the Government monopoly of salt. Equally important reforms were carried out in the army, although a conspiracy of 200 officers was formed to oppose them. C. also obtained from the court at Delhi a recognition of the Company's supremacy and right to collect the revenues in Bengal, Orissa, and Behar. For a short time, however, the fiction of a native viceroy at Murshidabad was continued. C. set an example of self-denial to his fellow-countrymen. The only large present he accepted (£60,000) he formed into a fund for the invalided servants of the Company. On his final return to England in 1767, his great services seemed to be forgotten in the general dislike with which the 'nabob' class were at that time regarded. The sufferings of the Bengal population from famine were contrasted with the splendour in which C. lived at Berkeley Square and Claremont. At length in 1772, the financial position of the Company having become serious, a parliamentary committee was appointed to inquire into its recent history. Chiefly owing to the eloquence of Wedderburne, the House of Commons, while affirming the general illegality of the private appropriation of military acquisitions, passed no censure on C. His health, however, gave way soon after: he became addicted to opium, and committed suicide on 22nd November, 1774. There are Lives of C. by Malcolm, Greig, and others.

Cloa'ca (Lat. 'a sink') is a cavity at the extremity of the alimentary canal of birds, reptiles, and amphibians, into which the great intestine, &c., open. In the *Ornithodelphia*, a group containing the two genera *Echidna* and *Ornithorynchus*, there is a spurious C. In the *Didelphia*, or Marsupials, there is a shallow C.

Cloaca Max'ima, a celebrated subterranean vault, the construction of which is ascribed in Roman legend to Tarquinius Priscus, by which the filth of ancient Rome was conveyed to the Tiber. It was formed by three arches, one within the other, the innermost being a semicircular vault about 14 feet in diameter, the blocks of which were united without lime. It was large enough to allow the passage of a cart loaded with hay, and Agrippa passed through it in a boat on an occasion when it was cleansed. The original C. M. extended only from the Forum to the river, but was ultimately extended as far up as the Subura, and of this extension vestiges were discovered in 1742. The expenses of cleaning the common sewers at Rome were defrayed partly by the treasury and partly by an impost called *cloacarium.* The censors were intrusted with the administration of the sewers under the Republic, but under the Empire this was vested in special officers, with the title of *cloacarum curatores* —'curators of the sewers.' The sewers at Rome were constantly flushed by the superfluous waters of the aqueducts.

Clock Bell-Metal is an alloy of copper, into which tin, lead, and zinc in variable proportions enter. Small quantities of antimony and bismuth are sometimes introduced, to give a crystalline grain and a certain tone to the bell-metal.

Clocks and Watches. See HOROLOGY.

Clog Al'manac, Rim Stock, or **Prime Staff,** an almanac or calendar of days, made generally of wood, but sometimes of horn, bone, or brass. When four-sided it contained three months on each of the edges; the days were marked by notches, every seventh by a larger notch. On the sides symbols, each linked to the proper notch by a line, indicated the Golden Number, a cycle of the moon, and festivals of saints. Some were perfect, containing the Dominical Letter (q.v.), the Prime (q.v.), and marks for all the feasts; others were imperfect, having only the prime and immovable feasts engraved on them. There were the family C. A., hanging like a modern clock or weatherglass, and the smaller one, carried in the pocket as watches or handy compasses now are. This instrument was much used in England and Denmark; but in the latter country it was generally flat, each side being divided into six columns; even six-sided ones were not uncommon, two months being notched on each edge. There also it was called a *Runic staff*, after the Runic characters used for notation. Specimens of the C. A. are to be seen in the British Museum, London; the Bodleian Library, Oxford; and St. John's College, Cambridge; and a few other places.

Clogheen' (Irish Gael. *cloichin*, dim. of *cloch*, 'a stone'), a town in the county of Tipperary, Ireland, 14 miles S.W. of Clonmel, on the river Tar, at the crossing of the roads from Dublin to Cork and from Cahir to Lismore. It has extensive flourmills, as the limestone soil of Tar Vale produces rich crops of wheat. Pop. 3176.

Clog'her (Irish Gael. *clochar*, 'stony land'), a decayed episcopal city in the county of Tyrone, Ireland. It is 15 miles S.S.E. of Omagh, and 98 N.N.W. of Dublin, on the Launy, a tributary of the Blackwater. St. Patrick is said to have been, in A.D. 444, the first bishop of the see, which is now united to that of Armagh. Pop. town, 273; parish, 8611.

Cloister.

Clois'ters (Lat. *claustra*, 'enclosed places'), vaulted passages connected with cathedrals and collegiate or monastic institutions, generally situated on the S. side of the church. They enclose on four sides a large area, called the cloister garth, and give covered access to the church, and to the various offices of the establishment ranged round the three remaining sides. The side-walls of the C. are in Northern Gothic generally of a design similar to the aisle-walls of a church, having windows sometimes glazed, with tracery and buttresses between; while in warmer countries the C. are generally open pillared arcades of the most graceful and beautiful design. A stone seat is often continued along one side of the C., and many of them have stalls or carrols, where the monks were in the habit of studying and copying books; and at certain hours of the day the C. formed a common place of meeting for conversation and recreation, as well as for processions to and from the church. Certain orders used the C. for interments. The prototype of the C. is to be found in the colonnade surrounding the court in front of the Basilican churches.

Clonakil'ty (Irish Gael. *Clough-na-Kiltey*, 'the stone-house of the O'Keelys'), a town in the county of Cork, Ireland, 26 miles S.W. of Cork. It stands at the head of a small inlet from C. Bay, and exports grain. Pop. 3221.

Clo'nes (Irish Gael. *Cluain-Eois*, 'Eos's meadow'), a market-town in the county of Monaghan, Ireland, on the high-road between Monaghan and Belturbet, 12 miles W. of the former town, and near the Ulster Canal. C. has large cornmills, a brewery, and some manufactures of crochet-lace. Near the town are the ruins of an ancient monastery, which is said to date from the 6th c., a round tower, and some very old earthworks, probably of heathen origin. Pop. 2032.

Clonmel' (Irish Gael. *Cluain-meala*, 'the honey-meadow,' so called from the abundance there in old times of wild bees' nests), a municipal borough in Tipperary, Ireland, with a small portion in the adjoining county of Waterford. It is situated in a beautiful valley on the Suir, here crossed by a bridge of twenty arches, is a well-built town, and has a considerable trade in corn, cattle, bacon, and butter. In the neighbourhood are extensive cornmills, breweries, and a distillery. C. returned one member to Parliament up to 1885. The town was the birthplace of Sterne, and the scene of Smith O'Brien's 'insurrection' in 1848. Pop. mun. bor. 8480; area 331 acres.

Clontarf' (Irish Gael. *Cluain-tarbh*, 'the meadow of the bulls'), a town in the county of Dublin, Ireland, 3 miles E.N.E. of Dublin, a favourite sea-bathing place, and famous in ancient Irish history as the scene of the defeat of the Danes by Brian Boroimhe in 1014. C. had a 'priory' as early as 550, which afterwards came into the hands of the Knights Templars, and is now a Carmelite monastery. C. Castle, not long ago burnt, is said to have been one of the finest specimens of antiquity in the British Isles. Pop. 2396.

Cloots or **Clootz, Jean Baptiste,** born at Val-de-Grace, near Cleves, 24th June, 1755, and educated at Paris, conceived the idea of making that city the metropolis of the universe, and abolishing national distinctions. Under the assumed name, Anacharsis, he traversed Europe, announcing his doctrine, and losing great part of his inherited wealth. Returning to Paris, he renounced his rank (of baron) in the Prussian nobility, and assumed the title of 'orator of the human race,' in which capacity he assisted at the absurd ceremony of introducing fictitious delegates from all foreign nations to the Assembly. After the September massacres he was elected a deputy, and in the interests of his universal republic he savagely called for the death of the King. A treatise of his in support of Mohammedanism was gravely approved of by the Assembly. At last Robespierre, feeling that the Hébertist party was threatening not only the Jacobins but the Republic, denounced C. as too rich, a foreigner, and an atheist. C. was executed 23rd March, 1794. His writings are, like himself, curious, but of no consequence.

Close, a term used in heraldry in connection with birds addicted to flight, as the eagle and falcon, indicating that the wings are not expanded, or *disclosed*, which is the technical term. C. applies also, in the same art, to barnacles or bits for horses, when they are not extended.

Close-Hauled, in navigation, is the manner in which a ship's sails are arranged when she is wanted to sail as nearly in the teeth of the wind as possible.

Clos'et, in heraldry, a diminutive of the Bar (q.v.)—one-half of its width.

Clotaire, the French form of the name of several Frankish kings of the Merwing or Merovingian dynasty. See MERWINGS.

Clothes-Moth (*Tinea*), the name given to various species of Lepidopterous moths, the young or larvæ of which destroy cloths, furs, and other fabrics, by biting them and otherwise destroying them, for the purpose or forming cocoons or pupæ-cases from the materials. Of this genus of moths (included in the sub-order *Heterocera*, and in the family *Tineina*), the *T. destructor*, *T. tapezana* of woollen fabrics, and the *T. pellionella* of furs, are familiar species; whilst *T. granella* or the Corn Moth (q.v.) is found in granaries and libraries also. *T. destructor* is of a buff colour; *T. tapezana* has the front wings black at their roots and the rest of the wings white; whilst in *T. sarcitella*, another common species, the colour is a silky grey, the head and chest being white. The antennæ are filiform, and the larvæ or caterpillars have eight or ten pro-legs. By means of their sharp jaws the larvæ nip out the fabrics in which they live, and amid which the female moth has deposited her eggs. Exposure to air, and saturation with the odour of camphor or spirit of turpentine, are the most effectual means for destroying these forms. But free exposure to currents of air and cleanliness are the surest preventives from their attack.

Clo'thing, Army, is a department of the British military system. Formerly the colonel of the regiment was paid so much a year for clothing it. This system, as was to be expected, led to gross abuse. The colonel contracted with a tailor for a wholesale supply at lowest possible price; the officer making a profit, it used to be calculated, of fully fifteen shillings per man. The disasters of the early part of the Crimean war gave rise to a national demand for reform in the system. Under the royal warrant of 21st June, 1855, the troops are clothed at the direct expense of the state, the colonels receiving compensation for the loss of their former perquisite. The A. C. Department is in Grosvenor Road, London, and chief officers of the staff of superintendence are director and assistant-director of clothing, storekeeper, medical officer, and inspector of colours. The cost of a uniform for a private in the W. India regiment is £2 10s. 2d., and for one in the line £2 16s. 5d.; for a Life-Guardsman it is £7 4s. 5d., for a Foot-Guardsman £4 13s. 10d., for a kilted Highlander £3 17s. 3d., and for one trewed £3 5s. 3d. The vote for 1894-95 was £789,600.

Clothing, Navy. On joining the royal navy every man receives £2 10s., which is paid to him to cover the expense of his outfit. Afterwards he has to clothe himself. An officer inspects his clothes once a week and makes an order for any raw material which the sailor may require, and for which he has to pay—the paymaster pays, and deducts the amount from the man's pay, except for blankets and bedding. The net estimates for 1894-95 for the victualling and clothing of the navy are £1,402,100, being an increase of £141,400 on those for 1893-94.

Clo'tho, in ancient mythology, one of the three Fates or *Parcæ* (q.v.)

Clotho, a genus of Spiders (q.v.), inhabiting the S. of Europe and N. of Africa, which construct a curious tent-like habitation of conical shape, fastened to rocks and in crevices; egress and ingress being obtained through a curious doorway. The exterior of the tent is purposely stained for concealment, and it is fastened securely by cord-like structures to its basis of attachment. *C. quinquemaculata* is a familiar species, about half an inch long, and coloured black on the abdomen. Another is *C. Durandii*.

Cloud, St., a town in the department of Seine-et-Oise, France, on the slope of a hill on the left bank of the Seine, 6 miles S.W. of Paris. The name C. is a corruption of Hlodoald, a grandson of Clovis (Hlodowig), who, forced to become a monk, took up his residence at *Novigentum*, the modern St. C., and was afterwards canonised. Its principal attraction was its splendid château, built by Mazarin, long the residence of the Dukes of Orleans, and the scene of many memorable historical events. Bonaparte was here named First Consul in 1799, and here Charles X. signed the famous ordinances of July, 1830. It was the headquarters of the Allies from 7th April to 3rd June, 1814, and also of Blucher in 1815 during the siege of Paris. It was almost wholly destroyed by the fire of the French artillery, 13th October, 1870, as it was believed to be the headquarters of the German staff. Pop. 5660.

Cloudberry, a plant of the natural order *Rosaceæ*, allied to the bramble, raspberry, &c., bearing an agreeably flavoured fruit, greatly used for preserves in Norway and Sweden, where it is common. It is also found, though not so plentifully, in high situations in Britain. The Antarctic representative of it is *Rubus geoides* of Tierra del Fuego and the Falkland Islands.

Clouds. Moisture is always being evaporated from all points on the surface of land and sea; its rate of evaporation being in direct ratio to the dryness of the atmosphere, and in inverse ratio to its density. The amount of moisture is shown by the wet-bulb thermometer, which gives the temperature of evaporation. 186,240 cubic miles of vapour are annually raised from the surface of the globe. Although the southern hemisphere possesses three times as much water as the northern, yet partly by the direction of the trade-winds, partly from the superior condensation-power in the N., more rain and fog occur there. There is absolutely less vapour in the atmosphere in January than in any other month; while in July, on account of the heat, the evaporation is greatest. The chief effect of moisture in the air is to obstruct the passage of the sun's heat; there is also considerable absorption of heat on evaporation. In the region of C., which is stated by Kämptz to be from 1300 to 21,320 feet, but which balloon observations extend to an elevation of perhaps 10 miles for light cirrus, the cloud-air is dry, the moisture being condensed by the colder air into C.; these C. prevent the free radiation of heat, and thus obstruct the formation of dew on the earth. The quantity of C. manufactured out of the invisible vapour depends on the differences of the air currents in temperature, moisture, and velocity. In Britain, the heavy E. wind, or polar current, forces upwards and transforms into dense black C. the light and moist S.W. wind. In the balloon observations at Kew, the temperature of the cloud-stratum, varying from 2000 to 3000 feet in thickness, was found to be the same at the top and at the bottom. As a general rule, the cloud-stratum is higher over land than over water, and increases in height with the oxygen of the air, *i.e.*, distance from the sea. In intense cold, C. often consist not of vapour, but of small crystals of ice. The appearance of a cloud depends on its being connected with an ascending current of vapour; when this ceases, the cloud is formed, and immediately begins to dissolve. C. also, if near the earth, imitate the depressions and elevations which they extend over. There is no radical difference between C. and fog, the latter being always close to the ground, which is then generally moister and warmer than the atmosphere. The *cirrus*, or cat's-tail is the highest cloud; it consists of long white silver horizontal bands, perhaps containing snow or ice. Travelling in the direction of its length, it seems stationary. The parallelism of these bands has been assigned to electrical conditions. The *aurora* is supposed to be connected with them; it is in this region that halos and parhelia are formed. The *cumulus* is the rounded, dense, white, mountainous cloud of the daytime. *Cumuli* move in currents near the earth, and are in fact formed from the ascending air which has been heated on the earth's surface. In the evening they often mass themselves and deepen in colour. Still lower is the *stratus* or horizontal band which forms at sunset and disappears in the morning. It includes the white and grey mists formed in valleys and over marshes. There are four subordinate forms of C.—the *cirro-stratus*, a compact structure of filaments, resembling in outline and position the *cirrus*; the *cumulo-stratus*, a mass of C., having at sunrise a black or bluish tint on the horizon, and passing into the *nimbus*, or rain and thunder cloud, which has a uniform grey tint, fringed at the edges; and the *cirro-cumulus*, which is a combination, of course in endless variety, of the *cumulus* and the *cirro-stratus*. C. move much faster than the wind at the surface of the earth; the rate of 109 miles an hour has been observed at Edinburgh, and the rate of 72 miles when the wind was blowing at 42 miles an hour. See Somerville's *Physical Geography*, and Buchan's *Meteorology*.

Cirrus.

Cumulus.

Clough, Arthur Hugh, an English scholar and poet, was born at Liverpool, 1st January, 1819, educated at Rugby under Arnold, passed to Balliol College, Oxford, and was elected a fellow of Oriel in 1842. The theological *fever* was strong at the time, and for a moment it seemed as if C. would catch it; but his spirit was too exquisitely susceptible of living impressions, and his mind too speculative, or rather too critical, to be long enthralled by 'archæological formulas.' The result was that he went the other way, and his brief career was mainly shaped by his antagonism to the 'form of thought which Oxford exacted of her children.' In 1848 he resigned his fellowship, and in the same year, a little earlier, published the *Bothie of Tober-na-Vuolich*, a 'true long vacation pastoral,' in classical hexameters, instinct with the finest aroma of elegant culture, the bright joys of college friendship, the humour, sympathy, sarcasm, and luminous talk of youth, relieved by picturesque descriptions of Highland scenery and delineations of Highland character. The work is imperfect in art, and is now beginning to fade from the memory; but at the time it was thought to indicate a new poet. Next year (1840) appeared his *Ambarvalia*. After leaving Oxford, C. travelled in France, Italy, and America, was appointed an examiner in the Education Department of the Privy Council in 1853, and in 1856 secretary to the Commission of Report on Military Education. His health now gave way; after visits to Greece and Constantinople, and a short return to England, he was again ordered to the Continent; but was carried off by malaria fever at Florence, 13th November, 1861. C.'s nature was singularly pure, tender, and strong, and his talent incomparably greater than his fame is likely to be. See *Poems by A. H. C., with a Memoir*, by F. T. Palgrave.

Clouted or **Clotted Cream,** prepared by boiling milk on which the cream has risen, and skimming off the cream, in which a quantity of coagulated casein becomes entangled by boiling. The S.W. of England, Devonshire and Cornwall, is noted for its C. C.

Clove, or **Culilawan Bark,** is a name also applied to the bark of *Myrtus caryophyllata*, a native of Ceylon and the Mascarene Islands.

Clove Gilliflower, the aromatic scented double-flowered varieties of *Dianthus Caryophyllus*.

Clove Nutmeg, the fruit of *Agathophyllum aromaticum*, one of the *Lauraceæ*, which is aromatic, though the kernel which it encloses is of an acrid caustic taste. The leaves are used in Madagascar as a condiment.

Clo'ver, or **Trefoil,** a genus of plants belonging to the order *Leguminosæ* (sub-order *Papilionaceæ*). There are from fifteen to twenty British species of C.; about one half are pasture plants, the rest mere weeds, of no economic importance. The cultivated species of C. are—The red C., the zigzag C., the carnation C. All the above have red flowers. The following species have pinkish or white flowers:—The Alsike C., and the white or Dutch C.; while the hop or procumbent Trefoil has yellow flowers.

The red C. is much employed as a 'shifting' crop, either by itself or in the mixtures known to the farmer as 'seeds.' It is now so much a cultivated plant that it is found difficult to make it stick to lands as perfectly as it once did: such soils are described as 'C. sick.'

The zigzag C., so called from the angular bends at each joint of the stalk, is a lover of sandy soil, and is probably only a variety of the red or broad-leaved C. It is usually known by the seedsmen as the 'cow grass,' though it is rare to find two seedsmen supplying the same plant under that name. The carnation or Italian C. is an introduction from the Continent, and is used on upland soils upon the white-crop stubble sown in the autumn. There are several varieties of it.

The Alsike C. is also a Continental form. From possessing characters intermediate between the red and the Dutch C. it is also called hybrid, though its hybridity is not admitted by botanists. It is a good pasture grass. The Dutch C. is a valuable feeding plant in dry and thin soils. The hop or procumbent Trefoil is a different plant from the hop trefoil of the farmer (which is *Medicago lupulina*). Bokhara C. is *Melilotus leucantha;* bush C. and Japan C., American names for *Lespedeza;* prairie C., an American name for *Petalostemon;* Soola C. and Maltese C., *Hedysarum coronarium;* sweet C., an American name for *Melilotus*. See MEDICK, MELILOT, and SHAMROCK.

Clover Weevil, a genus of Beetles of the section *Pentamera* and family *Rhynchophora*. This insect has, therefore, the head prolonged to form a *rostrum* or *beak*, and derives its name from its feeding on the leaves of the clover, the larvæ eating into the clover flowers. The African C. W. infests the red, and the yellow-footed C. W. attacks the white clover. The former is about a twelfth of an inch or little more in length, and is coloured of a dark-blue or blackish-blue tint.

Cloves. See CARYOPHYLLUS.

Clo'vis, the Latinised form of the name of the Frankish King *Hlodowig* (q.v.)

Cloyne (Irish Gael. *Cluain-uamha*, 'the meadow of the cave'), a town in the county of Cork, Ireland, 15 miles E. by S. of Cork. Its cathedral dates from the 13th c. C. was once a separate bishop's see, but was re-united in 1835 with that of Cork, from which it had been disjoined in 1678. The famous Berkeley was Bishop of C. There is little or no trade. St. Colman Maclenin founded a monastery here in 604, and the cave from which the place is named is still to be seen. Pop. of town 995.

Club (which has been conjecturally derived from the Old Eng. *cleofian*, 'to cleave,' and Welsh *clapiaw*, 'to form into a lump'), may be applied to any voluntary unincorporated society possessing a common fund, derived from the contributions of its members, and generally managed by a committee, who are not entitled to make their constituents liable for any expenses beyond the purposes for which the C. was formed. Clubs for dinner in common were popular in Athens, and eating in common was a prominent feature in the early religious or social *gilds* (a word connected with the Welsh *gwyl*, Breton *goel*, and Gaelic *feill*, 'a feast or holiday'). Thus the gild of Abbotsbury had a yearly banquet, to which the poor were admitted, the members being obliged to furnish so much bread 'well boueted and thoroughly baked.' Support and nursing of sick gild brothers, burial of the dead, and performance of religious services, were also objects of the early gilds. This common meal has been derived from the old Teutonic sacrificial banquet, and has been compared to the Greek *eranoi* (see Bekker's *Charicles*, ii. 239) and the banquets of the Roman *collegia*. These fraternities were spread all over Catholic Europe in the Middle Ages, there being eighty in Cologne and one hundred in Hamburg. One of their ceremonies is curiously preserved in 'the march of the members of the English benefit societies to morning service in their church before the midday dinner, the cricket-match and games of the afternoon, and the evening dance.' As the later frith-gilds, gilds merchant, and trade-unions all in their time acquired a corporate existence, they seem hardly to fall under the term C. It would, of course, be impossible to mention the objects, charitable, political, convivial, and religious, for which clubs have been formed. Among others, we may note the 'Mermaid' of Shakespeare; the 'King's Head and Green Ribbon C.' of the Shaftesbury clique; the 'C.' of Presbyterian and Tory Jacobites, which organised in Penston's Tavern the opposition to the Revolution settlement in the Scots Parliament of 1689-90. Specimens of the fantastic club are the 'Calf's-Head C.,' which (as late as 1735) used to dine off calf's-head, in contempt of the memory of Charles I., solemnly burning the *Ikon Basiliké*, and swearing republicanism over Milton's *Defensio Populi Anglicani;* and the 'Ugly C.,' celebrated by the *Spectator*, of which the qualifications of members were defined by an 'Act of Deformity.' Early in the 18th c. the Hell-Fire Clubs, which used Tartarëan names, and burned sulphur at their blasphemous meetings, were denounced by an Order of Council (28th April, 1721). In the latter half of the same century the celebrated convivial clubs of 'The Society of Bucks' and 'John Shaw's Punch-House' were formed at Liverpool and Manchester respectively. The 'Scramble C.,' and the 'Oyster and Parched-Pea C.' of Preston (which included among its office-bearers an Oystericus and a Clerk of the Peas), belonged to the same period. Among the political clubs of the period of the French Revolution may be mentioned the *C. des Enragés*, Breton C., *Société Publicole*. The 'Breton' developed into the 'C. of Friends of the Constitution,' and, after it met in the hall of the Jacobin Convent, the 'Jacobins,' who, known as the *Société Mère*, had 300 affiliated clubs in France. Barnave, Mirabeau, and Robespierre belonged to it. Still more violent were the 'Cordéliers,' among whom were Desmoulins and Danton. Lafayette's C. was the *Feuillans*, or 'Club of 1789, Friends of the Monarchic Constitution.' Of the same complexion was the *C. des Monarchiens*. It was the 'Electoral C.' which, meeting at the Hôtel de Ville, constituted itself a provisional municipality, and, as the affair of the Bastille approached, a permanent committee for arms.

Clubs for amusements, such as horse-racing, trotting, pigeon-shooting, polo, golf, skating, driving, athletics, football, gaming, cricket, boating, chess, debating, are now common. There are clubs, political and social, in every city, town, and district. Clubs for men only, clubs for women only, and clubs, of which the members are both men and women. In France, Italy, Switzerland, and England, Alpine clubs have existed for many years; their *Transactions* contain much interesting description and some scientific observation. Their chief advantage lies in the certainty of reliable guides and experienced companions. In 1812 the 'Roxburghe C.,' for the printing or reprinting of a limited number of copies of rare and interesting books or documents, was formed on the occasion of the public sale of the Duke of Roxburghe's library; it was followed by the Maitland, Spalding, and Bannatyne clubs in Scotland.

Among the great London clubs ought to be mentioned the 'Rota Coffee C.' in New Palace Yard, to which Milton, Marvell, and Harrington belonged; the 'October and March C.,' consisting of Tories under Harley and St. John; the 'Kit-Kat C.' in Shire Lane, to which Halifax, Marlborough, Walpole, and other Whigs belonged; 'Almack's (originally Brooke's) Chocolate C.,' founded in Pall Mall in 1764; 'White's,' removed to St. James's Street in 1736, to which Chesterfield, Cibber, and Bubb Doddington belonged; 'Turk's Head C.,' to which in 1763 Reynolds, Johnson, Burke, and Goldsmith belonged, removed to Thatched House, and now the 'T. H. C.;' 'Cocoa-Tree C.,' where Smollett did his election bribing; 'Beefsteak C.,' founded, with the motto 'Steaks and Liberty,' by Lord Peterborough in honour of Peg Woffington, to which Colman and Garrick belonged, and from which Wilkes was expelled for his *Essay on Woman*, 'Will's C,' where Dryden talked; and 'Button's C.,' frequented by Addison.

Clubb'ing, a disease affecting the roots of cabbages and allied plants, the result of which is that the whole force of vegetation is carried upwards to the leaf and stem, causing the destruction of those parts. It is a local disease, and probably depends upon peculiar conditions of the soil. Berkley recommends, as the most effectual preventive of it in districts subject to the disease, to put a small quantity of wood ashes into the hole in which the root of each plant is placed.

Club-Foot, or **Tal'ipes,** may be due to the contraction of certain muscles, or to the paralysis of others. It is generally congenital, but is sometimes the result of disease or destitution. Four kinds are usually described by surgeons. 1. *Talipes equinus.* The muscles of the calf are contracted, the patient walks on the front of the foot, and the heel is raised from the ground. This kind is usually a result of teething. 2. *T. varus*, the most common form of C.-F. The patient walks on the outer edge of the foot. 3. *T. vagus*, a rare form, compelling the person to walk on the *inner* aspect of the foot. 4. *T. calcaneus*, in which the person walks on the heel. Sometimes we find several of these forms in the same foot. The proper treatment consists in dividing the tendons of the contracted muscles by a thin knife underneath the skin, and applying means to keep the limb in position. In children C.-F. is always curable.

Club-foot.

Club-Grass, a common name for *Corynephorous*, a grass belonging to the oat tribe. Though rare in England, it is generally diffused throughout the continent of Europe.

Club-Houses, in London, Law Regarding. It is now settled (Fleming *v.* Hector) that these have no legal character similar to commercial partnerships or joint-stock companies, and that the members are not liable for the debts incurred by their secretaries, stewards, or committees.

Clupei'dæ, a family of Teleostean fishes belonging to the sub-order *Malacopteri*, and including the herrings, pilchards, sprats, sardines, anchovies, &c. It is distinguished by its members possessing scales of large size, by the wide mouth, into the formation of which both maxillary and inter-maxillary bones enter; by the single dorsal fin, and by the absence of a second soft or *adipose* fin. Most of the C. possess numerous *pyloric cœca*, or appendages to the stomach. The ventral fins are abdominal in position (*Abdominalia*). The Air-Bladder (q.v.) communicates with the throat by a duct. Sometimes the belly is rendered serrate by the presence of irregular scales.

Clupesoc'idæ, a family of Teleostean fishes, included in the Malacopterous sub-order, and allied to the Herring family, and to the Pikes. The members of this group are both marine and fresh water in habits. None are found in British waters.

Clu'sia, a large genus of tropical American trees or shrubs, the type of the natural order *Clusiaceæ* or *Guttiferæ*, so named from Charles de l'Ecluse or Clusius, a famous botanist of the 16th c. *C. grandiflora*, with its large leaves, from 7 inches to a foot in length, and white flowers 5 or 6 inches in diameter, is one of the beautiful trees of the tropics. *C. insignis*, or wax-flower, is a Brazilian and Demerara species, whose flowers excrete a quantity of resin, which, when rubbed with the butter of the chocolate-nut, is used by the Brazilian women to alleviate pain. A similar resin, yielded by *C. alba*, *C. rosea*, and *C. flava*, of the W. Indies, is used by the Caribs for painting the bottom of their canoes. *C. Galactodendron* is one of the Palo de Vaca, or 'cow trees' of Venezuela and other portions of S. America, so called from the milky juice, which exudes from incisions made in the bark, being used as a substitute for milk. It is affirmed by the credulous that the 'milk' flows more fully just before the full of the moon; one tree will yield a quart in an hour. The milk is nourishing, though the use of it leaves a sensation of astringency on the lips and palate. *C. Duca* yields the duca resin of Colombia, which is burnt for the sake of its agreeable odour. Many of the species are epiphytes—*i.e.*, parasites on the stems of other trees. Altogether about thirty species are described.

Clusia'ceæ, or **Guttif'eræ,** a natural order of trees or shrubs belonging to the Dicotyledons (division *Thalamifloræ*), natives of the humid tropics of S. America. There are thirty-two genera, and about 150 species described. Most of the plants have acrid properties, and yield a yellow resin. Among the chief and common plants of the order are Gamboge (q.v.), Mangosteen fruit-tree, the American Mammee apple-tree, bitter or Weandee oil-tree, the butter-tree of Sierra Leone, &c.

Cluso'ne, a town in the province of Bergamo, N. Italy, near the Serio, 17 miles N.E. of Bergamo, has linen manufactures, and a trade in iron, copper, vitriol, corn, &c. C. is also the name of a small river of N. Italy, which joins the Po some 18 miles S. of Turin. Pop. 3985.

Clus'tered Col'umns, or **Compound Piers,** one of the richest features in Gothic ecclesiastical architecture, when the shafts or columns are attached to each other sometimes for their whole length, at other times only at the base and capital. C. C. are susceptible of very effective adornment, as with floriated fillets.

Clu'tha, or **Mol'yneux,** the largest river in New Zealand, issues from Lake Wanaka, in the province of Otago, in 44° 35′ S. lat., 169° 20′ E. long., and after a S.E. course of 200 miles, falls into the S. Pacific in 46° 18′ S. lat., 169° 38′ E. long. Its principal tributaries are the Kawarau (draining Lake Wakatipu), Manuherikia, and Pomahaka. The C. is a very deep and rapid river, and was computed by Balfour, colonial marine engineer, to discharge 1,690,000 cubic feet of water per minute.

Cluy'tia, a genus of Euphorbiaceous plants, natives of Africa, and found in great abundance at the Cape of Good Hope. *C. lanceolata* is said to be used in Abyssinia as a cure for dysentery in cattle.

Clwyd, a Celtic word found both in the Cymric and Gaelic tongues, and derived from an adjective meaning 'strong.' This adjective is seen in the names of several rivers in Scotland and Wales—*e.g.*, the 'Clyde' in Lanarkshire, and the 'Cluden' near Dumfries; the 'C,' 'Cloyd,' and 'Clydach,' in Wales, which were probably so named from the strength or rapidity of their current. By far the largest and most important is the Scottish river, the Clyde (q.v.). The only other requiring notice is the C. of N. Wales, which rises in the Bronbanog Hills, in the S.W. of Denbighshire, flows in a northerly direction past Ruthin, St. Asaph, and Rhyddlan, and falls into the Irish Sea between the shires of Denbigh and Flint, after a course of 30 miles.

Clyde, a river of Scotland, rises in an amphitheatre of the Lowther Hills, in the extreme S.E. angle of Lanarkshire, near the sources of the Tweed and the Annan. It has its origin in the Daer Water and several other mountain streams, of repute among anglers. After flowing N. for some 20 miles, and sweeping round the E. base of Tinto Hill, it has a sinuous course in a north-westerly direction through the picturesque Dale of C. or Clydesdale, till it expands into a broad estuary, and eventually into a firth of the same name. Its only considerable tributaries are the Douglas, Avon, Calder, and Leven, and the principal towns it passes are Glasgow, Lanark, Hamilton, Renfrew, Dumbarton, Helensburgh, Greenock, and Gourock. The Vale of C. is famous alike for its orchards, its coal and iron, and its horses. By far the most singular feature of the upper C. itself is its series of romantic falls near Lanark, where the bed of sandstone and shale has been ploughed into deep gorges and gloomy defiles, through which the river descends some 230 feet in less than 6 miles. The falls, which are beautifully flanked with savage cliffs and wooded slopes, are four in number—(1) Bonniton Linn, consisting of a single leap of 30 feet; (2) Corra Linn, the most magnificent of the four, having one cataract of 90 feet, and a total descent of 120; (3) Dundaff Linn, a miniature cascade of 10 feet; and (4) Stonebyres, forming three successive falls, like Corra Linn, of 70 feet. At Glasgow the C. becomes navigable for large vessels, and begins to assume the appearance of a great trading and shipbuilding river. Its estuary rapidly widens below Dumbarton, until between Greenock and Helensburgh it has a width of 4 miles; but the promontory of Roseneath here hinders its further extension, standing well out into the channel, and separating the Gare Loch from Loch Long, both arms of the estuary stretching in a northerly direction. After sending off Loch Long to the N. and Holy Loch to the W., the main stream turns abruptly S., opens into the Kyles of Bute, but continues along the coast of Renfrew and Ayr, until it merges in the Irish Channel at Ailsa Craig. Its length to Glasgow is 75 miles, and its further course is 48 to Cantire, where it is considered that the Firth of C. begins. The river has a basin of 1500 sq. miles. In 1859 a fort (Mathilda) was erected about a mile to the W. of Greenock for the defence of the C.

Clydesdale Horse, a breed which originally belonged to Lanarkshire and Ayrshire, but whose great strength, fine action, noble form, and substance have made it much appreciated in England, on the Continent, in America and Australia.

Clytæmnes'tra, according to Homer, a daughter of Tyndareus and Leda, and half-sister of Helen, became the wife of Agamemnon, to whom she bore Orestes, Iphigenia, and Electra. On Agamemnon's return from Troy she murdered him in the bath; a crime for which, seven years afterwards, her own son Orestes took her life.

Cnidos'colus, a genus of *Euphorbiaceæ*, consisting of shrubs or herbaceous plants belonging to Africa. *C. stimulans*—a native of the Southern States of America—on account of the lacerated segments of the leaves, which are covered with spreading hair, stinging the naked feet of the negroes, is well known as 'Tread Softly.' Its tuberous roots are eaten like those of cassava. *C. quinquelobus* stings even more terribly, and on this account is shunned as a cultivated plant. In some cases the persons so stung will fall down, and remain quite unconscious for some time. In every case an excruciating pain is experienced, which, according to Black, from whom we take this account, 'lasts for some days, and the parts swell, and sometimes continue swollen, accompanied by an itching sensation, for months.'

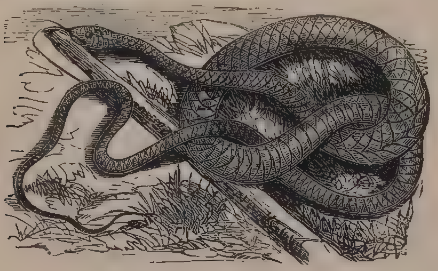
Cni'dus, or **Gni'dus,** anciently a city of Caria, Asia Minor, on the W. extremity of the peninsula of Triopion (now Cape Krio), which formed the S. side of the Ceramic Bay. A Lacedæmonian colony, and a member of the Dorian Hexapolis, it soon acquired wealth, and patronised art—one of its temples being adorned by the famous Venus of Praxiteles. The larger of its two ports was formed by transverse moles carried out into the sea, one of which is still almost entire. Eudoxus, the mathematician and friend of Plato, was a native of C.

Coach. The word is said by Taylor to be an English form of the Ger. *kutsche*, which itself comes from the Magyar *kotezy*, while that again has been formed from *Kottsee*, the name of a town in Hungary. The C. is a box-like carriage, with four wheels, mounted on springs or suspended on leathers. Carriages were employed by the ancients in travelling. The *carpentum* of the Romans was a richly decorated two-wheeled vehicle, covered with an awning, and chiefly used for the conveyance of Roman matrons in the days of the Republic, and during the Empire a four-wheeled carriage, called *carruca*, was invented; but there is no reason to suppose that either of these was suspended on leathers. Towards the end of the 13th c., the Queen of Charles of Anjou entered Naples in a *caretta*, a small highly adorned car; which, according to Beckman, is the first instance of the use of a C. in Europe. In the 16th c. coaches commonly appeared in European state ceremonies, particularly in Germany; and in 1588 they had become so general that the Duke of Brunswick forbade his vassels to use them, in so far as they discouraged the more manly and skilful exercise of horsemanship. The first coach made in England was built for the Earl of Rutland by Walter Quippen in 1555. In 1556 he built one for Queen Mary, and in 1564 a state-coach for Queen Elizabeth, which on account of its jolting she discarded for a Dutch coach imported for her in 1570. Within the next fifty years German coaches came into extensive use in England. Private coaches were not uncommon at the end of the 16th c., and at this period it appears that carriages were divided into two classes, coaches and *caroches*, the latter being larger and heavier, though considered more stately and more appropriate for court pageantry than the former, which were relegated to the country. Carriages were quite common throughout Europe generally in the two succeeding centuries. Hogarth has represented in his pictures the appearance of the sumptuously carved and gilt carriages of his time, and they certainly look ill-adapted for rapid motion, highly perched as the body is on slim supports between the two widely-separated pairs of wheels. An example of English coachmaking of the 17th c., still in a condition for use, exists in the 'Speaker's C.' It is made of elaborately carved oak with richly painted and gilt panels, and measures 14 feet from axle to axle, the total length being 19 feet. The royal state C. was constructed for the coronation of George III. in 1761. Its frame is composed of eight palm-trees whose branches support the roof, which is surmounted by a crown, borne by boys emblematical of the three kingdoms. Various figures support the body and the coachman's box, his footboard being a scallop-shell, and the whole structure is adorned with carved trophies, painted allegorical and mythological designs, &c. Its length is 24 feet, breadth 8½ feet, and height 12 feet.

Hackney Coaches first appeared in the streets of London in 1695. They do not derive their name from Hackney in London, as is commonly supposed, but from the French *haquenée*, a cob-horse, the vehicle to which the animal was harnessed being called *coche-à-haquenée*. The *hansom* was patented in 1834 by the inventor whose name was Hansom, but since then many improvements have been effected on the original design. About the same time a four-wheeled vehicle was introduced into London, and usurped the name *cab*, which previously belonged to the two-wheeled *cabriolet* imported from Paris about 1820. It is said that Lord Brougham was so fascinated with the general appearance of the 'cab,' that he ordered a better finished C. of the same shape, which has since borne his name, and become the national carriage of England. Carriage-building is carried to greater perfection in England than in any other country, and of the numerous varieties of pleasure carriages, the *brougham*, *landau*, and *barouche* need only be mentioned for their symmetry and elegant form, and combination of strength with lightness.

The chief kinds of wood employed in carriage-building are ash for framework of bodies, Honduras mahogany for panelling, and white pine for seat-boards and under-part of bodies; the wheel spokes are formed of sapling oak or hickory. Canadian black walnut wood has been found to be an excellent substitute for most of these woods. The painting of a carriage is a most tedious process, and the beautiful glossy colour is only acquired by a great number of successive coats of paint and varnish, each layer after drying being smoothed and polished before another is applied. See Thrupp's *History of Coaches*, and article CARRIAGE.

Coach-Whip Snake, so called on account of the whip-like appearance of its tail, the scales of which, both in arrangement and colour, very much resemble the thong of an ordinary whip. It occurs in Florida, S. Carolina, and Georgia, U.S. of America, and is said to be harmless to man, although when attacked it shows considerable courage and dexterity in defence. The head and body are long, narrow, and of black colour, while the tail is thin and of a tawny brown. The C.-W. S. measures from 5 to 7 feet in length, has great power of speed, and feeds on birds and the smaller vermin.



Coach-whip Snake.

Coadju'tor, a subordinate fellow-worker. In ecclesiastical law the word is specially applied to the assistant to a bishop.

Coagula'tion. There are many substances which exist in a soluble and insoluble condition. The act of passing from the soluble to the insoluble state is termed *C.* The spontaneous C. of the fibrine contained in blood—the clotting, as it is termed—the C. of albumen by heat, as in the case of the boiling of an egg, and of caseine by rennet in the manufacture of cheese, are familiar examples of this phenomenon.

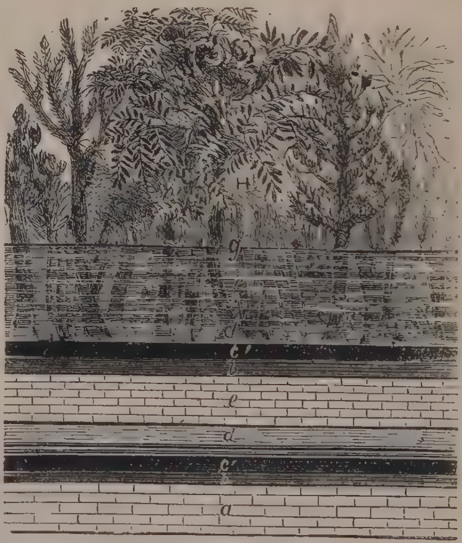
Coagulation of the Blood.—The change which occurs in blood usually after removing it from the body by which it separates into solid and fluid portions. See BLOOD.

Coa'ita, or **Qua'ta,** a species of Platyrhine, S. American monkeys, belonging to the genus *Ateles* (q.v.), or spider-monkeys. The C. measures about a foot long in the body, the tail itself, which is very elongated, measuring 2 feet. The face is dark coloured. This monkey is not to be confounded with the *Coaiti* (q.v.), or Coaiti-Moudi, a carnivorous mammal.

Coai'ti, a genus of Carnivorous mammalia, included in the Bear family, and belonging solely to the New World, being found in Surinam and Brazil. In this genus the molar teeth are small, and the canines compressed and sharp. The muzzle is very elongated, proboscis-like, and extremely mobile. The claws are long, and of curved, compressed shape, and the tail is also of considerable length. The red C., or C.-Moudi, has a fur of reddish-chestnut colour, the ears and legs being black, the tail banded with maroon colour, and the lower jaw white. It is fond of climbing trees. The brown C., or *Narica,* has a brown-coloured fur, which is sometimes mottled with black, and tinted with chestnut. The under parts are coloured grey. The fur is thick and coarse. The C. feed on both animal and vegetable matters, and although shy, may yet be domesticated with success.

Coaiti.

Coal (Old Eng. *col,* Dutch, *kool,* Fr. *koal,* Ger. *kohle,* a word found indeed in all the Teutonic languages, and having its congeners in Latin), is the name given to a substance which it is much easier to recognise than to define, and the question, What is C.? has at once baffled the law courts and scientific men to answer. Dr. Percy (*Fuel*) has thus attempted to distinguish it from all other bodies. 'C. is a solid, stratified, mineral, combustible substance, varying in colour from dark-brown to black, opaque, except in extremely thin slices, brittle, not fusible without decomposition, not sensibly soluble in ether, chloroform, benzole, or oil of turpentine, not containing sufficient earthy matter to render it incapable of being applied with advantage as a source of heat in ordinary fireplaces or in furnaces.' There is no doubt that C. is vegetable matter which has undergone great changes from the length of time it has been stored up within the earth, and the various influences to which it has there been subjected. A gradation in physical as well as chemical characteristics can be traced, leading from wood and peat at one extremity, up to anthracite, which is the ultimate



The Process of Coal Formation.

a, limestone; *b*, shale; *c' c'*, coal-beds formed; *d*, slate; *d''*, coal-bed in course of formation; *e*, sandstone; *f*, water; *g*, surface of water, and petroleum or hydrocarbon oils; *H*, foliage of coal plants rooted in *c'*.

product of these changes recognised as C. Liebig explains the chemical changes necessary to produce C. from wood or peat by the theory of the elimination of a compound of hydrogen and carbon as marsh gas, of carbon and oxygen as carbonic acid, and of hydrogen and oxygen in the form of water. As regards physical characteristics, certain varieties of peat are hard, black, and lustrous like C., and some lignites or brown coals retain so much woody appearance and structure that boxes have actually been made from them.

The varieties of C. are usually classified as—(1) Anthracite, (2) Bituminous C., and (3) Lignite or brown C.; but it is not possible to strictly limit any class, and each contains within itself many minor variations. Anthracite or stone-C. is usually of a brilliant black lustre; it has a conchoidal fracture, and it does not soil the fingers on handling. It is often called Blind C., on account of the difficulty with which it is ignited and burns. It includes such coals as contain the highest proportion of carbon, its range being from 90 to 95 per cent. Enormous deposits of anthracite exist in the eastern division of the great Pennsylvanian C.-field in the U.S. Bituminous C. includes the greater proportion of C. in common use, and nearly all the deposits in British C.-fields come under this head. It contains generally from about 73 to 90 per cent. of carbon, leaving out of account the ash or earthy matter always present in variable proportions. Several varieties of bituminous C. are distinguished according to their mode of burning, which depends chiefly on the relative proportions of carbon, oxygen, and hydrogen they contain. Steam-C. approaches anthracite in its properties; dry or non-caking C. does not possess the valuable property of agglutinating during burning which characterises caking or household C. and makes it so valuable for domestic use. Cannel or parrot C. differs considerably in appearance from ordinary bituminous C., being of a dull, lustreless, black colour, not splitting into thin layers, and generally devoid of vegetable structure under the microscope. Cannel-C. contains a comparatively large percentage of oxygen and hydrogen, and it is therefore of value for the manufacture of C.-gas or paraffin oil. It is only distinguished from the bituminous shales now extensively used for paraffin and gas by the much larger proportion of ash which the latter contain. Lignite or brown C. is a name generally restricted to such deposits as are of more recent origin than the carboniferous epoch to which the great C.-fields at present worked belong. Lignites vary in colour from a light earthy brown to a deep lustrous black, which last is undistinguishable from ordinary bituminous C., and they contain from 50 to 70 per cent. of carbon, leaving out of account the ash they contain. They also usually have a large percentage of water. Deposits of lignite of great industrial value occur in Germany, and some of them yield on distillation a very large proportion of paraffin. Taking 100 parts of carbon as a standard of comparison, the following may be regarded as showing the average composition of these leading varieties of C.:—

	Carbon.	Hydrogen.	Oxygen.
Anthracite .	100	2·84	1·74
Bituminous C. .	100	6·21	21·23
Lignite . .	100	8·37	42·42

Although the greater proportion of the C. in Europe and America belongs to the deposits of what is known as the carboniferous epoch, it must not be concluded that C. is on that account a product peculiar to that period. In Great Britain workable seams of C. are found in oolitic deposits at Brora in Sutherlandshire, and C. of a similar age is also found in Yorkshire, while at Bovey Tracey, in Devonshire, a lignite has been worked which belongs to a period so comparatively recent as the Miocene age. The brown C. deposits of N. Germany are not older than the Wealden of England, and the enormous C.-fields of India and China are supposed to have been formed during the Permian epoch.

C.-fields are very widely and generally distributed throughout the world, and the total quantity of C. known to exist within available depths is at present great beyond compute. The output of coal in several countries is given in the subjoined table, according to the latest returns. Some coal-producing countries, such as China, &c., are not included, as either the statistics given are not reliable or no statistics are forthcoming at all.

Year.	Country.	Output in Tons.	Value in £.
1893	Austria-Hungary .	21,610,233	6,759,882
"	Belgium . .	19,411,000	7,256,240
"	Canada . .	3,719,170	1,728,317
1891	France . . .	30,050,000	15,212,000
1893	Germany . .	95,476,200	—
"	Great Britain .	164,325,795	55,809,808
1892	India . . .	2,537,696	55,711
1893	Italy . . .	317,249	81,883
1891	Japan . . .	2,572,133	—
1893	New South Wales	3,278,328	1,171,722
"	New Zealand .	691,548	383,905
"	Queensland . .	264,403	125,340
"	Russia . . .	7,418,000	—
1892	Sweden . . .	199,380	—
"	United States .	160,088,295	42,608,881

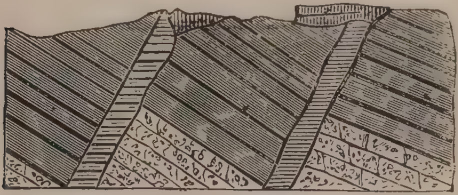
The extraordinary rapidity with which the annual output of C. from British mines has increased in recent times, led some years ago to a species of panic regarding the possible early exhaustion of our mineral wealth, and in consequence a Royal Commission was appointed to 'inquire into the several matters relating to C. in the United Kingdom.' As a result of the labours of that commission, we have the most accurate and reliable statistics attainable regarding the limits of the various British fields, their available contents, and the rate at which they are being worked out. We may perceive from the following statistics how the demand upon our C.-fields has increased, it being estimated that the consumption, at the beginning of the century, was about 10,000,000 tons:—

1855, 64,453,070 | 1865, 98,150,587 | 1873, 127,016,747
1893, 164,325,795

The whole available C. in ascertained C.-fields, according to the report of the commissioners in 1871, including only such as exists within 4000 feet of the surface, and seams of not less than one foot in thickness, amounted to 90,207 millions of tons. To this amount they added as existing under Permian and recent rocks, but still within the 4000 feet limit, 56,273 millions of tons as the probable contents of fields yet unexplored, making an aggregate attainable amount of C. of 146,480 millions of tons. Lying at a depth ranging from 4000 to 10,000 feet, in all the fields included in the above estimate, it is calculated there is an additional quantity of more than 48,465 millions of tons. But as the internal temperature of the earth increases at the rate of 1° Fahr. for

Coal Plants.

each 60 feet downwards from the surface, and as there is good reason to believe that it rises in much more rapid proportion as we penetrate inwards, it is not supposed to be possible, under any conditions at present known, to work at a depth of more than 4000 feet, while at the depth of 10,000 feet the heat must be much greater than that of boiling water, and the shaft of the pit reaching to that depth would be nearly 2 miles long. The total available deposit of workable C. is, after deductions, for the present 143,392 millions of tons, and of that amount Scotland possesses 9400 millions of tons, of which 1800 millions lie under the Firth of Forth. Ireland possesses only the insignificant total of 130 millions of tons, not as much as the output of the United Kingdom for one year. In judging of the possible exhaustion of British C.-fields, three methods of viewing the subject may be adopted. Judged by the annual output at which we have now arrived, it is easy to say we have C. which will furnish our present rate of supply for about eight hundred and seventy years. Taking the alarmist view of the rapid development of C.-mining during the past quarter of a century, and supposing the demand to continue progressive in the same ratio, we must, according to Price Williams and others, exhaust our C.-fields in 360 years. Neither of these views take into account the conditions under which the demand for C. has increased so rapidly, nor the probable future of the industry. 'On the one hand,' say the commissioners, 'the rate of consumption may be thrown back to any extent by adverse causes affecting our national prosperity, and on the other hand, new discoveries and developments in new directions may arise to produce a contrary effect upon the consumption of C.' They also point out that long before the period of total exhaustion a time of scarcity and dearness would be first reached; that naturally the best and most accessible seams are first exhausted, leaving only such as are more difficult to win, and of less value. Gradually thus we would lose the easy industrial supremacy we now possess through C., and instead of exporting, as we do at present, it would become cheaper to import C. from America or other fields than to work out the remnants of our own. Other considerations might be adduced pointing towards the improbability of the consumption of British C. continuing to increase at the rate of recent experience. Continental, Eastern, Australasian, and American fields are being rapidly opened up, and worked more in proportion to their size than hitherto; improved scientific processes and machinery are yearly extracting much larger proportions of calorific effect from C. than heretofore, and there is much less waste in the mining processes. The introduction of improved processes in metallurgy, such as the hot blast and the Bessemer process, has already been the means of effecting enormous economies, and in almost all directions involving the burning of C., great room for other like improvements yet exists.


Trap Dikes. English Coal Fields.

The industrial applications of C. do not end with its great value as a calorific agent. Distilled at a low temperature, it yields paraffin and paraffin oils used for illuminating and lubricating, and by applying a higher temperature, C.-gas is produced. The residual gas-tar and liquor of these processes are also of great value, being the sources of ammoniacal salts in the case of the liquor, while the tar yields aniline, whence the C.-tar dyes are produced, the disinfectant carbolic acid, pitch for artificial asphalt and other useful products.

For mining of C. and the regulations of C.-mines, &c., see under MINING.

Coal'brook Dale, a valley and hamlet in Shropshire, on the Severn, which is here crossed by a cast-iron bridge of more than 100 feet span, and 40 feet high. The dale has a valuable coal-field, the group of strata enclosing the beds having a thickness of from 700 to 800 feet, and also extensive ironworks. The inhabitants are mainly employed in the foundries and collieries. Pop. ecc. par. 1502.

Coal'fish, a Teleostean fish included in the Cod family, the fry or young of which are known as *Podleys*, whilst the adult form is also known by the name of *Saithe.* The length varies from 10 inches to 1 or 1½ feet; the upper parts are of a deep bluish-black colour; in shape and form it resembles the Whiting (q.v.) very closely. The flesh is coarse, but is eaten salted in the northern parts and islands of Scotland. The C. occurs also on the American coasts and in the N. seas. It is voracious in habits, following many kinds of bait.

Coalition is a term applied in English politics to the union of two parties or portions of parties for the attainment of a common end. A notable C. in British history is that of 1782, when Lord North and Charles James Fox, the leaders of opposing parties, took office in the same cabinet. More recently (1853) the C. of the Whigs and Peelites in the Aberdeen cabinet is memorable in connection with the Crimean war. The C. of the Conservatives and Liberal Unionists in 1895 took place in opposition to the policy of the Separatist Liberals under Lord Rosebery and Sir W. V. Harcourt, who advocated the construction of an Irish Parliament at Dublin whose business should be to legislate for Ireland in matters, purely Irish and not Imperial, while the Irish representation should still be continued in the Imperial Parliament. This question had remained entirely outside the range of practical politics until Mr. Gladstone in 1886 adopted that Home Rule scheme which was understood to meet with the approval of the Irish National party.

Coal-Mines, Law as to. A coal-mine is legally part of the lands within which it is situated, but it may form a separate estate. A proprietor may sell the surface of the land, reserving the coal and other minerals, or he may sell the latter and reserve the former.

Coal-Mines Regulation Act, 50 and 51 Vict. c. 58, which re-enacted and amended the Act of 1872, was passed to carry out proper regulation and inspection of mines.

Under the Act, no boy or girl under twelve years old can be employed under, or above, ground, and no woman or girl of any age, is to be employed in any mine to which the Act applies below ground. Boys of 12 and upwards may not work below ground more than 54 hours per week. A register must be kept of the boys, girls, and women employed. Wages are not to be paid at public-houses. Single shafts are prohibited. A daily inspection by a competent person of every mine is directed, and a great number of regulations are made with the view of promoting healthfulness and safety in the coal-mines. Mines of shale, fire-clay, and stratified ironstone also come under this Act.

Coam'ings of ships are frames of wood or iron placed round hatchways and other openings in the deck to keep out water.

Coan'za, Cuan'za, or **Quan'za,** after the Congo (q.v.) the most important river of Lower Guinea, Africa, rises in the plateau of the interior, and, after a course of 600 miles marked by numerous cataracts, enters the sea 38 miles S. of San Paulo de Loando. It forms several islands near its mouth, has numerous tributaries, and is navigable for large boats as far up as the lowest cataract, about 110 miles.

Coast-Guard, a body of seamen formerly employed by customs department exclusively to keep a look-out for smugglers, but since 1856 under the control of the Admiralty, and liable to be called to serve as regular sailors on board ships of war. The force may be augmented to the number of 10,000 at the utmost, but the number for 1894-5 was 4200.

The coasts of the United Kingdom are divided into eleven districts: Hull, Harwich, Newhaven (East and West), Weymouth (East and West), Holyhead, Leith and Clyde, Limerick, and Kingston (2), at each of which there is a district gunship stationed, while there are also 9 steam cruisers and 16 sailing cruisers attached to nine of the districts. Able-bodied seamen employed in the service are divided into three classes—boatmen, commissioned boatmen, and chief-boatmen; they receive high sea-pay, free house rent, and medical attendance, and 1s. 4d. a day besides in place of provisions. They are drilled in the serving of land-batteries, gunboat exercise, and naval gunnery. The pay of the C.-G. is estimated, for 1894-5, at £208,941, and contingencies at £54,623, showing an increase of £290.

Coast Volunteers, or **Royal Naval Artillery Volunteers,** an attempt, which has not been very successful, to organise seafaring men and others, in connection with the Coast-Guard (q.v.), but separate from it, specially for the defence of the coasts of the United Kingdom. On 5th August, 1873, an Act of Parliament was passed authorising the formation of a Royal Naval Volunteer Force, and the regiment of Royal Naval Artillery Volunteers was duly formed, and 126 officers were appointed to command the men. The regiment was, however, disbanded on 1st April, 1892.

Coast'ing Trade is the maritime commerce between ports of the same country. Formerly, by statute 12 and 13 Vict. c. 29, entitled 'an Act to amend the laws in force for the encouragement of *British* shipping and navigation,' no goods or passengers could be lawfully carried coastwise from one part of the United Kingdom or Channel Islands to another except in British ships. The same restriction existed in reference to the coasting trade in any of our possessions in Asia, Africa, or America. But by statute 17 and 18 Vict. c. 5, the restrictions were repealed and *Foreign ships* in the coasting trade were placed on the same footing as *British* ships and made subject to the same regulations. The Queen was also granted retaliatory powers, as in the statute of the preceding year (c. 107). Statute 18 and 19 Vict. c. 96 specially directed that *Foreign* ships engaged in the coasting trade around the United Kingdom and the Channel Islands should be subject to the same regulations as to stores for the use of the crew and in all other respects as British ships.

Coatbridge', a town in the parish of Old Monkland, Lanarkshire, 8 miles E. of Glasgow. It stands in the centre of a district rich in minerals, and is near the great ironworks of Gartsherrie, Summerlee, Dundyvan, Calder, and Langloan. In the immediate neighbourhood are upwards of fifty smelting furnaces. C. is one of the most thriving towns in Scotland, the population having increased from 1599 in 1841, to 13,624 in 1871. The pop. of mun. bor. is now 16,328.

Coat of Arms, a garment worn in the knightly exercises and actual battles of the Middle Ages, embroidered with the armorial insignia of the wearer. It was made of velvet, fur, cloth of silver or of gold, and descended to the knee. The phrase is applied in modern heraldry to the insignia alone, on whatever field they are emblazoned. See HERALDRY, SHIELD.

Coat of Mail, a suit of armour made of plates or scales of metal, or of linked rings, which was worn in the Middle Ages.

Co'balt is a steel-grey metal, occurring in small quantities in the free state in Meteoric Iron (q.v.), in combination with arsenic as *tin-white C.*, with arsenic and sulphur as *C. glance*, and with arsenic and oxygen as *C. bloom;* it is also present in many copper ores. Before the discovery by Scheurer, in 1540, of the beautiful blue colour which oxide of C. imparts to glass when fused with it, compounds of the metal possessed no value, and their presence in the mines was attributed by the superstitious German miners to a malevolent demon, or *kobold*, who was supposed to have placed them there instead of the useful ores which they resemble in appearance; it is from this curious superstition that C. derives its name. Metallic C. was isolated by Brand in 1773. It may be obtained by strongly igniting oxalate of C. It is hard, very infusible, and magnetic, and in its chemical properties and compounds resembles iron. Its atomic weight is 59, and the symbol for its atom Co. Chloride of C. is a red salt, obtained by dissolving oxide of C. in hydrochloric acid; its solution is employed as a *Sympathetic Ink* (q.v.); nitrate of C. is prepared in a similar manner. C. has two oxides, the protoxide and the sesqui-oxide; the latter is used for staining glass and porcelain, and is obtained as a black powder by precipitating chloride of C. by a solution of bleaching powder. When C. ores, which have been previously roasted, are fused with sand and pearl ash, the oxide of C. produced by roasting the ore dissolves in the glass formed by the pearl ash and sand, with a magnificent blue colour, whilst nickel, copper, iron, &c., also present in the ore, collect at the bottom of the vessel in which the fusion has been made in a metallic mass called *speiss*. The blue glass when finely levigated forms *smalt* or *C. ultramarine*, whilst from the speiss, nickel is extracted. *Zaffre* is an impure oxide of C., obtained by roasting C. ores with sand. *Thenard's blue* is prepared by igniting a mixture of freshly-precipitated alumina and carbonate of C., or of the phosphate of alumina and C. *Rinman's green* is obtained by evaporating a mixed solution of nitrate of C. and nitrate of zinc to dryness, and calcining the residue.

Coban', a town of Guatemala, Central America, on the Rio Dolce, 55 miles N. of Guatemala. It lies in a region rich in sugar-cane plantations and in tropical fruits. Pop. 27,820.

Cobbett, William, an English political writer, born 9th March, 1762, at Farnham, in Surrey, was bred to work on his father's farm. In 1783 he enlisted in the 54th Foot and went to Nova Scotia; while there he taught himself constantly, and rose to the rank of sergeant-major. Discharged in 1791, C., after spending a few months in Paris, settled in Philadelphia as bookseller and pamphleteer. He wrote in the bitterest manner against freethought, free institutions, &c., and was twice fined for libel. His *nom de plume* was Peter Porcupine: latterly his publication became periodical, and was called the *Political Censor*. Returning to London in 1800, where he was received with considerable attention by public men of Pitt's party, he started first a daily paper called the *Porcupine*, and then the *Weekly Register*. His influence may be inferred from the fact that Windham stated in the House of Commons that C. deserved a statue of gold. By his discussion of the treaty of Amiens he contributed to the rupture with France. In 1803 he suddenly went over to the Radical side of politics, either because he was slighted by Pitt or from conviction. This led to more than one Tory prosecution followed by fine and imprisonment. In 1817 his *Twopenny Tract* alarmed the Government into passing the 'Six Acts,' and C. retired for two years to America, where he studied agriculture, and drew certain conclusions on 'cottage and farm economy,' which, on his return to England, he tried unsuccessfully to realise on two farms. In 1825 appeared his *History of the Reformation in England and Ireland*, which, with his *Legacy to Parsons*, expresses his opinion that the transactions in Church property at the Reformation were fraudulent, and that the original Catholic endowments should be restored to educational and charitable objects. C. was now a popular leader on social and economic, as well as political, questions, as may be seen in his *Advice to Young Men and Women, Poor Man's Friend, Rural Rides, Emigrant's Guide*. As the Reform Bill drew near, the political interest became predominant. C. was once more prosecuted for some intemperate language, in which, in the *Register*, he had defended the burning of threshing-machines by the distressed labourers (Luddites) as leading to the reduction of tithes. Returned to the House of Commons for Oldham in 1832, he sat there for three years. He died at his farm of Ash, near Farnham, 18th June, 1835. The rugged independence and energy of C.'s character was somewhat marred by an inordinate vanity, which led him to regard himself as one of the leading men in Europe of his time, and by the superficial knowledge of social and political institutions, which is so often the bane of self-educated men. He is acknowledged to be a master of plain, forcible prose; and the warmth of his public and private affections and his substantial honesty have not been seriously questioned. C. is seen at his worst in his conceited *History of George IV.* See an admirable essay by Professor Thorold Rogers. His son, **John Morgan C.,** published a complete collection of his *Political Works.*

Cobden, Richard, an English politician, born at Dunford, near Midhurst, 3rd June, 1804, was the son of a small gentleman farmer. In 1838 he abandoned his career as a calico-printer in Manchester (which had been rapidly successful) that he might devote himself and his fortune to the Anti-Corn Law agitation. He seconded J. B. Smith's celebrated motion before the Manchester Chamber of Commerce, and for nearly six years attended the Inner Council of the League, which met twice a day at Newall's Buildings, Market Street, Manchester. It was C. who gained over many of the Chartists and the clergy, and who founded the Anti-Corn-Law Conference, which sat in the Palace Yard to watch the Free-trade motions in Parliament. At Drury Lane and Covent Garden, and at the great centres of Protectionism through the country, C. and Bright, during the memorable year of 1843, seemed to carry everything before them, until the *Times* itself declared (18th November) that the 'League was a great fact.' In the meantime C. had been, in August, 1841, returned to Parliament for Stockport, and took part in the debates on Villiers' annual motion, 'that all duties payable on the importation of corn, grain, meal, and flour do now cease.' In 1844 he brought his motion for a select committee to inquire into the effects of protective duties on imports in the interest of the tenant farmers and farm labourers of the country. He was replied to by Gladstone. After the triumph of his principles in 1846 (a triumph which Sir R. Peel stated in Parliament to be mainly due to C.'s efforts), he was returned unopposed for the W. Riding of York, which he represented till 1857, when he was rejected by his constituency for having offered what was considered at the time a factious opposition to Lord Palmerston. In 1859 C. was chosen by Rochdale. In 1860 he carried through the Commercial Treaty with France, was offered a baronetcy and a seat in the Privy Council, but declined these honours; soon after fell into bad health, and withdrew from political life. He died 2nd April, 1865. C. was an ardent advocate of free trade in land, viz., the abolition of primogeniture, strict settlements, &c.; of financial reform, in which he included the substitution of direct for indirect taxation, and the consequent throwing open of all ports; of reduction in the votes for the services, as involved in his principle of non-intervention; of national, in the sense of undenominational, education. He spoke against the confiscation of the unarmed vessels belonging to subjects of a hostile belligerent, and against the practice of public loans being negotiated without inquiry for purposes of tyranny and oppression. Although there was no rhetorical art or epigram in C.'s speeches, they were marked by unaffected grace and simplicity, by keen logic, and by an abundance of well-chosen and accurately stated facts. His *Political Writings* were published in 2 vols.

Cobi'ja, or **Puerta la Mar,** the only seaport of Bolivia, and capital of the province of Atacama, 300 miles N. of Copiapo, has an insignificant trade. Pop. 2590.

Cob'le, or **Cobb'le,** a low, flat boat, with the stern square. It is much used by salmon-fishers.

Coblenz, or **Koblenz'** (the Roman *Confluentes*), the capital of Rheinland, Prussia, situated on the Rhine, at its confluence with the Moselle, is a fortified city of the first rank. It is connected, for purposes of defence, with the strongly fortified castle of Ehrenbreitstein (q.v.), on the opposite bank of the Rhine. The old town is irregularly built, with many of its streets narrow and ill-kept, but the new town is well built, and its streets airy and clean. The Church of St. Castor, founded early in the 9th c., stands on a tongue of land jutting out between the Rhine and the Moselle; other public buildings are the Government-house, the town-hall, the king's palace, and the old castle of the Electors of Treves. There are manufactures of linen, cotton, furniture, and japanware. Vine culture engages the industry of many of the inhabitants. C. is a free port, and carries on an extensive commerce, especially in corn, wine, and iron; it has also a trade in volcanic products for millstones and mineral waters. Pop. 36,250

Cob-Nut, a large cultivated variety of the Hazel (q.v.). The Jamaica C., or Hog-nut, is a tree of the natural order *Euphorbiaceæ.* Its white juice, which turns black in drying, is used in Guiana and other countries as ink. The nut is wholesome if the embryo is extracted; otherwise it is cathartic.

Cob'ra, a genus of Colubrine snakes belonging to the section *Venenosa*, and included in the family *Elapidæ.* The distinguishing features of the whole genus are the possession of one or two smooth teeth behind the poison fangs, and the power of distending the loose skin at the sides of the neck, so as to form a kind of movable hood. The Portuguese name of the C. (*C. da capello*) means 'hooded snake.' This snake is one of the most deadly and venomous of known serpents. It inhabits India, and receives the name of 'spectacle snake' from the spectacle-like mark which exists on the back of the neck—a mark wanting in the nearly-allied *Naja Haje* of Egypt. The C. attains a length of 3 or 4 feet, and is coloured of a pale brown on the upper parts, and a lighter tint below; whilst the colour is variously marked with black, and exhibits variations. Specimens destitute of the spectacle-mark come from the E. Indies. The poison proves fatal to man within a comparatively short period.

Cobra di Capello.

Co'burg, or **Koburg,** capital of the Duchy of Saxe-Coburg, Germany, and alternating with Gotha as the residence of the Grand Duke of Saxe-Coburg-Gotha, is situated on the left bank of the Itz. The town is mostly old, and not well-built. Of its churches, the most notable is the *Moritzkirche*, with a tower nearly 340 feet high. The old castle of the Dukes of C., in which Luther was concealed in 1530, stands on a height 500 feet above the town. The ducal palace was erected in 1549, and is the principal building. There is a library containing 13,000 volumes. C. has manufactures of cotton, linen, and woollen fabrics, artistic work in marquetry, gold, and silver, also bleaching and dye works, breweries, &c. Pop. 18,600. Near C. are the 'pleasure-castles' of Rosenau and Kallenberg.

Coburg Peninsula, in the N. of Australia, forms the N.W. extremity of Arnhem Land, to the W. of the Gulf of Carpentaria, and partly encloses Van Diemen Gulf. It is an irregular promontory, about 50 miles from E. to W., but slightly connected with the mainland, and separated from Melville Island by the narrow channel of the Dundas Strait.

Co'ca, or **Cu'ca,** a shrub of the natural order *Erythroxylaceæ*, the leaves of which are extensively chewed by miners and travellers in Peru, mixed with a little unslaked lime or the ashes of the Quinoa (q.v.) or of the trumpet-tree. They have an effect on the constitution analogous to that of wine, enabling those using them to bear up under great fatigue and hunger. Respiration, so difficult at high altitudes, no longer becomes a labour; the desire for sleep departs, and the spirits attain buoyancy unknown before. Taken habitually and in large quantities, C. occasions various stomachic disorders, and eventually ruins mind and body. Used to a great extent with tobacco, it produces a sort of intoxication. Such, at least, is the account given by the native Indians who have long been acquainted with its use, and by Spruce, Tschudi, Scherzer, and other travellers. Weddell does not, however, think so highly of it, affirming that it does not supply the place of food, but merely deadens the sense of hunger for a time. Its use is now rapidly spreading, not only among the Indians, but among the Europeans and other settlers in Peru. Some years ago it was calculated that 30,000,000 lbs. were annually gathered, and that the use of the drug was indulged in by 10,000,000 people. In Bolivia alone about 15,000,000 lbs. are produced annually. It is probable that C. owes its peculiar properties to an organic base, to which Weddell has applied the name of *cocaine*, which in many of its properties resembles *theine*. A tonic wine has been made from it, and this, as well as the leaves, may probably yet be used as a medicinal agent.

Coca.

Cocce'ji, Heinrich, Freiherr von, a very able and learned jurist, was born at Bremen, 25th March, 1644, went to Leyden to study law in 1667, and to England in 1670. Having acquired a profound acquaintance with the subject in all its branches, he was appointed Professor of the Law of Nations at Heidelberg in 1672, of Jurisprudence at Utrecht in 1688, and regular Professor of Law at Frankfurt on the Oder in 1690. C. was sent on a mission to the Hague by Friedrich I. in 1712, and after his return was created a baron of the empire and a privy councillor. He died 18th August, 1719. His chief work is his *Juris Publici Prudentia* (Frankf. 1695), which was long used as a text-book in German universities. Other productions of C. are *Anatomia Juris Gentium* (Frankf. 1718), and *Grotius illustratus* (3 vols. Bresl. 1744-48).—His son **Samuel,** born 1679, succeeded him as professor (1703), but devoting himself to a public career, rose to the highest legal position, dying (22nd October, 1755) High Chancellor of the Prussian state. He was the great reformer of the administration of justice in Prussia. His great professional work is the *Corpus Juris Fridericianum* (Berl. 1749-52).

Cocce'jus, Johann, whose original name was Koch, born at Bremen, 9th August, 1603, was first appointed Professor of Hebrew at Bremen (1629), then at Franeker (1636), afterwards Professor of Theology in the same place (1643), and finally Professor of Theology at Leyden (1650), where he died, 5th November, 1669. He established a peculiar theological system called the *federal* method, founded on the idea of a covenant between God and man, which again was twofold—the covenant before the fall (of works), and the covenant after the fall (of grace); the latter embracing a threefold economy—prior to the law, under the law, and of the gospel; and also a school of biblical interpretation, according to which the Old Testament history exhibited, as in a mirror, the history of Christ and of the Christian Church, and which carried on a great controversy in the Netherlands during the 17th c. with the opposite school of Grotius (q.v.). See Conybeare's *Bampton Lectures* (1824).

Coccin'ia, a climbing cucurbitaceous shrub, common in the hedges in India, the ripe fruits of which are used by the natives in their curries, and the leaves and other portions are also used medicinally.

Cocc'o, Co'coa Root, or **Eddoes,** a name applied to various species of *Colocasia* and *Caladium*, tropical and subtropical, closely allied genera of plants belonging to the natural order *Araceæ*, the underground root, or Corms (q.v.), of which are used as food, *e.g. C. antiquorum*, *C. esculenta*, *C. macrorhiza* (the Taro of the South Sea Islands—q.v.), *C. Himalensis*—the root of which, in addition to its nutritive properties, is, when fresh, stimulant, diaphoretic, and expectorant. The leaves of *C. antiquorum* when raw are acrid, but by boiling they lose their acridity, and are eaten as a substitute for spinach. The corms of *C. esculenta* are sometimes called Yams (q.v.) in the W. Indies, Madeira, &c. Lecoq has described curious spasmodic movements in its leaves, occurring spontaneously, at irregular intervals, and at different periods of the day and night. The quivering was sometimes of sufficient force to ring little bells attached to the leaves. Lecoq states that *C. esculenta* is quite destitute of Stomata (q.v.), and he attributes the phenomenon to the incessant pulsation of the imprisoned sap.

Coccosteus (Gr. 'berry-boned'), a genus of extinct *Ganoid* fishes, included in the sub-order *Ostracostei*, and having the head defended by a large ganoid shield, the plates of which were covered with small tubercles; the presence of these latter giving origin to the name 'berry-bone.' A ventral or sternal shield also existed, but this latter had probably no connection with the upper one. A lower jaw or mandible existed, and this carried teeth of small size. The Notochord (q.v.) was persistent, but the neural spines of the vertebræ, their hæmal spines, and the fin-rays were ossified. This genus of fishes is exclusively confined in Britain to the Devonian rocks. Barrande has, however, described one from the Silurian rocks of Bohemia.

Cocc'ulus, a genus of plants of the natural order *Menispermaceæ*. A decoction of the roots of *C. villosus*, an Indian species, is used in cases of rheumatism, &c., and the fruits supply a kind of vegetable ink.

Cocculus.

Cocculus Indicus, the fruit of the Anamirta Cocculus, a plant belonging to the natural order *Menispermaceæ*, a native of the E. Indies. The pericarp contains an alkaloid (*Menispermint*) which is not poisonous. The seeds are very poisonous, of the size of a large pea, and are very bitter. They owe their bitter and poisonous properties to Picrotoxin, a white, intensely bitter substance, crystallising in needles. C. I. has been used to give bitterness to beer, porter, and ale, but it is forbidden by law under very heavy penalties. It is sometimes used to destroy lice. In some countries it is employed to stupify fish, so as to render them easily caught.

Cocc'us, a genus of *Hemipterous* insects, belonging to the sub-order Hemoptera, and forming the type of a tribe named *Coccina*. From members of this genus the Cochineal (q.v.) and Kermes dyes are obtained. Many species infest our hot-houses under the general name of bugs, and do harm to our plants; but it is to the tropical members of the group that we owe our dyes and other commercial products—such as lac, wax, &c. They are all minute insects, the males being two-winged, and the females wingless, but possessing a rostrum or beaked process. The females infest plants, and suck nutriment from them by means of the rostrum. The abdomens of the males are usually provided with two elongated filaments. The *C. aceris* is a well-known British species. *C. cacti*, living in the Nopal or *Cactus opuntia* of Central America, furnishes Mexican cochineal. *C. lacca*, of the E. Indies, gives us lac. The females alone appear to yield the colouring matter. See COCHINEAL INSECT.

Coc'cyx is the the inferior or posterior terminal portion of the vertebral column. In man it consists commonly of four rudimentary vertebræ, sometimes of five, rarely of three. These unite together, and in advanced life the C. unites with the sacrum. See SKELETON and VERTEBRAL COLUMN.

Cochabam'ba, the second largest city of Bolivia, and capital of a department of the same name, on the Rio de la Rocha, is the see of a bishop, and has fifteen churches, manufactures of cottons, woollens, leather, saddles, starch, soap, &c., and an active trade in grain and fruits. Pop. 26,300. C. was founded in 1572, and played a conspicuous part in the Revolution of 1815.—The *department of C.* is rich in precious metals, and grows cotton, sugar, dyewoods, &c. Area 21,417 sq. miles; pop. 361,390.

Cochin (*Kochi-bandar*, 'small port,' or *Kochi*, 'a morass'), a native feudatory State in S. India, called after its former capital, which is now included within the Madras District of Malabar: area, 1362 sq. miles; pop. 722,906, of whom 501,544 are Hindus, 43,389 are Mohammedans, 173,831 are Christians, and 1142 are Jews. It lies between the Western Ghâts and the Arabian Sea, consisting for the most part of a strip of lowland, deeply intersected by a chain of lagoons. The staple crop is rice, and the soil is so fertile that three harvests are often taken off the same field. Oilseeds, cotton, indigo, sugarcane, tobacco, and ginger are also grown. The bordering hills of the Nelleampatti range yield coffee, cardamoms, and pepper. The coconut palm flourishes everywhere along the coast-line. Its many products—coir, oil, coprah, and nuts—supply the chief exports. Timber, such as teak, blackwood, and poon, is one of the most valuable products; the quality of the teak wood being excellent for shipbuilding purposes. The chief industries are salt evaporation, carving of ivory and sandalwood, and ornamental metal works. The majority of the Christians, who are mostly engaged in boating and fishing, belong to the Roman branch of the Syrian Church, established here in 1659; but there are also several congregations of Jacobite and Nestorian Christians of unknown antiquity. The Jews live in a suburb of C. town and are divided into two separate communities—the *white* Jews, as fair as Europeans; the *black* Jews, who are as dark as the native Hindus. They have a tradition that they are descended from certain fugitives from Jerusalem, when the city was destroyed by the Romans. They are unable to account for the difference of the colour of their skins, but it seems impossible to attribute it to intermixture of race, as the Jews are proverbially strict on that point. The capital is Ernakollam (pop. 7283), but the residence of the Rajah is at Tripunthora. The Portuguese first landed at the town of C. under Admiral Cabral, and here Vasco da Gama died in 1524. In 1662 the Portuguese were driven out by the Dutch, who, 100 years later, lost it to Travancore, from whose power it passed to Haidar Ali. In 1799 the British conquered Mysore and regularly took over C. The first treaty with the native Rajah dates from 1798. The *town* of C., situated on the left bank of the principal navigable backwater, has a population of 17,601, of whom 4716 are Hindus, 3090 are Mohammedans, 9768 are Christians, and 27 are Jews. It is a most interesting place, with colonies of many distinct creeds and races. Inscriptions prove that both Syrian Christians and Jews were settled here in the 8th century. The spacious, unadorned Church of St. Francis, with monuments dated 1546, is supposed to be the oldest European church in India. The Portuguese fort has entirely disappeared, but there are many quaint buildings of the Dutch period. The exports are chiefly coconut products, timber, coffee, pepper, and tobacco. A very large percentage of the Cochinese suffer from *Cochin leg*, already referred to in a previous article. See BARBADOS LEG.

Co'chin-Chi'na, the **Anamese' Empire,** occupies a long and narrow strip of territory on the E. coast of the Indo-Chinese Peninsula, and consists of the inland province of Anam, and the maritime provinces of Tonquin in the N. and C.-C. in the S. It is bounded on the N. by China, on the E. and S. by the Gulf of Tonquin, the China Sea, and Lower or French C.-C., and on the W. by Siam. Area, 27,020 sq. miles; pop. estimated at 4,600,000. A mountain range runs N. and S., separating the inland from the two maritime provinces. Spurs from this central chain occupy much of the area of Anam and C.-C., and numerous streams descending from it flow E. through the latter into the China Sea. Anam is watered by the Mekong. The province of Tonquin is flat, and is watered by the great and valuable river Song-koi, which, rising among the mountains of Yunnan, passes through rich alluvial plains in its lower course, and falls into the Gulf of Tonquin. The inhabitants are Mongols, Chinese, and Malays, engaged chiefly in the cultivation of rice, which is the principal article of food, and in working the tin and other valuable mines. The religion is Buddhism, the form of government is modelled upon that of China, and the capital is Hué, on a river of the same name in the province of C.-C.

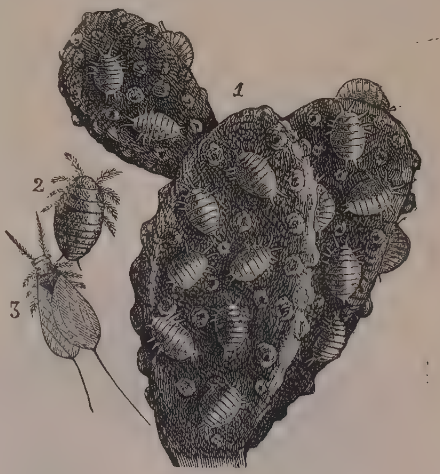
History.—The early history of Anam, by which name the empire is always spoken of by the natives, has been said to be 'either a wild fable or a revolting recital of internal war, anarchy, and bloodshed.' Little is known about it with certainty until 1624, when the Christian religion was introduced into the country by Portuguese Jesuits from Macao. In 1778 Warren Hastings, Governor-General of India, despatched a mission to Anam with the view of establishing commercial relations with the empire. A frightful civil war was then raging throughout the country. The envoy was inhospitably received, and was at last counselled to take refuge on his ship in the harbour of Hué, whence with difficulty he escaped with his life. A few years afterwards the French attempted with greater success to establish relations with Anam. A Franciscan friar, usually designated Bishop of Adrian, but whose real name was Pigneaux de Behaine, and who was of French birth, while prosecuting a Christian mission in the country, became intimate with the reigning sovereign, had an opportunity of affording him signal services which led to the extension of his sovereignty in Tonquin and Cambodja, and thus obtained an ascendency over his mind. The result was the ratification of an offensive and defensive alliance between the Anamese sovereign and Louis XVI. of France in 1787, or immediately thereafter. This treaty, however, led to no results till 1884, when the whole of Cochin-China, including Tonquin, was taken under the protectorate of France.

Cochin-China, Lower or **French** (*Basse Cochin-Chine*), a French colony in the extreme S. of the Indo-Chinese Peninsula, consisting of tracts of land on both sides of the lower course of the Mekong or Cambodja, bounded on the N.E. by C.-C., on the N.W. by the kingdom of Cambodja, and on the S. by the China Sea. Area, 23,082 sq. miles; pop. 2,034,453, most of whom are Anamites—the remainder being Cambodians, Chinese, Malays, &c. There are about 3050 French. The colony consists of the four provinces of Saigon, Mytho, Vinhlong, and Bassac. In the extreme N. and N.E. (the province of Bassac), the land is covered by spurs of the mountain range that runs N. through the Anamese empire, and by elevated uplands. This hilly district is productive in indigo, tobacco, cotton, sesamum, hemp, vegetables, earth-nuts, sugar-cane, betel, maize, mulberry-trees,

&c. Forests of valuable timber trees also occur. In the other provinces of the colony the surface is flat, the soil alluvial and rich, and covered by an intricate and widely extended network of rivers and *arroyos*, or channels scooped out partly by nature and partly by human labour. The chief river is the Mekong or Cambodja, 'which,' says Louis de Carné, 'will bear comparison with the noblest rivers of Asia.' It divides itself into three great branches in its passage through the inland districts, and these are again subdivided into many minor branches, forming a delta 40 miles wide by 60 miles. Other important streams are the Donnai and the river of Saigon. All the greater rivers are navigable for vessels of considerable draught, though the sandbars at their entrances, over which the water is seldom more than from 9 to 12 feet deep, are an obstacle to navigation. A vast tract of the area of the colony is in rice-fields, and rice is the chief product of the country. In 1893 the amount of rice exported from C.-C. was 695,515 tons, or more than double that exported in 1873. China, Singapore, and Europe received the greater part of it. Silk, cotton, hides, pepper, fish, and copra were also exported. The only great seaport, and the centre of commerce of the colony, is Saigon (q.v.). The climate is not considered healthy for Europeans. The rainy season, that of the S.W. monsoon, lasts from May to October, during which the temperature ranges from 68° to 86° Fahr. The hottest weather occurs in the months of February and March. The administration of government is in the hands of a governor and council, and the colony is represented by one deputy. There are now over 50 miles of railway and nearly 2000 miles of telegraph. The imports are estimated at £1,421,865 and the exports at £3,228,274.

History.—The connection between France and the Cochin-Chinese empire dates from the latter part of the 18th c., when, in 1787, the King of Anam, in return for services performed, engaged himself by treaty to cede the town and harbour of Touran or Kwang-han, with the territory belonging to it, to Louis XVI. The King failed to carry out his treaty by the stipulated transfer of territory, but he yielded so far as to treat the French representatives with respect, and he extended protection to the French missionaries. In the succeeding reign the Christians suffered severe persecution at the instigation of the King, and many of the French missionaries were murdered. Under Tien-fri, who ascended the throne in 1841, the persecutions of the Christians were recommenced, until, in 1847, Captain Rigault di Genouilly arrived on the shores with a demand for the fulfilment of the treaty of 1787. His demand being refused, he fired into and destroyed five Cochin-Chinese junks. The relations of the two powers remained, however, unaltered — the Anamese persecuting, the French protesting—till 1857, when the Anamese King, Tu-duc, fiercely assailed the Christians, and, among others, murdered a Spanish prelate. An alliance of France and Spain against Tu-duc was the result, and on the 30th August, 1858, a squadron of French and Spanish ships appeared before Touran, summoned the forts to surrender within a given time, and receiving no answer, fired and took possession of the town and forts on the following day. The town and surrounding territory of Saigon were taken by the French in 1859, Mytho in 1861, Vinhlong in 1862, and Bassac in 1893. By treaty, 1862, the King of Anam engaged to pay France an indemnity of 1,000,000 sterling, to cede to that power the provinces then known as Lower C.-C., and to guarantee toleration in religion and commerce. Having acquired these three provinces, the first care of the French governor of the new colony was to secure the peace of the frontiers. To attain this end was a matter of no small difficulty. The little kingdom of Cambodja, on the N.W. of the colony, had for years been ravaged by Siam on the W. and C.-C. or Anam on the E. It was evident to the French authorities that tranquillity was only to be secured by protecting Cambodja against her rapacious neighbours, and thus guaranteeing her independence. Accordingly, Rear-Admiral de la Grandière was despatched to the Viceroy of Cambodja (then under suzerainty to Siam), to inform that ruler that henceforth he was to consider himself a tributary to France, and a treaty giving validity to this arrangement was ratified between the two powers in August, 1863. This arrangement naturally and not unexpectedly led to complications. The French felt themselves called upon to suppress an insurrection of a section of Cambodians assisted by Anamites in 1867, and to prevent the recurrence of similar disturbances, the French governor wrested the southern provinces of Lower C.-C., and joined them to Vinhlong. Since this period the French have applied themselves to the object of developing their colony. In 1866 an expedition was organised to explore the course of the Mekong, and to open up a commercial highway by this river between the western provinces of China and the great seaports of the French colony. The river, obstructed by impracticable rapids, and with an irresistible current, was found to be quite unfit for navigation, and thus the dream of making Saigon the seaport of Yunnan and Szechuen vanished conclusively. But the resolution to extend French influence in Indo-China was not abandoned, and in furtherance of this aim the minutes of a treaty with Anam were signed on the 14th March, 1874, the chief conditions of which were—opening three ports in Tonquin; liberty for Europeans to reside therein; liberty to travel in the interior under passport from French consul; leave to pass Chinese productions through Tonquin; freedom in regard to Catholic (Roman) faith; obligation that French protection be called upon in case of internal disturbance. In 1883-84 the French Republic developed great activity in Cochin-China, and first took Anam under its protection, and subsequently drove Chinese troops out of Tonquin, resulting in warlike operations between France and China, which terminated in a treaty being signed in 1885. At the present time the arrangement is as follows:—Annexation of C.-C. by the French whose officials govern the country; Anam ruled by a King who resides at Hué with a French resident to take care of French interests; Cambodja ruled by a French resident in the name of the King of Cambodja; and Tonquin administered by a French resident in the name of the Regent of the country.

Coch'ineal Insect, a species of the Hemipterous genus *Coccus* (q.v.), which lives on the *Cactus Opuntia* or Nopal of Central America, and on other species of cacti as well—such as the *Cactus* or *Opuntia Tuna* of Peru, &c. The C. I. was first introduced into Europe in 1523 from Mexico, but cochineal is now produced in the E. Indies and Algiers, as well as in Europe. This insect is of small size, and of a deep red or mulberry colour. The insects scraped from the cacti are killed by immersion in boiling water and are dried in the sun. 70,000 of these small insects go to the pound of cochineal.



Cochineal.

1, Cochineal insects on cactus branch; 2, Female insect; 3, Male insect.

Coch'lea, a portion of the internal ear. See EAR.

Cochlosper'mum, a genus of small trees and shrubs indigenous to tropical India, Africa, America, and N. Australia, belonging to the natural order *Flacourtiaceæ* (*Brixineæ*). The stem of *C. Gossypium* of India yields kuteera gum, used as a substitute for gum and tragacanth. The cottony substance which adheres to the seeds is used to stuff pillows, &c. A decoction of the roots is used in Brazil as a cure for abscesses, and for pains which are the result of falls and other accidents. *C. Planchoni* is a native of Western Africa; its roots yield a yellow dye. *C. tinctorium* of Senegambia furnishes a yellow dye.

Cock, a name applied generally to the males of Rasorial or Gallinaceous birds, but sometimes restricted to denote the male of the common or Domestic Fowl (q.v.). In the C.-birds of most Rasores (q.v.) the ornaments displayed in the form of plumes, brilliant lustres, wattles, and epidermal appendages are seen to greatest perfection. The presence of these appendages is doubtless a mark of sexual difference and selection. See SEXUAL SELECTION.

Cockade′ (*cocarde*, Old Fr. *coquarde*, 'a cockscomb,' then a red device in the hat like a cockscomb), originally applied to the ribbon with which the loop of a cocked-hat was ornamented, is a term now used to signify a ribbon, a knot of ribbons, of leather, or something similar, worn on the hat as a badge of office or a party symbol. The badge of the Stuarts was a white rose, and a white C. became the symbol of their party after the Revolution, while that of Nassau was orange, and the Hanover C. black—the latter becoming common in this country after the accession of George I. It was in the 18th c. that these marks of distinction assumed military importance, a tuft of grass or corn being worn by the soldiers under Marlborough and Prince Eugene. In the War of Succession the French C. was white, that of Spain red; and the two colours were blended when the armies of these countries were subsequently combined. When in 1789 French citizens generally exhibited the 'red, white, and blue,' it was partly in defiance of an order issued in 1782, which forbade all who were not soldiers to wear the regulation white C. of France. The red and blue were added as being the colours of Paris. The tri-colour has been the badge of the French army since the Restoration, at the beginning of which an ineffectual attempt was made to establish the white of the monarchy as the sole colour. The Austrian C. is black and yellow; the German, black and white; the Belgian, black, yellow, and red—the shape on the Continent being generally a flat disk, and the material generally leather, but at times silk or other stuff. On the flat disk the colours are disposed concentrically. The adoption of the C. by European nations was only the systematising of ancient usage. The Plantagenet family was named after their sprig of broom—*Planta genista;* and the Wars of the Roses are so named after the badges of Lancaster and of York.

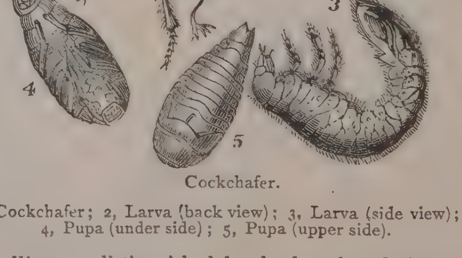
Cockatoo′, the name by which several distinct genera of Scansorial birds, included in the Parrot family, are distinguished. The sub-family *Cacatuinæ* is sometimes formed to include these birds, in which—the true cockatoos—the tail is broad and even, and the head adorned with an erectile crest. The bill is larger and less acutely curved than in the parrots. These birds are confined to Australia and the E. Archipelago. The food consists of fruits and seeds, and the nests are built in holes of trees. They may learn to speak, but not with the same distinctness or fluency as the parrots. The great sulphur-crested C., the lesser sulphur-crested C., the galeated C., the tricolour-crested C. (the crest of scarlet, yellow, and white) of Australia, the Goliath C., the long-billed C., and the Banksian C. of Australia are well-known forms. The genera *Microglossus* of New Guinea is also included in the C. family.

Tricolour-crested Cockatoo.

Cock′atrice, a fabulous monster, said to be hatched by a serpent from a cock's egg, and to inflict death by its breath and by its look. The word occurs four times in the authorised version of the Old Testament, where it evidently means a venomous serpent, and is probably identical with the reptile named by the Greeks *basiliskos*. See BASILISK.

Cockburn (pron. *Co′burn*), **Henry,** a notable Scottish advocate and judge, was born at Edinburgh, 26th October, 1779, educated at the High School and University of his native city, and was called to the bar in 1800. After seven years' waiting for briefs, he was appointed Advocate-Depute to the then Tory Lord Advocate; but having, through his long and intimate friendship with some of the chief Liberals of the time, Horner, Brougham, and above all Jeffrey, thrown aside the political principles hereditary in his family, he was dismissed from the office. C.'s very considerable ability, his shrewd common-sense, and his impressive and homely manner, began to win him a reputation and a practice—particularly after the introduction into Scotland of jury trial in civil causes. In 1831, under the Grey Ministry, he was made Solicitor-General for Scotland, and in 1834 became one of the judges of the Court of Session, when he took the title of Lord C. He died 26th April, 1854, at his residence of Bonaly, near Edinburgh. C. was not a voluminous author, although he wrote some articles for the *Edinburgh Review*, chiefly on law reform. His best-known works are his *Life of Jeffrey*, published in 1852, and the *Memorials of his Times*, published two years after his death, containing glimpses of the Edinburgh society of the time in which he lived. This was continued by the publication in 1874 of his *Journal*, in 2 vols., a work principally valuable for the news gathered by C. of the 'Disruption' of 1843, which ended in the formation of the Free Church, of the events which led up to it, and of the men who took part in it. A volume of C.'s correspondence has also been published.

Cock′chafer, the name given to a beetle of the tribe *Lammellicornes*, distinguished by the length and size of the leaves of which the terminal joint of the antennæ is composed.



Cockchafer.

1, Cockchafer; 2, Larva (back view); 3, Larva (side view); 4, Pupa (under side); 5, Pupa (upper side).

These leaves are largest in the male C., and fold up like a fan. The C. belongs to the *Phyllophaga*, or leaf-eaters. It is not common in Scotland, but occurs in England and Europe. The adult feeds on leaves, the larvæ feeding on the roots of corn and grasses. The C. is of a black colour, covered with a downy white substance, and is on an average an inch in length. It spends from three to four years in the grub or larval condition, but has not a long existence as the adult. The larvæ are very destructive to grasses, and occasionally immense hordes of these beetles appear in certain localities, and devastate the plant-surroundings. Such an invasion occurred in Galway in Ireland in 1688.

Cock'er, one of the spaniels, nearly allied to the Blenheim dog. Its colour is usually of a blackish tint. The C. is of small size, and is employed in pheasant-shooting. Its ears are pendent, but the tail is not of great length.

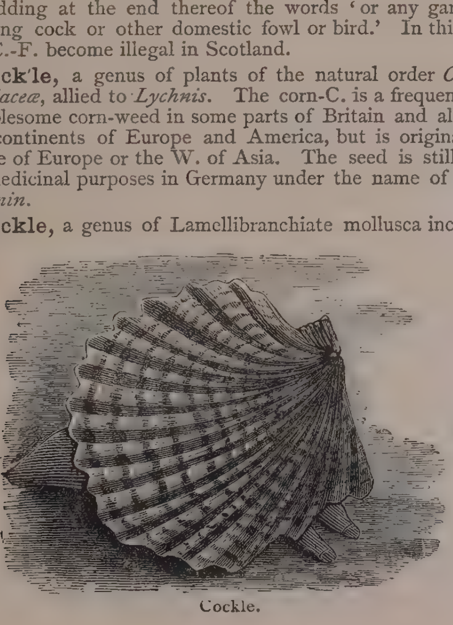
Cocker, Edward, an arithmetician and caligrapher, was born probably in 1631 at London, where he died about the year 1677. C. was a schoolmaster by profession. His famous *Arithmetic* was published shortly after his death by John Hawkins. C. was also the author of a small dictionary, and of a book of sentences for writing, called *C.'s Morals*.

Cock'ermouth, a municipal borough in Cumberland at the confluence of the Cocker and the Derwent, 25 miles S.W. of Carlisle. C. has considerable trade, manufactures of woollens, linens, cottons, hats, and hosiery, tanneries, breweries, and dyeworks. It returned one member to Parliament till 1885. The poet Wordsworth was a native of C. C., which is a place of considerable antiquity, has the ruins of a castle built soon after the Norman conquest. There is a fine promenade a mile long on the N. bank of the Derwent, with the old castle at one end and wooded cliffs at the other. Pop. parl. div. of county, 63,590; reg. sub-dist. 11,785; and civ. par. 5464.

Cock-Fighting is now prohibited by statute 12 and 13 Vict. c. 92, under which every person who shall in any manner encourage, aid, or assist at the fighting or baiting of any bull, bear, badger, dog, cock, or other animal, shall forfeit and pay a penalty not exceeding £5 for every such offence. In 1850 an Act entitled 'Cruelty to Animals (Scotland)' was passed, but the wording of the statute was found not to include *game or fighting cock*, and as the practice of C.-F. had become most common, and the law did not prohibit it, a short statute was passed on 30th May, 1895, whereby the definition of the word *animal* in the 11th section was amended by adding at the end thereof the words 'or any game or fighting cock or other domestic fowl or bird.' In this way has C.-F. become illegal in Scotland.

Cock'le, a genus of plants of the natural order *Caryophyllaceæ*, allied to *Lychnis*. The corn-C. is a frequent and troublesome corn-weed in some parts of Britain and all over the continents of Europe and America, but is originally a native of Europe or the W. of Asia. The seed is still sold for medicinal purposes in Germany under the name of *black cummin*.

Cockle, a genus of Lamellibranchiate mollusca included in the family of *Cardiadæ*, the members of which possess equivalve shells of heart shape, with radiating ribs: the mantle is open in front, and the syphons are short. The foot is large and sickle-shaped. The common C. is a well-known edible mollusc of our coasts. It is enabled to take leaps of considerable extent by straightening its foot suddenly, and leaping through the impetus thereby gained. By means of the foot also these molluscs burrow in the sandy coasts in which they are found. A great many species exist. Two adductor muscles exist for the purpose of closing the shell. A C. shell weighing 120 lbs. has been brought from the South Sea Islands, and is to be seen at Kenmare Castle. It has been used as a punch-bowl.



Cockle.

Cock'ney (from the Fr. *cocagne*—'*Pays de Cocagne*'—an imaginary land in mediæval mythology where the houses are made of cakes; perhaps formed from the Lat. *coquinus*, from *coquere*, 'to cook'), was a name given to the luxurious inhabitants of London, as opposed to the less effeminate denizens of the country. 'The King of Cockeney'—*i.e.*, of London—occurs in some verses ascribed to Hugh Bagot, Earl of Norfolk, in the time of Henry II. 'The Land of Cockaigne' is applied in a popular satire of the 13th c. to a Fool's Paradise for monks, in which the pleasures are all sensual.

Cock of the Plains, a species of grouse inhabiting N. America. It is the largest member of that family found in the New World; but is smaller than the Capercailzie (q.v.). The plumage is of a general yellowish-brown tint, the under parts being white, whilst generally it is mottled with dark tints. The males have bare sacs on the neck, which they can distend at will. C. occurs in California and Columbia. Its flesh is bitter, owing to the bird feeding on certain herbs (*Artemisia*, &c.).

Cock of the Rock, a Dentirostral (*Insessores*) bird, belonging to the Manakin family, and so named from its possessing a singular double crest of feathers rising from the sides of the head, whilst the upper tail-coverts give the bird the appearance of a cock-like tail. It inhabits Guiana. Its colour is a fine orange, with the wing-gills and tail black. Another species is found in Peru.

Cock'pit, a theatre in which gamecocks used to be exhibited fighting. The room in which the Judicial Committee of Her Majesty's Privy Council met at Westminster was so called, because it was built on the site of the C. of the palace at Whitehall. In *nautical language*, the term is applied to a place under the lower gun deck, containing the rooms of several junior officers; here the surgeon keeps his medicine-chest, and attends to the wounded.

Cock'roach, a genus of Orthopterous insects belonging to the Cursorial section of that order, and included in the family *Blattina*. All the legs are formed for running; the head is concealed beneath the thorax; the feelers are long and bristle-like; simple eyes or ocelli are generally wanting; wings may be wanting in the females only, or in both sexes; the hinder wings fold up fan-wise, the front wings forming elytra or wing-covers; spines exist on the tibiæ, and the tarsi are five-jointed. The body is flattened and ovate, and the abdomen is terminated by a pair of jointed appendages. *B. orientalis* is the common C. or black-beetle, found in great quantities in many houses. The wings in this species exist in the males only, and are rudimentary. These insects are supposed originally to have been imported from India. They occur also in ships, a second species, *B. Americana*, being found in the latter habitations. They are of nocturnal habits, devour animal and vegetable matters, and exhale a disagreeable smell. *B. gigantea* is a large W. Indian species, also named the *Drummer*, from its making a knocking noise in the night-time. The eggs are enclosed in horny cases, and are arranged therein in a double row, each egg being partitioned off from its neighbour. *B. Lapponica* occurs in Lapland.

Cocks'comb, a plant belonging to the natural order *Aurantiaceæ*, is a native of the E. Indies, and is now extensively cultivated in our conservatories, and in the open air in warm localities.

Cocksfoot Grass, a genus of grasses, of which one species, the common C., is generally distributed over the cooler portions of Europe, Asia, N. America, and the N. of Africa. In Britain it forms one of the best of our pasture grasses, growing well on most lands, particularly where the soil is loamy or chalky. It is also suitable for growing on boggy soils under course of reclamation. In America it is called the *orchard grass*. Twenty-nine species are described by Steudel.

Cock'swain, or **Coxwain** (pron. *coxon*), is the commander of a boat's crew, and steersman of the boat. The C.'s whistle brings his men together on the shortest notice. The word is formed from the Welsh *cwch*, 'a boat,' and '*swain*,' properly a servant, but here the petty officer in command.

Co'coa, Caca'o, or **Co'co,** a tree belonging to the order *Byttneriaceæ*, from the seeds of which the drinks called C. and chocolate are prepared. It is a native of Mexico, Demerara, and other portions of tropical America, but is now naturalised in various other tropical countries, such as Martinique, the W. Indies, Colombia, the Philippine Islands, Guiana, the Canaries, &c. About the year 1520 the seeds were introduced into Europe as a medicinal agent. The tree is much branched, and attains a height of from 16 to 20 feet on an average, though occasionally it grows to twice that height. It produces ovoid fruits, each of which contains from 13 to 40 seeds—the *C. beans* of commerce. After being shelled and bruised to pieces, they constitute *C. nibs*. The seeds are extracted from the fruits by their being allowed to ferment for some time, and then opened by hand, or by being buried in the earth until the pulp becomes rotten, after which the seeds are dried in the open air or by means of a fire. The last method of extracting the seeds produced the *Cacao terré* of the French manufacturers, and is by some considered as yielding the best C. In commerce there are two kinds of C., viz., Caraccas C. from Caraccas, and Island C. from Bourbon, Mauritius, the W. Indies, &c., which is less esteemed than the first-named quality. Most of the C. used in England comes from Guayaquil. It is very nutritious, chiefly owing to the soft, solid oil known as *C. butter*, which forms more than 50 per cent. of the shelled bean. The rest consists of starch, gum, mucilage, gluten, albumen, &c., and a crystallisable principle called *Theobromine* analogous to Caffeine (q.v.). It is prepared for use in various ways. First it may be prepared as Chocolate (q.v.), or by grinding up the roasted seeds with their outer shells or husks between hot cylinders into a paste, when it is then mixed with starch, sugar, &c. This forms *common C.*, *soluble C.*, &c., or the *C. nibs* already mentioned. This latter is the purest form of C. The husks are sometimes imported from Italy under the name of 'miserable,' and are used in Ireland and Italy for making a thin, though wholesome and agreeable, beverage in favour with the poorer classes of these countries.

Cocoa.

From the pulp which surrounds the seeds a kind of spirit is distilled. C., as a beverage, is nourishing and wholesome, and the *butter* is official in the English pharmacopœia. As an emollient, and as an ingredient for making 'suppositories,' it is valuable from not becoming rancid. C. mixed with rice, meal, starch, sugar, and flavoured with vanilla, constitutes the *Racahout* of the Arabs.

Co'co-Nut, a species of palm, a native of the Indian coasts and the South Sea Islands, but now naturalised in suitable situations in most tropical countries. It always prefers the vicinity of the sea-shore, though sometimes found at a considerable distance inland. It is one of the most graceful of its order, often rising to the height of from 60 to 100 feet, in a stem not over 2 feet in diameter. With the exception of the bamboo, there is perhaps no plant which is applied to so many and so varied uses as the C. From the husk surrounding the nut, coir or fibre is manufactured, and out of this mats, brushes, cables, &c., are made. In Southern India and other countries the fruits form one of the staples of life. The oil extracted from it is used in cookery when fresh. By pressure, stearine, used in making candles, can be extracted from it. The shells are made into spoons, drinking cups, lamps, &c.; when burnt furnish an excellent charcoal and lampblack. 'Toddy' is made out of the fresh sap, as already described in the case of other palms, and vinegar, arrack, and sugar are also some of the products of this juice. The leaves are used for thatching houses, making mats, baskets, hats, &c. The terminal leaf bud is boiled and eaten as a potherb. The hard wood is used for an infinite variety of purposes, and in this country is familiar under the name of 'porcupine wood,' out of which ornamental boxes, &c., are made. It is even considered that the flowers are potent as an astringent, the roots as a febrifuge, and the milk as a cure for ophthalmia. With this category of uses we have by no means exhausted the list of economic purposes to which the C. are applied, which are, indeed, almost endless. There are about a dozen other species of *Cocos*, one of the most interesting of which is *C. butyracea* of New Granada. From this tree toddy is also extracted, but the method adopted is somewhat different from that employed in other countries. The tree is cut down, and a long cavity excavated in the trunk near the top; at the end of about three days this cavity is found filled with the sap, which constitutes 'toddy.' *C. coronata*, a small Brazilian species, has a quantity of starch stored away in its loose pithy interior, which is used as food.

Coco-nut Palm. Tree, flower, and fruit.

The *Double C.*, the *Coco de Mer*, *Coco de Salomon*, *Coco des Maldives*, is *Lodoicea Sechellarum*.

Coco-Nut Beetle, a genus of *Longicorn* Coleoptera or beetles, the larvæ of which inhabit coco-nut trees and eat into the stems. The larvæ are eaten by the natives of the E. Indies, and are of large, soft conformation.

Cocoon', the shell or covering of fibrous material in which many species of insects are protected during their pupa or chrysalis condition. The cocoons of several species are of very great industrial importance, especially those of the moth *Bombyx mori*, or the silkworm, which is the source of all ordinary silk. Several other species of moths yield silky fibre used in textile manufactures, the most important of which is the Tusseh or Tussur moth of India, which spins a large grey-coloured C. from which a very strong silky fibre is derived. In addition, the Ailanthus moth has been introduced from

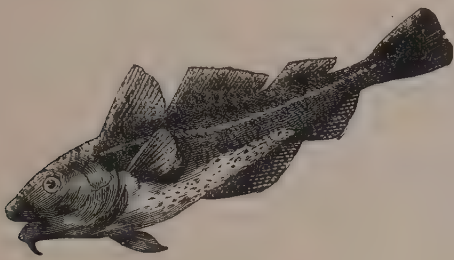
China for culture in France, and silk is obtained from a hybrid between it and the Arrnidy moth of Bengal. Among other valuable cocoons may be mentioned the Moonga of Assam, which forms one of the principal exports of that country; and the Mezankooree of the same region, from which much of the native dress of Assam is made; and the Yama-mai or oak silkworm of Japan, which has been introduced into Europe. There are, besides, numerous other species of moths, which yield useful silk both in the Old and New Worlds.

Co'cum Oil, a vegetable butter obtained from the seeds of an Indian tree belonging to the same genus as the mangosteen. It is of a pale greenish-yellow colour, and very friable. C. is exported to Britain, where it is used in the manufacture of pomatum.

Cocy'tus, a tributary of the Acheron, in Epirus, and supposed by the ancient Greeks to be connected with the lower world. In their mythology it was one of the rivers of Hades, and is mentioned in the Odyssey. Virgil also assigns it a place in Tartarus, as with the Pyriphlegethon flowing into Acheron. The name is derived from *kōkuein*, to shriek, to wail. Hence Milton's—

> 'Cocytus, named of lamentation loud
> Heard on the rueful stream.'

Cod, a genus of Teleostean fishes belonging to the suborder *Anacanthina*, and to the family *Gadidæ*, which also includes the haddocks, whitings, &c. The ventral fins are jugular in position, that is, exist on the throat beneath the pectoral fins. The body is spindle-shaped. The scales are soft and of small size. The median fins are large. The lower jaw is furnished with a *cirrhus* or barbule. Three dorsal and two hind fins exist. The fishery of the C. forms a source of industry, which gives employment to thousands of men on the coasts of the United Kingdom, Holland, Sweden, Norway, Iceland, Newfoundland, and elsewhere. The flesh is eaten both in a fresh and salted state. The air-bladder and roe are regarded as delicacies, and from the liver is obtained the cod-liver oil which, in tubercular and phthisical complaints, is so invaluable a remedy. The fishery is carried on by hand-lines chiefly, the bait being cuttlefishes, shellfishes, &c.



Cod.

Varieties of C. (rock and red C.) exist, and the Dorse (q.v.) is sometimes named 'Baltic C.' The average length of the C. is 2½ or 3 feet, and its weight from 10 to 12 lbs.

Co'da (Ital. 'tail,' Lat. *cauda*) is a name given to a phrase or passage sometimes added, like a peroration, at the end of a musical composition.

Coda'rium, a genus of plants of the order *Leguminosæ*. *C.* (*Dialium*) *acutifolium* and *C. obtusifolium* yield the Sierra Leone fruits known as brown and velvet tamarinds, the pulp of which has an agreeable flavour, and is very commonly eaten.

Code (Fr. *code*, Lat. *codex*, older form, *caudex*). A collection and chronological arrangement of the laws of a state is sometimes so named, but this is usually called a *Digest*; and by a C. we generally denote a legal system which, though it may adopt some existing laws and customs, is founded on principles fundamentally new, such, for instance, as are advocated in the *Fragment on Government* and other writings of Jeremy Bentham. Roman law was first reduced into a C. by order of the Emperor Theodosius, A.D. 438. This, under the name of the *Theodosian C.*, continued for some centuries to be the only authoritative compilation recognised in the western part of the empire. The *C. Justinian*, whose authority prevailed in the eastern division of the empire, was compiled and finished by Tribonian about the year 533. It consists of the *Institutes*, or elementary principles of Roman law; of the *Digest* or *Pandects* (q.v.), containing the opinions of eminent lawyers; of a new C. or collection of imperial *Constitutions*; of the *Novels*, or supplementary C. These form the *Corpus Juris Civilis*, as published about the time of Justinian. They are the foundation of the legal systems of most of the states of Europe.

The old laws of the French monarchy were founded partly on Roman law, partly on custom, and partly on ordinances of the kings. In 1800 Bonaparte appointed a commission to form a scheme of a civil C. This was promulgated in 1803-4 as the *C. Civil des Français*. Under the empire it was named the *C. Napoléon*, by which name it is still known. To judge of its value, we should read reports of the discussions in the French Council of State. The *C. de Procédure Civil* (1806) prescribes the forms of civil process, and the rules of the courts' practice. The *C. d'Instruction Criminelle* was promulgated in 1808, the *C. de Commerce* in 1808, the *C. Penal* in 1810. Regarding the last, Thibaudeau says:—'Napoleon was absent from its discussion. He said that the laws should be concise, and leave much to the judges and the government in imposing the penalty, because,' he said, 'men have feelings of compassion unknown to the law.' Under the head of *Violations des réglements relatifs aux manufactures, aux commerce et aux arts*, any coalition to lower wages is punishable by fine and imprisonment, and workmen combining to stop a manufactory are to be punished in the same way; leaders in both cases being subject to severer penalties.

Among mediæval codes the fullest and best was that of the *Gothic Law*. It was initiated by Alaric, King of the Visigoths, and enlarged by his successors. The second was the Burgundian; the third the Salic Law (q.v.), whose history is somewhat obscure. It dates from the exodus of the French from Germany. The fourth or Frisian law dates from the times of Pippin and Karl Martel. The *Asegabuch*, a set of Frisian laws, was composed about A.D. 1200. A complete collection of them was published by Richthofen. All these codes ultimately merged in the law of the feudal system.

Codification is the process of forming a C. of laws. It may be either done by public authority, as in the cases of the *Codex Theodosianus* and the *Codex Justinianus*, or it may be done by a private person, as were the codes Gregorianus and Hermogenianus. Many attempts have been made to procure the codification of the laws of England. Notwithstanding the earnest advocacy of Lord Brougham and other judges and lawyers since his time, these have hitherto been almost totally ineffectual. In British India and in those of our colonies which use the Indian Penal Code, the law has been codified to some extent; and also in Great Britain the law relating to partnerships, promissory notes, cheques, and bills of exchange has been codified; but in other directions the law may have been *consolidated* but not *codified*.

Co'deine is an Alkaloid (q.v.) present in opium, and was first extracted from that substance by Robiquet in 1832. It is a colourless crystalline body possessing a bitter taste and a powerfully alkaline reaction, combines with acids to form crystalline salts, and is a narcotic poison.

Codiæ'um, a genus of Spurgeworts (*Euphorbiaceæ*) indigenous to the Moluccas and islands to the N. of Australia. *C. pictum* of the Moluccas is often cultivated about houses in that country, and used for fences. The leaves are strewed on the ground on festive occasions, and are also used to decorate triumphal arches. When chewed, both bark and roots excite a burning sensation in the mouth.

Cod'icil (Lat. *codicillus*, a dim. of *codex*) is a supplement or addition made to a will by the testator, adding to, explaining, or altering some part of his former disposition. It may be written on the same paper as the will, or affixed to it, or written on separate paper and deposited in a different place from that in which the will is placed. In general the law relating to codicils is the same as that relating to wills, and the same guarantees of signature and attestation are required. A man may make as many codicils as he pleases, and the last is equally valid with the first, if not contradictory. See WILL.

Cod'lin, or **Codling,** a variety of apple, for boiling or roasting, and thence deriving its name, which is probably connected with *coddle* and *caudle*, the origin of which again is the Lat. *calidus*, 'warm.'

Codling Moth, belonging to the Tortricina tribe. The larvæ live in apples (hence its name), and destroy much fruit. The caterpillars have ten feet, and roll up leaves to form a cocoon. The wings are short but of broad conformation.

Cod'liver Oil is obtained from the liver of the cod, torsk, and other members of the Gadidæ (cods, haddocks, whitings, &c.) family of fishes, the chief centres of its production being Newfoundland and Norway. Three varieties are known in commerce by the names of 'white,' 'pale,' and 'brown,' the difference in colour arising from the various modes of preparation. A fourth and very impure variety, prepared in Norway, is largely used by curriers under the name of cod oil. In Newfoundland the process of preparation is very simple. The livers are taken, as fresh as possible, and well washed to remove traces of gall, &c.; they are then heated in a boiler with steam or boiling water till the oil rises to the surface, when it is removed, and excess of water driven off by heat. The oil is next strained through cloth bags of different degrees of fineness, an operation which effectually prevents the admixture of solid extraneous matter. C. O. thus prepared is almost devoid of smell, taste, or colour, and possesses valuable medicinal properties. In Newfoundland it is worth from 5s. to 6s. per gallon. The disagreeable taste and smell of ordinary C. O. are partly due to the putrefaction of very minute pieces of liver and other solid impurities not removed by filtration. Its proximate constituents are olein, palmitin, and stearin, with small quantities of butyric and acetic acids, and a peculiar substance called 'gaduin.' When taken internally, this oil supplies the system with nutritive fatty matter, and to this circumstance its efficacy in the treatment of pulmonary diseases is to be attributed.

Codogn'o, a town in the province of Milano, N. Italy, near the Po, 24 miles W. of Pavia, is a railway junction between Milan and Piacenza, has silkmills, and linen factories, and an active trade in agricultural produce. Pop. 11,659.

Cod'rington, Sir Edward, an eminent British admiral, was born in 1770, entered the navy in 1783, fought under Lord Howe, and at the battle of Trafalgar, in 1805, was captain of the *Orion*. In 1821 he was made vice-admiral, and in 1827 commanded the British, French, and Russian fleets which crushed those of Turkey and Egypt at the battle of Navarino. Although for political reasons he was re-called, C. continued to be honoured both at home and abroad, and in 1837 reached the dignity of Admiral of the Red. He sat for Devonport from 1832 to 1839, and died 28th April, 1851. C.'s son, **Sir William John Codrington,** was born 1800, and entered the army as an ensign in the Coldstream Guards. On the outbreak of the Crimean war, he was made commander of a brigade of the Light Division, took part in the battles of Alma and Inkerman, and on the resignation of General Simpson, was appointed commander-in-chief of the English forces. On his return to England he entered Parliament as member for Greenwich in 1857, but accepted the governorship of Gibraltar in 1859. He was made a G.C.B. in 1865, and received various foreign honours—French, Sardinian, and Turkish. He died in 1884.

Cod'rus, the last King of Athens, according to the Greek legend, reigned about 1068 B.C. The Dorians having invaded Attica, the oracle declared that their success depended on the life of C. being spared. The Attic King, learning this, entered the hostile camp in disguise, and quarrelling with the soldiers, was slain. On this the Dorians returned home. The kingly authority was henceforth abolished at Athens by the Eupatrids, and Medon succeeded his father as Archon for life.

Coëfficient (Lat. 'together-making'), in algebra, is one of two factors, simple or compound, which together make up an expression. Thus, in 4 ab^2c^3, 4 ab^2c^2 is the C. of c, 4 ab^2 of c^3, 4 ab of bc^3, abc of 4 bc^2, &c.

Cœhoorn, or **Cohorn, Menno, Baron Van,** a great military engineer, was born near Leeuwarden, in Friesland, in 1641, studied fortification under his uncle Bernardus Fullenius, Professor of Mathematics and Engineering at Franeker, entered the army at the age of sixteen, and after distinguishing himself in various battles and sieges, particularly those of Maestricht and Namur, rose to be lieutenant-general and chief director of Dutch fortifications, and the trusted engineer of William III. Of the towns he fortified, Bergen-op-Zoom is considered to be that which most unmistakably shows his genius. C., who has deservedly been called the Dutch Vauban, died at the Hague, 17th March, 1704. He wrote several books, of which the *Nieuwe Vestingbouw* ('New System of Fortification') is the best known. It was translated into many European languages.

Coe'horns, so called from the engineer of that name, are small howitzers or mortars, about 4½ inches calibre, which, being easily moved, and requiring but a small amount of powder, were at one time much used in sieges, especially in pouring shells into the outworks of a fortress.

Coel, or **Koil,** a town of British India, in the N.W. Provinces, district of Alighar, 2 miles S. of Alighar, and 80 S.E. of Delhi. Alighar is the administrative headquarters of the district, but C., with which town it is connected by a fine tree-shaded avenue, is the place where the general headquarters courts sit. The district of C. is a well-tilled plain watered by the Ganges Canal. Pop. 61,485.

Cœlelmin'tha, literally 'hollow worms,' the name formerly given to certain groups of parasitic worms or *Entozoa*, belonging to the sub-kingdom *Annuloida* or *Echinozoa*, and included in the order *Nematelmia* or 'round worms.' Owen gave this name to these groups, in allusion to their possessing a distinct body-cavity, and in contradistinction to the Tape Worms (q.v.), and others, which possess no alimentary canal or body-cavity. The *Ascaris* or round worm, *Strongylus*, and *Filaria* or the Guinea-worm, are illustrative examples of C.

Cœ'le-Syr'ia (Gr. 'Hollow Syria'), now known by the Arabic name *El-Bŭkâ'a* ('the deep plain') is properly defined by Strabo as the valley between Libanus and Antilibanus (about 100 miles long by 10 broad), but sometimes erroneously made to include the coast of the Mediterranean. The Lowland Scotch expression for districts similarly depressed is exactly the same, *e.g.*, 'The Howe of the Mearns,' and 'The Howe of Fife.'

Cœnæsthe'sis, a term designating undue susceptibility to external impressions. Some persons are susceptible of slight changes in the circumstances of their lives, while others are not so. To some individuals freedom from anxiety, good digestion, a bright sun and a dry bracing air, is the cause of cheerfulness, exhilaration, or even of joy; while some mental cause of depression, a slight disorder of digestion or of liver, or a dull day, may cause gloominess and even despair. (Carpenter's *Mental Physiology*.)

Cœ'nobites ('dwellers in a *cœnobium*,' from the Gr. *koinos*, 'common,' and *bios*, 'life'), the name given to monks in the 4th c. who lived together in the same dwelling under an abbot or head, as distinguished from those who lived alone or solitary, as 'monks' (in the original use of the word) or *anchorites*.

Cœ'rulein is a dye recently introduced for dyeing and calico-printing, and is obtained by treating Gallein (q.v.) with concentrated sulphuric acid at 200° C. (392° Fahr.). A beautiful green colour is produced by dissolving C. in an alkaline solution. In calico-printing this solution and the mordant alumina yield a rich green, while iron mordants produce a brown colour; both dyes are fast. On treating a hot aniline solution of C. with alcohol and acetic acid, an indigo-blue colour results, which may be communicated to wool.

Coff'ee, a genus of *Rubiaceæ* or *Cinchonaceæ* (for opinions differ), consisting of between fifty or sixty species, but only one of which produces the fruit from which by decoction can be made the beverage known as *C.* All are shrubs or small trees under 20 feet in height, natives of the tropics—the greater number of the species being found in the western hemisphere. The most important is *Coffea Arabica*, which grows to a height of about 20 feet, but when cultivated is seldom allowed to attain to more than 10 or 12 feet. Though now cultivated solely within the tropics, the native country of the C. shrub is the mountainous country at the extreme S.W. point of Abyssinia—the word *C.* being derived, according to some, from *Kaffa*, the name of one of the Abyssinian provinces; though it is more probably the Arabic *quahwah*, pronounced by the Turks *kahve*, whence the French *café*. From Abyssinia it was introduced into Arabia, and from Arabia into Batavia, about two centuries ago, by the Dutch. Whether it was the Dutch or French who first introduced C. into the western hemisphere is a disputed point, but at all events it is agreed on every hand that all the C. now imported from Brazil, Central America, the W. Indies, &c., is the progeny of a single plant, most probably derived from the Botanic Garden at Amsterdam, into which it was introduced from Batavia. Its use as a beverage soon spread among Eastern nations, though at first it was opposed by the priests, on the ground of its being one of those intoxicating beverages forbidden by the Koran. In 1652 the first C.-shop was established in London by a Greek named Pasquet, the servant of an English merchant of the name of Edwards, who had become acquainted with the beverage in the E., but who, to save himself from the annoyance of visitors anxious to taste the new drink, established his servant in a house where it could be bought. From this date the use of C. rapidly increased, and spread into the European continental countries, where it is now popular, and prepared to greater perfection than in Britain. The value of the coffee imported into the chief countries of Europe, Turkey, Egypt, and the United States of America is estimated at £52,168,755. The following table points out the distribution of the commodity, a large proportion of which arrives from India, Ceylon, Java, and Brazil. The duty paid to the British Revenue is about £166,000 annually.

Coffee.

Country.	Value of Coffee in £.
Austria-Hungary	3,324,833
Belgium	2,144,640
Bulgaria	89,880
Denmark	902,000
Egypt	301,058
France	5,826,920
Germany	10,691,650
Great Britain	3,997,406
Italy	1,261,920
Netherlands *	2,917,750
Norway	766,388
Portugal	122,175
Roumania	149,960
Russia	651,900
Spain	586,720
Sweden	1,500,666
Switzerland	680,640
Turkey *	879,541
United States of America	15,972,708

* Coffee, valued at £1,661,000, was also exported.

* Coffee, valued at £450,000, was also exported.

From this it will be seen that the United States of America and Germany are the chief customers of the C. planter. Next come France, Great Britain, Austria-Hungary, the Netherlands, and Belgium. Then follow Sweden and Italy. There is also a transit in some of the countries, notably Turkey and the Netherlands, where the value of the export is more than half that of the import.

After the coffee-berries are ripe they are gathered, and deprived of their outer pulp by machinery, then steeped in water to remove all mucilaginous matter, after which the parchment-like covering of the seeds is removed by means of a mill and a winnowing machine. They are now roasted, the heat not only reducing the berries to one-half their original bulk, but also causing the development of a volatile oil and a peculiar acid to which the flavour and aroma of the C. is due. In Sumatra and other of the Malay islands, an infusion of the roasted leaf is used, under the name of C.-tea. It is said to contain a large quantity of Caffeine (q.v.), which constitutes the active principle of the C., and it is probable that the use of the leaf may extend. In Central Africa Speke describes the natives as chewing the C.-beans instead of making a decoction of them. The physiological effect of C. is that it acts as a stimulant to the brain, causing sleeplessness, and is accordingly used as an antidote to narcotic poisons. According to the most widely received belief, it acts like tea as a soother to the vascular system, and by preventing waste of the tissues of the body, enables it to support life on a less quantity of food than would be otherwise required for the maintenance of animal existence. Cocoa (q.v.), Paraguay Tea (q.v.), and other beverages which have a similar effect on the system, also contain a principle analogous to caffeine, but neither Chicory (q.v.), nor any of the numerous substitutes for C. do so, or have any pretensions to act in a similar manner on the system, except that they supply to the palate a sensation not unlike that of C. For instance, what is called Swedish C. is the seeds of *Astragalus bœticus*.

Essence of C. is a very concentrated infusion or decoction, mixed with extract of chicory and burned sugar until it is of the consistency of molasses. A teaspoonful, mixed with boiling water, makes a useful substitute for the legitimate decoction of the ground C.-beans. The name Wild C. is given in the W. Indies to *Faramea odoratissima*, *Zuelania lætoides*, and *Eugenia disticha*.

Coffee-Bean-Tree, or **Coffee-Tree, Kentucky.** See GYMNOCLADUS.

Coffee-Bug, a genus of Hemiptera (*Homoptera*) belonging to the family *Coccidæ*, and so named from its destructive inroads on the coffee plantations. Ceylon has particularly suffered from its ravages. *Lecanium Ilicis* is an allied species which lives on the *Ilex* or evergreen oak of the Mediterranean coasts. The red ants are in turn destructive to the C.-B.

Coff'er (Fr. *coffre*, 'a chest;' Gr. *kophĭnos*, 'a basket') is the name given to a casket for keeping jewels and other valuable articles; the term being sometimes applied to a chest. In architecture, it denotes a deep panel in a ceiling, the same as a caisson; in fortification, a particular kind of *caponnière*.

Coffer-Dam, a water-tight enclosure within which the foundations for a bridge abutment, quay wall, or other such structure may be excavated and the masonry built. A C.-D. commonly consists of two continuous rows of wooden piles driven in the ground, and left sufficiently long to reach above high-water mark. The rows are several feet apart, and the space between them is filled with clay puddle, so as to make a thick wall impervious to water. The water is pumped from the enclosed space, so that excavation and erection can go on within it, without the use of divers, at all states of the tide. Of late years cast-iron has in a number of instances been used with success instead of the wooden piling. For illustration of C.-D. see Art. on Blasting.

Coffin, a chest or box in which a dead body is interred. The word is probably derived from *cophinus*, a Latinised form of the Greek *kophinos* ('a basket'), though it must be noted that no such use of *kophinos* was known to the ancients themselves. In the East at the present day a dead body is consigned to the earth wrapt merely in a cloth or 'winding-sheet,' which Mohammedans express by the Arabic word *kafan*, and it is probable that to it our English word is to be traced. In early times the bodies of persons of distinction were deposited in coffins, and when Joseph died, 'they embalmed him, and he was put in a C. in Egypt.' The Egyptians enclosed embalmed bodies in cases of cedar, which are still found in a state of almost perfect preservation, from the dryness of the rock tombs where they were deposited. Coffins of wood and burnt clay have been found at Athens; and while it was customary for the Greeks to burn dead bodies, recent investigations seem to prove that burial of unburnt corpses in coffins was equally frequent. Among the Romans, too, inhumation in coffins of wood and stone was practised. Pliny mentions that a kind of stone found near Assos in Troas, was made into coffins which speedily consumed the corpse. (See SARCOPHAGUS.) The kistvæn or C. of the ancient Britons was formed of rough slabs of stone; during the tenth and two following centuries, stone-coffins were in common use in England, and towards the end of that period they were employed in the interment of monks, whose bodies before that period were laid in the earth. Coffins both of lead and wood, belonging to the Old English and later periods, have also been discovered, those of the Templars found in the Temple Church in London being of the former material. The present mode of sepulture in closed coffins has recently been condemned on sanitary grounds, retarding, as it does, the resolution of the body into its component elements, and the question of adopting cremation has been openly discussed. As a compromise between the two modes, Seymour Haden has suggested the use of coffins of basketwork and other easily perishable materials of open construction, which will accelerate the dissolution of the body, by freely admitting air and moisture, and in cases of death from infectious disease, he has proposed to use a double basket case, the intermediate space being filled with charcoal powder.

Coffin also signifies the raised crust of a pie, and in this sense it is frequently used by Shakespeare; and the whole hoof of a horse's foot above the coronet is so named in veterinary practice.

Cogg'eshall, a market-town of Essex, consisting of Great C. and Little C., on the Blackwater, 40 miles N.E. of London, and 10 W. of Colchester. Great C. is connected with Little C. by a bridge across the river, and contains a beautiful church, St. Peter's, restored in 1868, a grammar-school, endowed by Sir Robert Hitcham, a mechanics' institute, a public library, &c. Its manufactures are chiefly silk, velvets, patent isinglass and gelatine. In 1142 King Stephen here founded a Cistercian abbey, part of the ground-plan of which was discovered in 1865. Pop. reg. sub-dist. 3906—Great C. civ. par. 2730; Little C. civ. par. 379.

Coggia's Comet, a large comet visible without telescopic aid to our earth, appeared in the summer months of 1874 in the northern hemisphere. The nucleus was bright and well-marked, and the tail could be traced for a considerable distance in the sky. Tietjen, Schulhof, and Geelmuyden have given calculations which all agree in assigning to it a great length of revolution, the period deduced by the last being 10,445 years.

Cogn'ac (Lat. *Cogniacum*, 'the corner of the water;' Fr. *coin*, Lat. *cuneus*), an old town in the department of Charente, France, on a height overlooking the plains of the Charente river, 20 miles W. of Angoulême. It gives name to the famous brandy, and has also large manufactures of leather, linseed oil, and pottery. There are two important fairs held here in May and November. C. is the birthplace of François I., and its only historical building is a ducal château, now converted into a store. Pop. 17,392.

Cog'nate. See AGNATE.

Cog'nition, or **Cog'niscing,** is a process in Scotch law for inquiring into the mental condition of any one suspected of being idiotic or insane.

Cognition and Sale is, in the law of Scotland, the name given to a process before the Court of Session, at the instance of a Pupil (q.v.) and his Tutors (q.v.), for obtaining a warrant to sell the whole or a part of the pupil's estate.

Cognitionis Causa.—In Scotland, when the creditor of a deceased proprietor brings an action against the heir to constitute the debt against him, and the heir renounces the succession, the court will give a decree for the debt. This is called a *decree C. C.*

Cognition and Sasine is, in the law of Scotland, the form of entering an heir in burgage property.

Cogn'izance, a name given rather indefinitely to a distinguishing mark in heraldry. See BADGE and CREST.

Cognoscen'ti (Ital. form of the Lat. *cognoscentes*, 'knowing ones'), critics in matters of art, whose *knowledge*, genuine or otherwise, is their title to the function they assume.

Cogno'vit Actio'nem, an English law-term, indicating the written confession of a defendant that the cause of action against him is just. Judgment may then proceed on the C. A., and execution follow according to the terms agreed to in the writing.

Cohabita'tion, in the law of Scotland, means the living together of a man and woman, as husband and wife, who are generally reputed to be such. It may constitute marriage as implying contract. See CONTRACT, MARRIAGE.

Co'heir or **Coheir'ess,** one of two or more persons to whom an inheritance descends. See SUCCESSION, COPARCENARY, COMMON TENANCY, &c.

Cohe'sion, that property of a homogeneous portion of matter on which depends its resistance to any straining or disrupting force. It is thus distinct from Adhesion (q.v.), which is a similar molecular attraction subsisting between two different portions of matter in contact. Both seem to be superficial attractions, independent of mass, and quite inappreciable at sensible distances. C. is most strongly marked in solids, and its experimental determination in the case of material used for purposes of construction, is of the greatest importance in practical engineering. Liquids possess the same property, though to a less extent, otherwise they could not hold together as drops. Further, all the curious phenomena of Capillarity (q.v.) are due to the simultaneous and mutual action of C. in the liquid, and adhesion between the liquid and some other kind or kinds of matter. The so-called C. and submersion figures of Tomlinson are also capillary phenomena, which are best noticed here, and are thus produced. When a drop of liquid is gently placed on the clean surface of a specifically heavier liquid, the former is observed to spread out according to a definite pattern, which is different for each pair of liquids, thus suggesting, as Tomlinson pointed out, a method of analysis. This is a C.-figure. Submersion-figures are formed by the gradual sinking of a liquid through a specifically lighter one; and some of these are extremely beautiful and regular, the vortex rings produced in many instances being singularly perfect. It is a common error in popular science to say that gases have no C., but even possess among the particles a repelling action. Such an hypothesis, however, is of absolutely no use in the molecular theory of gases, and adds a complexity which is not to be desired. C. acts between the particles *when they are sufficiently near*, but owing to their velocities at collisions, these particles rebound almost instantaneously, so that the cohesive forces act during a practically indefinitely short time, and are not sufficiently great to overcome the energy of motion of the particles.

When a solid is heated it generally expands, the molecules being driven further apart, and consequently the cohesive forces diminish in intensity. At length the solid melts, and the molecules acquire a certain freedom, the energy of heat being transformed into energy of motion; but the velocities are not sufficiently great to neutralise the effects of C., which is still apparent. By the application of more heat, however, the fluid expanding becomes more mobile, expands, and the molecules get more active, till at last their velocities become so great that the effects of C. are no longer evident—the liquid becomes a gas. Thus, though increase of temperature has a powerful effect upon cohesive forces, it seems to be only because the distances between the molecules and their velocities are increased; but it affords an argument in favour of the energy-nature of heat, placing it in the same category with motion.

Co'hort, a division of the legion, in the ancient Roman armies. There were always ten cohorts in a legion, and during the republic these were all equal to each other. Hence the strength of the C. varied with that of the legion, and ranged at different periods between 300 and 600. Under the empire the first C., which had charge of the eagle, was twice as strong as each of the other nine. The word was sometimes loosely used in the general sense of *battalion*.

Cohosh, the black snake-root, and plant of the order *Ranunculaceæ*. It grows to a height of 4 to 8 feet, and occurs in Florida and Canada, where it may be found in the woods. C. is a tonic when taken medicinally, and also produces a reduction of force and action of the pulse.

Cohosh.

Cohune' Oil, a valuable oil obtained from the kernels of a Brazilian palm, *Attalea cohune*.

Coif (Fr. *coiffe*, a headdress, from Lat. *cofea*, used by Fortunatus), a defensive hood which was worn as a portion of a soldier's armour in the Middle Ages. It was sometimes continuous with the hauberk, and sometimes separate. The name was also given to a covering for the head, especially of the tonsure, worn by Roman Catholic priests. In legal language, it was the cowl or covering of lawn worn by serjeants-at-law under their caps—a relic of the ecclesiastical character of lawyers. To become a serjeant-at-law was the same thing as to attain the *Degrees of the C.;* after which a barrister left the Inn of Court, which called him to the bar, to become a member of Serjeants' Inn.

Coimbatore' (*Kóyam-batúr* or *Koyampadi*), the chief town and administrative headquarters of the district of the same name, Madras, British India, on the left bank of the Noyel, a tributary of the Cauvery, 304 miles by rail S.W. from Madras; pop. 46,383. It is well built, with wide streets and a good water supply. Situated 1437 feet above sea-level, in a gorge of the Ghâts, it is exceptionally cool and healthy for Europeans. C. was a spot of much strategic importance, owing to its position; and was repeatedly passing from the hold of one power to that of another until it finally became British in 1799. The *district* of C. has an area of 7860 sq. miles; pop. 2,004,839, of whom 1,945,010 are Hindus; 43,947 are Mohammedans; 15,566 are Christians; and 213 are Buddhists. The staple crops are the 'dry grains' of *cholum*, *cumbu*, and *ragee*. Rice cannot be grown without artificial irrigation. Other crops are potatoes, oil-seeds, flax, cotton, tobacco, sugarcane, coco-nut, and areca-nut. The only manufacture is cotton-weaving, and the export of inferior cotton, tobacco, and grain, in exchange for salt is limited. Palladam is the chief centre of the cotton trade. Wild elephants, now preserved by law, are taken alive in the N. part of C. During the drought of 1876-7 this tract was saved by the railway from the extreme pressure of famine.

Coim'bra (anc. *Conembrica*), a city of Portugal, capital of the province of Beira, on the right bank of the Mondego, 110 miles N.N.E. of Lisbon, built on the slope of a hill in the form of an amphitheatre. The streets are steep, narrow, and ill-paved; but there are several fine buildings, including the cathedral and the university—the only one in Portugal—originally established in 1290, and transferred here a second time from Lisbon in 1537. There is a student attendance of 1166, and the subjects taught are theology, law, medicine, mathematics, and philosophy; law and philosophy appear to attract the majority of the undergraduates. George Buchanan (q.v.) was for some time a professor at C. Being accused of heresy, he was imprisoned in a monastery, where he commenced his Latin metrical version of the Psalms. The library of the university possesses 60,000 volumes. C. has manufactures of earthenware, linen, and woollen. Pop. town 51,226; district 316,624. Area of the latter is 1500 sq. miles.

Coin, Coining (Fr. *coin*, Lat. *cuneus*, the 'wedge' by which money was stamped). See MINT, MONEY, CURRENCY, NUMISMATICS.

Coin, Coining, Laws Regarding. On 6th August, 1861, the laws of the United Kingdom relative to the coinage were consolidated and amended by statute 24 and 25 Vict. c. 99. To counterfeit the gold or silver coinage, was constituted a felony in England and Ireland and a high crime and offence in Scotland, punishable at the discretion of the court by penal servitude for life or for not less than three years, or by imprisonment for any term not exceeding two years with or without hard labour and with or without solitary confinement. To diminish or lighten the gold or siver coinage became a felony in England and Ireland and a high crime and offence in Scotland, and the punishment was set at penal servitude for three to fourteen years, or imprisonment for two years with or without hard labour and with or without solitary confinement. Colouring counterfeit coin or any pieces of metal to make them pass for gold or silver coin, or colouring or altering a genuine coin to make it pass for a higher coin—felony, and high crime and offence; penal servitude for three years up to life or imprisonment up to two years, with or without hard labour and with or without solitary confinement. Unlawful possession of filings or clippings of gold or silver coin—felony, and high crime and offence, penal servitude for three to seven years or imprisonment up to two years, &c. Buying or selling counterfeit gold or silver coin for less than its nominal value, and importing counterfeit gold or silver coin—felony, and high crime and offence; penal servitude for three years up to life, or imprisonment up to two years, &c. Exporting counterfeit coin—misdemeanour, and crime and offence; imprisonment up to two years, &c. Uttering or tendering counterfeit coin, with knowledge of its being false or counterfeit—misdemeanour, and crime and offence; imprisonment up to one year, &c. Possession of three or more counterfeit gold or silver coins—misdemeanour, and crime and offence; penal servitude up to three years or imprisonment up to two years, &c. Defaced coin is no legal tender. Making, mending, or having possession of coining tools—felony, and high crime and offence; penal servitude from three years up to life, or imprisonment for two years, &c. Any person, to whom coin, suspected to be counterfeit or diminished otherwise than by reasonable wearing, is tendered, may cut, break, bend or deface any such coin, and he who tenders it must bear the loss provided there be no dispute, or, if dispute arise, provided the coin be declared counterfeit, or so diminished, by any Justice of the Peace after inquiry has been duly held before him. The Coinage Act of 1870 consolidates and amends the laws relating to the coinage and to the mint. Gold is a legal tender for any amount. Silver is a legal tender for any value not exceeding forty shillings, and bronze C. is so to the value of one shilling. The Act deals with the defacing of light C., and with the coining and purchase of bullion at the Mint. See MINT.

Coir, or **Coco-Nut Fibre,** is a material usefully employed in the manufacture of ropes, cords, mats, &c. It possesses in a high degree all the requisite qualities—strength, firmness, and elasticity. In the Laccadive Islands, cordage and rope-making form a considerable branch of industry, and in many of our prisons and industrial schools the imported fibre is used for making coco-nut mats.

Cojutepec′, a town of San Salvador, Central America, with a pop. of 8600. A few miles off there is a lake of the same name, which exhibits a remarkable phenomenon. After a gale its waters assume a dark greenish hue; and fish in considerable quantities are cast ashore dead.

Coke (lit. '*cooked*' or '*caked*' coal) is a substance 'which bears the same relation to coal that wood charcoal does to wood.' It is obtained by heating coal to a high temperature in a closed vessel, or its equivalent, and consists essentially of the fixed inorganic matter of the coal with a considerable part of its carbon. It is most commonly prepared in ovens called C.-ovens, which, when filled with coal, are closed up excepting an opening for the exit of gases, and some small holes for admitting air. The coal is ignited at the top, allowed to burn until no further visible smoke is emitted, and then cooled gradually. C. contains from 6 to 12 per cent. of incombustible matter (ash), but *exclusive* of this it is nearly pure carbon. It burns freely, without smoke, and without caking or clinkering (q.v.) upon the fire bars. It is also free from some of the impurities of the coal from which it has been made, and for these and other reasons, it forms in many cases a most useful fuel. It was at one time used exclusively for many purposes (*e.g.*, the smelting of iron), for which it is now found practicable to use the fuel in its natural state as coal. C. can only be made from that class of coals known as 'caking' coals, which tend to soften and clinker by heat, and which it is on that account difficult to use in ordinary furnaces without mixture with some non-caking fuel. In its conversion into C., coal loses from a quarter to nearly a half of its weight, this loss including the greater part of its hydrogen, nitrogen, and oxygen. The cause of the phenomenon of caking, or forming C., is not at present known. It has been connected with the proportion of oxygen in the coal, but although, in the average, caking coals contain much less oxygen than those which do not cake, yet analyses show that, in many instances, the ultimate composition of specimens of both kinds is almost identical. It is probable that this property of caking (as well as many other properties of coal) depends rather upon the proximate than upon the ultimate constitution of the fuel, and of this we have as yet scarcely any experimental knowledge.

Coke, Sir Edward, an eminent English judge and jurist, was born at Mileham, in Norfolk, 1st February, 1552. He was educated at the free grammar-school of Norwich, and at Trinity College, Cambridge, and, after a course of law study at Clifford's Inn and the Inner Temple, was called to the bar in 1578. His professional career was one of brilliant and rapid success. He filled in succession the posts of Recorder of Norwich, Recorder of London, Solicitor-General, Speaker of the House of Commons, and Attorney-General. Although the manner in which he conducted the prosecutions of Essex and Raleigh did not add to his reputation, he gained on the whole a high character as a judge. In 1606 he was appointed Chief Justice of the Common Pleas, as a reward for the way in which he conducted the prosecution of those concerned in the Gunpowder Plot; in 1613 he was made Chief Justice of the King's Bench, and refused to yield a jot of the judicial prerogatives to James I., for which, as well as for persistently opposing the court party in Parliament, he was both disgraced and imprisoned. Under Charles I., he continued an advocate of the popular cause, and in 1628, during the third Parliament of that monarch, took a leading part in the preparation of the celebrated Bill of Rights. He died 3rd September, 1633. C. has been well described by Green in his *Short History of the English People* as 'a narrow-minded and bitter-tempered man, but of the highest eminence as a lawyer, and with a reverence for the law that overrode his every other instinct.' His works, including his *Reports* and *Institutes*, the first of which is the famous *C. upon Littleton*, are among the most valuable of British law classics.

Col (Fr. a doublet of *cou*, 'neck,' from the Lat. *collum*, of the same signification), applied in Alpine geography to a mountain pass, as *C. du Géant*, *C. Cervin*, *C. Longet*, &c.

Co′la, Koll′a, or **Goora Nuts,** the seeds of *Cola* (*Sterculiaria*) *acumenata*, a tree belonging to the natural order *Sterculiaceæ*, inhabiting tropical Africa, and extensively used as a condiment by the natives of the western and central portions of that continent, and by the negroes of the West Indies and Brazil, into which countries it has been introduced. An extensive inter-tribal trade is carried on in this nut by the Africans. A small piece is chewed before each meal as an appetiser or aid to digestion, and to improve the flavour of any eatable or drinkable. It has an astringent taste. Bitter C. is obtained from Fernando Po, but its source is not yet ascertained, though it is believed to be derived from some species of *Guttiferæ*. There are also several varieties of the true C.-nut, all of which have, however, similar properties—among others, it is said, those of Cinchona Bark (q.v.).

Col′bert, the name of a French family which in the 17th c. produced several distinguished men, and was understood to be descended, according to a popular but now discredited tradition, from a Scottish house established in Champagne as early as the 13th c. The so-called 'tradition' cannot be traced beyond the rise of the great statesman's fortunes, and probably originated in a desire to find for him an ancient and aristocratic origin. Two branches of the C. family in the 17th c. are found pursuing commerce—one at Reims, the other at Troyes. To the former belonged **Jean Baptiste C.,** Marquis de Seignelay, the illustrious French minister, who was born at Reims, 29th August, 1619, and received a practical training from the Italian bankers of Cardinal Mazarin, who recommended him warmly to Louis XIV. When appointed Comptroller-General of Finances in 1661, he established a chamber of justice, which suppressed great frauds in the collection of the revenue. Minister of Marine in 1668, he gradually acquired authority over the kinds and rate of taxation, the public regulation of commerce, agriculture, and manufactures, in fact, the whole non-military administration of the revenue. On his industry (he worked sixteen hours a day) and his integrity depended much of the glory of the reign of the 'Grand Monarque.' He raised the revenue from 89,000,000 to 105,000,000 francs, and reduced the debt from 52,000,000 to 32,000,000; and yet, fearing the prodigality of his master, he steadily opposed all borrowing by the state. As Sully had favoured agriculture, C. paid special attention to the cloth, silk, and hat trades, &c. His regulations of manufactures, enforced by public inspectors, were no doubt intended as a great act of national technical education, but they hampered trade in the most disastrous manner down to the Revolution. Political ideas led him to prohibit corn exportation; but by the Languedoc Canal, the creation and repair of roads, and the diminution of certain feudal burdens, he benefited agriculture and the people generally. He also extended the French marine; Brest, Toulon, Rochefort, &c., dating their importance as naval stations from his rule. In 1663 and 1666 he founded the *Académie des Inscriptions et Belles-Lettres*, the *Académie des Sciences*, and the *Jardin des Plantes*, thus continuing the policy of Richelieu. He had also the happiness of assisting such men as Corneille, Molière, Racine, and Mézerai. Latterly the huge expenses of Louvois' military policy and of the court, and the suspicion the King had of C.'s ambition, oppressed him, and made his position difficult. At last an unjust accusation of jobbery in some fortifications compelled C. to retire, and he shortly afterwards died, 6th September, 1683. No man contributed so much to the glory of Louis XIV.'s reign. C.'s brother **Charles** was created Marquis de Croissy; his son, **Jean Baptiste,** who succeeded him in the Marquisate of Seignelay, had something of his father's greatness; another son, **Jacques Nicolas,** became a prelate of the Church; and in the 18th and even 19th c. the family had still some names of mark. See D'Aubigny's *Vie de C.* in the *Hommes Illustres de France*, and Pierre Clément's *Lettres, Instructions, et Mémoires de C.* (Par. 1862 *et seq.*), and his *Histoire de C. et de son Administration* (Par. 1875).

Col'chester, a parliamentary and municipal borough in Essex, on the S. bank of the Colne, 51 miles N.E. of London by railway. From its port and suburb, Hythe, the river is navigable to the sea, 15 miles distant, and corn, malt, and oysters are exported. The baize and silk manufactures have much declined. Among its notable public buildings are the Town-hall, the Corn Exchange, the Hospital, two ancient churches dating back to William I. and Edward II., and the ruins of an old castle, a Benedictine abbey, and St. Botolph's priory built in the 12th c. Its 'camp' is the second largest in England. C. returns one member to Parliament. C. is of great antiquity. It is the Roman *Camelodunum*, or *Colonia*; the *Colne-céaster* of the English conquerors, a favourite stronghold of the Danes, and a place of note in the times of Elizabeth and of the civil war. Roman remains are abundant in the neighbourhood. Pop. mun. bor. co-extensive with parl. bor. 34,559.

St. Botolph's Priory, Colchester.

Col'chicum, the meadow saffron or 'Autumn crocus,' falsely so called, a plant of the natural order *Melanthaceæ*. *C. autumnale* is found wild in many parts of England. The flower expands in the autumn, but the leaves are not fully developed until the ensuing spring. The dried bulbs and seeds are used for the cure or alleviation of gout, though it is only a dubious remedy. They contain a poisonous principle called *Colchicine*, and act upon all secreting organs as a sedative though rather acrid, and apt to create depression, and in large doses even death. Cattle are not unfrequently injured by eating it. It is believed to have been the basis of the empirical medicine for the gout long famous as *Eau medicinale*, and Royle is of belief that *C. variegatum*, or perhaps *C. bulbocodioides*, furnished the Arabian hermodactyls, at one time considered so potent for soothing pains in the joints.

Colchicum.

Col'chis, anciently a province of Asia Minor, bounded on the W. by the Pontus Euxinus or Black Sea, on the N. by the Caucasus, on the E. by Iberia, on the S. by Armenia, and coinciding nearly with the modern Russian province of Imerethia and the district of Mingrelia. C. was from the earliest times celebrated for its trade in linen. As the birthplace of Medea, and the scene of the adventures of the Argonauts in quest of the Golden Fleece, it had a dubious reputation among the ancient poets as a seat of sorceries and enchantments.

Cold Cream, a simple ointment, applied as a cooling emollient to inflamed surfaces. An excellent C. C. may be made by melting one part of white wax in four parts of sweet almond oil, then adding gradually three parts of rose water, and stirring the mixture constantly to render it homogeneous.

Coldstream, a town of Berwickshire, on the left bank of the Tweed, 15 miles S.W. of Berwick. It was the favourite ford for the passage of the invading English and Scottish armies during war. Later on, from its proximity to England, it became as 'famous' as Gretna Green for its irregular or clandestine marriages. Pop. 1535.

Coldstream Guards, after the 1st Foot the oldest corps in the British army, one of the three regiments of Foot Guards included in the Household Brigade, and so named from having been raised at Coldstream in 1660 by General Monk. It was at first named 'Monk's Regiment.' The following is a list of the battles and campaigns at which the regiment greatly distinguished itself:—Oudenarde, Malplaquet, Dettingen, Lincelles, Egypt (with the Sphinx), Talavera, Barrosa, Peninsula, Waterloo, Alma, Inkerman, Sevastopol, Egypt (1882), Tel-el-Kebir, Suakin (1885). From this it will appear that the C. G. have had a fair share of the fighting which has engaged the attention of the army during the last two centuries.

Cole'brooke, Henry Thomas, a great Orientalist, third son of Sir George C., was born at London, 15th June, 1765. After residing in France he was appointed, in 1782, to a writership in India, where he became a judge and President of the Board of Revenue. Following in the track of Sir William Jones, he devoted himself to Sanskrit, and in 1797 published a translation of a digest of Indian laws. He laboriously collected and studied ancient Sanskrit MSS., and contributed to the *Researches* of the Calcutta Asiatic Society learned and suggestive essays on the Hindu religion, the Sanskrit language and poetry, the Vedas, &c. He was appointed President of the Royal Asiatic Society of Great Britain in 1820, and died in London, 18th March, 1837. C. was a man of wide comprehension, keen critical insight, and deep research. He was one of the first scholars who revealed the riches of the Sanskrit literature to Europeans, and his edition of the *Amara Cosha* (1808) marks an epoch in Sanskrit-English lexicography. He advanced the study of philology not so much by original speculations as by collecting and elucidating Sanskrit works formerly inaccessible to Europeans, on which succeeding researches have been based. Among C.'s other works are a *Sanskrit Dictionary* and *Remarks on the Husbandry and Commerce of Bengal*, in which he advocated free trade with India. His *Miscellaneous Essays* were published in 1837 (later ed. with *Memoir* by his son, 1873).

Colen'so, The Right Rev. John William, D.D., Bishop of Natal, South Africa, was born 24th January, 1814; graduated as second wrangler at Cambridge in 1836; was from 1838 to 1842 assistant-master at Harrow; acted as tutor in St. John's College, Cambridge, from 1842 to 1846, and was rector of Forncett, St. Mary, Norfolk, until his appointment, in 1854, to the bishopric of Natal. For the first part of his *Pentateuch and Book of Joshua* (1862)—a microscopic investigation of Scripture, displaying extraordinary acuteness, combined with an almost morbid eagerness to discover contradictions in the narrative—C. was deposed from his see by the Bishop of Cape Town, but the deposition being declared illegal by the Privy Council, he was afterwards reinstated in his diocese. On revisiting England in 1874, he was forbidden to preach in their dioceses by the

Bishops of London, Oxford, and Lincoln. C.'s theological views have created much discussion in England and a schism among the Anglicans of the Cape. It cannot be said with justice that any adequate reply has yet been given to his destructive criticism. He died at Bishopstowe, S. Africa, 20th June, 1883. His works comprise *Miscellaneous Examples in Algebra* (1848); *Plane Trigonometry* (1851); *A Translation of the Epistle to the Romans* (1861); *A Zulu Grammar and Dictionary; A Zulu Translation of the New Testament; The New Bible Commentary by Bishops and other Clergy of the Anglican Church Critically Examined* (1871); six parts of his *Pentateuch and Book of Joshua* (1862-72), and *Lectures on the Pentateuch and the Moabite Stone* (1873).

Coleop′tera, an order of Holometabolic ('complete metamorphosis') insects, represented by the numerous kinds of Beetles, and so named from the front pair of wings being hard and horny, unfitted for flight, but forming *elytræ* or wing-cases for the protection of the hinder pair. The inner margins of the *elytræ* are generally straight, and form a suture when approximated. The mouth is eminently masticatory, and consists of a *labrum* or upper lip, two *mandibles* or biting jaws, two *maxillæ* or lesser jaws, a *labium* or lower lip, and *palpi* or organs of touch appended to the *maxillæ* and *labium*. The hinder wings fold transversely when at rest. Compound eyes are always present. The antennæ or feelers vary widely in form, and are composed generally of eleven joints. The chest consists of pro-, meso-, and metathorax—three distinct segments. The tarsus consists usually of not more than five joints, but fewer joints may be developed. The larvæ generally consist of thirteen joints, inclusive of the head. The body is soft, the head in the larvæ being horny. The pupa may be enclosed in a cocoon, but its parts are always to be recognised as they lie within the pupa-case. Many variations in the wings and wing-cases exist, and the body is generally invested by a hard covering of *chitinous* or horny material. The order is classified by the number of joints in the tarsi, by the shape and form of the antennæ, and by other salient features.

Coleorhiz′a (Gr. *koleos*, 'sheath,' *rhiza*, 'root') the cellular sheath which covers the radicle (and afterwards the fibrillæ) of Dicotyledons, as it pierces the lower part of the embryo. See ROOT.

Coleraine′ (Irish Gael. *Cuil-rathain*, 'the corner of the ferns,' alluding to an incident in the life of St. Patrick), a seaport, county of Londonderry, Ireland, on the right bank of the Bann, 4 miles above its mouth. The suburbs of Killowen and Waterside, on the opposite side of the river, are joined to C. by a handsome bridge. C. has manufactures of linen, cotton, soap, leather, and paper, and carries on a large trade in grain, pork, butter, whisky, &c. The salmon fishery on the Bann is one of the most valuable in Ireland. Although ships of 200 tons can discharge at the quay of C., the real port of the place is Portrush, 5 miles distant, which has steam communication with Glasgow and Liverpool. The Barony of C. is included partly in the North Derry parl. div. of the county, and partly in that of South Derry. Pop. of township 6845.

Coleridge, the name of an English family distinguished in literature and law.—**Samuel Taylor C.,** 'logician, metaphysician, bard,' but most memorable as bard, was born on 21st October, 1772, at Ottery St. Mary, in Devonshire. While yet a child he lost his father, who was vicar of the parish. His education began at Christ's Hospital, where Charles Lamb was his contemporary. He there became proficient in Greek, but, according to himself, preferred metaphysics and theology to history and poetry. The work of Bowles (q.v.), however, changed his ideas as regards the last of these. In 1791 C. entered Jesus College, Cambridge, where he devoted his mind to classics, but did not graduate. Debt, his academic failure, and a cross in love, led him to enlist in a dragoon regiment, from which unhappy position his friends procured his release in April, 1794, after four months of soldiering. Soon afterwards, at Bristol, he engaged with Southey in a visionary scheme to found a *Pantisocracy*, or ideal communistic settlement in America; but scarcity of funds fortunately arrested this at the outset. Here, also, a volume of poems was published, and in the next year (1795) C. married Miss Fricker, whose sister became the wife of Southey on the same day. He now lived at Nether Stowey, in Somersetshire, while Wordsworth resided at All-Foxden, a neighbouring village. Here C. remained for three years, during which some of his greatest works—*The Ancient Mariner*, *Christabel*, and *Remorse*—were composed. It was at this period that C. preached Unitarianism at Taunton. In 1798 the first edition of the *Lyrical Ballads* by Wordsworth and C. appeared, and in the same year the Wedgewoods gave him the means of visiting Germany. On his return he translated Schiller's *Wallenstein*, which appeared in 1800. C. now resided at Keswick. From 1804 to 1806 he travelled on the Continent, spending the first part of this period in Malta as secretary to the governor. In 1808 he lectured in London on poetry and the fine arts; but from this time till 1816 he was under the mastery of opium. In that year he made a heroic and happily successful effort to break off the habit; and coming then into contact with Gillman, lived in his house at Highgate until he died, after four years' confinement to a sick-room, on the 25th of July, 1834. During the latter part of his life C. was an orthodox Trinitarian.

C.'s genius was subtle, comprehensive, and eminently original. As a critic, he shows keen insight and exquisite taste. As a philosophic writer, though he embodied no definite scheme and founded no special school, and is at times misty and desultory, he is yet, by his enthusiasm and learning, by the vivifying influence which he exerted over reproductive minds, entitled to be considered, as John Mill said, one of our chief 'seminal' thinkers. His teaching was a strong check to the Benthamism of his day, and his marvellous conversational powers lent him a Socratic influence over many of his youthful contemporaries. Along with De Quincey, he may be regarded as the first interpreter of German thought to Englishmen. His chief prose works are *Statesman's Manual* (1816), *Biographical Sketches* (1817), *Biographia Literaria* (1817), *The Friend* (1818), *Aids to Reflection* (1825), *Constitution of Church and State* (1830). But it is as a poet that his fame is highest and will be most lasting. *The Ancient Mariner* and *Christabel*, in which he introduced the form of lyrical narrative adopted by Byron and Scott, are full of thrilling weirdness and enchanting melody. *Kubla Khan* is a bewitching extravaganza of delicious cadences and dreamy Oriental splendour. His *Odes to France, Love, Youth and Age*, and other shorter pieces, delight us by their tender sentiment, soft fanciful colour, and unsurpassably rich and sweet music. The *Hymn in the Vale of Chamouni* stands apart from his other works. It is marked by sustained and lofty imagination, by solemn and austere religious sentiment. His dramatic attempts are not part of his characteristic work; they neither add to nor lessen his fame. See C.'s *Biographia Literaria; Specimens of C.'s Table-Talk;* Cottle's *Early Recollections of S. T. C.;* and Gillman's *Life of S. T. C.*—**Hartley C.,** eldest son of S. T. C., was born in 1796, at Clevedon, near Bristol. His early years gave evidence of great talent, but through his irregular conduct at Oxford University he forfeited the Oriel Scholarship. After some profitless life in London he went to Ambleside, and there remained till his death, 6th January, 1849. C.'s sonnets, though admirable, are excelled by his prose works, of which the chief are *Lives of Northern Worthies* and *Life of Massinger*. See *Memoir of Hartley C.* by Derwent C.; also an article in *Macmillan's Magazine*, vol. v., by Lord (formerly Sir J. D.) C.—**The Rev. Derwent C.,** son of S. T. C., was born at Keswick, 14th September, 1800. He was educated at Cambridge, served as a tutor in Plymouth, and was from 1841 to 1864 Principal of St. Mark's College, Chelsea. He afterwards became rector of Hanwell, Middlesex. He is author of a *Memoir* of his brother, H. C., whose poems and prose remains he edited; of a work on *The Scriptural Character of the English Church*, and of a Life of Winthrop Mackworth Praed. In 1861 he addressed two letters on Education to his cousin the Right Hon. Sir John T. C.—**Henry Nelson C.,** son of S. T. C.'s brother, Colonel C., was born in 1800. He wrote a work entitled *Six Months in the*

West Indies, and an *Introduction of the Greek Classic Poets*, but is best known for his *Specimens of the Table-Talk of S. T. C.*, which he published in 1835. He contributed to various periodicals, and died 26th January, 1843.—**The Right Hon. Sir John Taylor C.**, nephew of S. T. C., was born at Tiverton, Devon, 9th July, 1790. He was educated at Oxford, where he became a fellow of Exeter College, was called to the bar at the Middle Temple in 1819, was appointed serjeant-at-law in 1832, judge of King's Bench in 1835, and privy councillor in 1858. He was made D.C.L. of Oxford in 1852, and was editor of the *Quarterly* after Gifford's death, published an edition of *Blackstone's Commentaries* in 1825, and a *Memoir of Keble* in 1869. He died 11th February, 1876.—**Lord C., The Right Hon. John Duke**, son of the above, was born 3rd December, 1820, educated at Eton and Oxford, and called to the bar at the Middle Temple in 1846. He was made Recorder of Portsmouth in 1858, and a Queen's Counsel in 1861. After contesting Exeter unsuccessfully in 1864, he was elected for that city in 1865; was made Solicitor-General in 1871, and in 1873 was appointed Lord Chief Justice, and raised to the peerage, with the title of Baron C. of Ottery St. Mary's, Devon. He was a man of fine literary as well as legal acquirements, and at one time contributed to various periodicals. Died 14th June, 1894.

Coleroon', a river of India, the northern branch of the Cauvery, in the Carnatic, and forming through the greater part of its course of 93 miles the boundary between the districts of Trichinopoly and Tanjore. It falls into the Bay of Bengal 120 miles S.S.W. of Madras. From the constant deepening of the bed of the C., and a corresponding rising of that of the Cauvery, the supply of water in the latter river had become inadequate to the proper irrigation of Tanjore. This was remedied by throwing two weirs, locally called *anicuts*, across the C. in 1856. The lower *anicut* is 1901 feet long, and cost £30,000, but the revenue in S. Arcot since the construction has increased £10,000 per annum.

Colet, John, an English scholar and patron of learning, the son of Sir Henry C., a city knight, who had been twice Lord Mayor of London, was born in 1466, studied at Magdalen College, Oxford, and after spending some time in Paris, went to Italy to learn Greek. In 1504 he became Doctor of Divinity, and in 1505 Dean of St. Paul's. The death of his father in 1510 gave him the possession of an ample fortune, with part of which he at once began to found St. Paul's School. After a generous and enthusiastic career, in which he laboured with equal zeal for the revival of learning and the reformation of religion, he died, 16th September, 1519. C. had a thoroughly modern mind. An intense scorn of those mediæval beliefs, which constitute the peculiarities of Roman Catholicism, animated all his preaching; the picture of Christ drawn by the Evangelists appeared to him the only thing worthy of absolute reverence. It is not surprising that his impatient eloquence alarmed the old-world party, and but for the help of the liberal Archbishop Wareham, he might have suffered persecution as a heretic. Later on, in Henry's reign, C. would certainly not have escaped trouble. Among his published works are a treatise on the sacraments of the Church, and two treatises on the Hierarchies of Dionysius; others exist in MS. at Oxford. See Seebohm's *Oxford Reformers of* 1498, and Green's *Short History of the English People* (1875).

Col'ic (Gr. *kōlikos*, from *kōlon*, 'the large intestine') is an internal disease, painfully affecting the stomach. The face has a peculiar anxious expression. Pain may be alleviated by pressure, and hence C. is distinguished from inflammation, in which pressure always aggravates the pain. C. may be due to indigestion, or to cold, &c., when opium, chloroform, ether, or belladonna gives relief. In all cases poultices or hot fomentations do good. Sometimes C. is caused by working amongst minerals, as copper or lead. Copper C. and lead C. are characterised by the severity of the pain and the length of the spasms; in the former there is a purple line round the gums; in the latter there is a blue line round the gums. In both cases Epsom salts should be given. Lead C. is often called painter's C., because painters are subject to it from working with lead paints.

Colicoden'dron, a tropical American genus of *Capparidaceæ*, all of which have acrid properties. *C. Yeo* of Brazil possesses the acrid principle to such an extent as to be dangerous to horses and mules (Von Martius).

Colign'i or **Colign'y**, the name of a French family, 'seigneurs' of Châtillon-sur-Loing in Burgundy, from whom have come several distinguished men.—**Gaspard de C.**, Marshal of France, was the first who entered the French service after the annexation of Burgundy by Louis XI. He accompanied Charles VIII. on his expedition to Naples, and Louis XII. in his conquest of the Milanese; was created marshal by François I. after the battle of Marignano, and received the governorship of Champagne and Picardy. By his marriage with Louise de Montmorency, daughter of the Constable of France, he greatly increased his influence. C. died 24th August, 1522. Of his two sons, one, **Odet de C.** (born 1515, died 1571), became a cardinal at the age of eighteen, but having embraced the doctrines of Calvin, was excommunicated by the Pope. He publicly espoused in his 'red robes' Elisabeth de Hauteville, who was sometimes called, in spite of the ecclesiastical curse, *Madame la Cardinale*. When the civil war broke out, Odet took part in all the strifes with the Guises, but was poisoned by his valet (at whose instigation is not known) after the peace of 1570.—A still more notable person is his younger brother, **Gaspard de C.**, admiral of France, a great soldier, and a leader of the Huguenots, who was born at Châtillon-sur-Loing, 16th February, 1517. Entering the army at an early age, he distinguished himself greatly during the reigns of François I. and Henri II. at Cerisales, Carignano, Rentri, and St. Quentin, and on other occasions. At first the colleague of Condé, and on his death his successor, in the leadership of the Huguenots, whose doctrines he had embraced from purely conscientious reasons, he fought bravely at the battles of Dreux, Jarnac, and Montcontour, and succeeded in securing an advantageous peace for his party in 1570. After an attempt had been made privately to assassinate him, on the instigation of the Guises, who were jealous of the influence which his powerful mind had acquired over Charles IX., C. perished in the Massacre of St. Bartholomew, 24th August, 1572. See De la Ponneraye's *Histoire de l'Amiral de C.* The family continued to be more or less conspicuous all through the 17th c.

Coli'ma, the capital of a state of the same name in Mexico,

Colima.

with a pop. estimated at 25,736. It is in a fertile plain near the volcano of C., which rises 12,003 feet above the level of the sea. Its port, of the same name, 40 miles S.S.W. from the city, has good anchorage, but is little frequented. The *state* of C., one of the Pacific states of Mexico, has an area of 2272 sq. miles and a pop. of 73,026. The coast-line extends 100 miles, and the land, which is in general of low elevation, yields excellent cotton and many tropical products.

Coll, one of the Inner Hebrides, N.W. of Mull, Argyllshire; length about 12½ miles; greatest breadth 3½ miles; highest summit 326 feet. Much of the soil is incapable of cultivation, but some spots are remarkably fertile. The inhabitants neglect the valuable ling fisheries on the coast, leaving them to be prosecuted by fishers from a distance. Pop. 522, showing a decrease of 121 since 1881.

Coll'ar-Beam, a piece of timber connecting horizontally opposite rafters, and placed above the level of the feet of the rafter. Also the straining piece of a queen-post truss.

Coll'aring, the neck or cylindrical part of a Doric or Tuscan column.

Collat'eral Se'curity is, in law, a security besides the main one for payment of a debt or for the discharge of an obligation. Such a security can never be available further than for securing the fulfilment of the principal obligation.

Collateral Success'ion is the succession of the brothers and sisters of the deceased. Formerly in Scotland no representation was allowed in succession to personal (moveable) estate; but now the issue of a predeceasing next of kin come in place of their parent in the succession to an intestate, and take the share to which the parent would have been entitled. See BROTHERS, LAW OF SUCCESSION AMONG, SUCCESSION.

Colla'tion, a term of Scotch law. The somewhat analogous one in English law is Hotch-pot (q.v.). C. is a provision of the law of Scotland by which the heritable and moveable (real and personal) succession of a deceased person may in certain circumstances be accumulated into one mass, and divided equally among the next of kin. C. may take place either between the heir in heritage and the executors, or amongst the younger children. If the heir accept the heritable (real) estate, he has no share in the moveable (personal) estate. But he may have his share in both by giving up his exclusive right to, that is collating, the heritage. C. may take place with regard to collaterals as well as to descendants.

Collation to a Benefice is, in England, the act by which a benefice is bestowed. C. comprises presentation and institution, so that where the bishop and patron are one, as he cannot present to himself, he confers the benefice by C.

Coll'e, a town in the province of Siena, Italy, 22 miles S.S.W. of Florence, on the Elsa. It is a bishop's see, has a cathedral and castle, several manufactories, especially paper-mills, and a trade in the corn, wine, oil, and silk produced in the neighbourhood. Pop. 8773.

Collec'tions at Churches. In England C. at C. are at the disposal of the incumbent and churchwardens. Should they disagree as to the distribution, they are to be disposed of as the ordinary shall appoint. (See OFFERTORY.) In Scotland money is still collected at the doors of churches. Formerly one-half of the sum collected by the Established churches was given in support of the poor, the other half was formed into a fund for the temporary relief of sudden distress. Collections at dissenting churches are the property of the congregation. By the present Poor Law Act it is provided that in all parishes in which poor's assessment is levied, the ordinary church collections shall belong to the kirk-sessions, to be applied to no other purposes than those to which they were legally applicable before the date of the Act.

Coll'ects are brief, comprehensive prayers found in all liturgies, and consisting of five parts: invocation, the reason on which the petition is founded, the petition itself, the benefit hoped for, and ascription of praise or mention of the Lord Jesus, or both. They were so called probably because they were originally concluding prayers offered up by the priest alone, in which the previous devotions were all *collected* or summed up, or because in the C. the voices of all the people were collected, as it were, into one, instead of its being said like litanies. See Blunt's *Dict. of Doctr. and Hist. Theology*.

Coll'ege (Lat. *collegium*, a number of persons united by the same office or calling, a corporation or fraternity), in ancient Rome was an association or corporation with a certain constitution, some of them resembling a modern guild, some being of a religious character, as of the pontiffs, the augurs, &c., and others concerned with government and administration. In modern times a C. is a court or council, as of cardinals, bishops, electors, &c.; a society or corporation banded together for a common object, and for mutual help in the preservation of their privileges, as a C. of physicians, surgeons, &c. C. also means a church inferior to a cathedral, which is served by clergy living in common. The commonest meaning of C., however, in England, is that of an academic establishment endowed with revenues, and connected with a university, whose students and teachers live together in particular buildings in a monastic way, and the president of which, with the other officers, teachers, and students, forms a corporation independent of the university. In Scotland C. is more nearly synonymous with university. It is so in the case of those of Glasgow and Edinburgh, and although there are two colleges in the University of Aberdeen, the two are simply united under the same government as one to form the university. In France the C. is a high-school of a superior kind, affiliated and subordinate to the university.

College of Arms. See HERALDS' COLLEGE.

College of Justice. This term has in Scotland been applied to the Court of Session or Supreme Civil Court, composed of Lords of Council and Session, and of the members and officers of court. The court receives the title of C. of J. in the Act of 1537, and the judges of it were in 1540 termed senators. By the Treaty of Union, no person can be appointed a judge of this court who has not served as an advocate or principal clerk of session for five years, or as a Writer to the Signet (q.v.) for ten years. The judge must be at least twenty-five years of age. The admission is made by the judges in virtue of a letter directed to them by the sovereign. There is a form of trial, but the court has no power to reject the presentee. See SESSION, COURT OF.

Colle'giate Churches were parish churches turned into capitular foundations to accommodate the overflow of canons from some of the cathedrals. They are thus inferior to cathedrals in not having a bishop's throne, although a bishop or even an archbishop was sometimes head of the chapter. See Walcott's *Sacred Archæology*.

Coll'ey, or **Collie,** the name given to a Scottish shepherd's dog. The origin of the name is not at all clear. Probably it comes from *colly*, 'grimy, black,' or it may have been called after the name of a person, C. its first breeder. The C. is one of the most sagacious of dogs. For shrewdness it is not excelled by the Newfoundland or the St. Bernard. It seems to combine the merits of both. It can take the water and retrieve like the former; it can gallop up precipices and descend into crevices after man or sheep with as sure a step, as keen a scent, as undaunted intrepidity and gentle carefulness for the lost, as the latter. The stories told about the acute and accurate knowledge of a C. dog are very numerous—indeed, they surpass those recorded of the St. Bernard. Hogg, the Ettrick Shepherd, says that at one time he had several hundred lambs, which he was taking to the fold. They scampered off over the hills in three separate divisions in different directions, defying all efforts to find them. Night came, and the search had to be given up. The dog remained at his task, and in the morning he was found in a gorge standing watch over the whole of the lambs. The C. is an ornamental as well as a useful dog. The general character of the head of the C. resembles that of a fox, the nose pointed the eye rather small, but full of intelligence, mingled with sagacious craft, the ears half prick, the tips falling over somewhat, neck long and taper, shoulders and brisket deep, back rather short, coat thick and long, tail long, full feathered, and curling well over the back. The backs of the fore-legs should be feathered, the hind ones bare from the hocks, the hips wide and prominent, and the hocks well separated. The colour varies from bluish-grey and tan to lightish grey, from black and white and fawn to black and tan. An absolute necessity to the shepherd, the C. makes also a capital watchdog. Its size varies from about 18 inches to 2 feet in height.

Coll'ier, Jeremy, a nonjuring divine and polemic, was born 23rd September, 1650, and studied at Cambridge University; was appointed rector of Ampton in 1679, and chosen lecturer at Gray's Inn in 1685. His life was one long controversy. He was strongly opposed to the Revolution of 1688, writing bitter pamphlets against the Government, and falling foul of Bishop Burnet. For this he was twice imprisoned. The latter portion of his life was occupied with a more useful strife, which he commenced with a pamphlet, entitled *A Short View of the Immorality and Profaneness of the English Stage* (1698). The wits of the day, including Congreve and Farquhar, endeavoured to meet C., but he beat them at their own weapon of satire, and he is generally credited with having aided much in purifying the stage. After a life spent in literary activity, he died, 26th April, 1726. Among his other works may be mentioned an *Ecclesiastical History of England*, and a translation of the *Meditations* of Marcus Aurelius, which has been praised by Matthew Arnold.

Collier, John Payne, born in London, 11th January, 1789, descended from the celebrated Jeremy C., and for a time law and parliamentary reporter on the staff of the *Morning Chronicle*, is known as one of the most able commentators on Shakspeare and Shakspeare's contemporaries. In 1831 he published a *History of English Dramatic Poetry to the Time of Shakspeare, and Annals of the Stage to the Restoration*. It was followed in 1835 by *New Facts regarding the Life of Shakspeare*. The work, however, which created the greatest sensation was a volume published in 1853, bearing the title *Notes and Emendations to the Text of Shakspeare's Plays, from Early Manuscript Corrections in a Copy of the Folio of* 1632, *in the Possession of J. P. C.* The publication of this book caused a prolonged, fierce, and somewhat painful controversy, but the bulk of C.'s emendations seem now to be accepted by Shaksperian editors. Among the later noteworthy works of C. are a *Bibliographical Account of Rare Books* (1865), a series of reprints of the productions of early British poets and pamphleteers, and an edition of Shakspeare, completed in 1875.

Colliers, Coal-bearers, and Salters. The workmen at coal-pits and salt-works in Scotland were formerly under servitude. They became bound, independent of agreement, merely by entering the works, to perpetual service there; and in the event of sale or alienation of the ground in which the works were, the right over the workmen passed to the purchaser without express grant. This slavery was abolished by Act of Parliament 15 Geo. III. c. 28; made more effectual by another Act passed in the thirty-ninth year of the reign of Geo. III. See COAL-MINES REGULATION ACTS.

Collimation, Line of, the straight line which passes through the centre of the object-glass of a telescope and the intersection of the wires placed at the focus. The difference between the actual line and the true axis of symmetry of the telescope is termed the *error of C.*

Coll'ine (Gr. *kolla*, 'glue'), a term applied to gelatine, isinglass, and glue.

Coll'ingwood, Cuthbert, Admiral Lord, an English naval commander, was born at Newcastle-upon-Tyne, 26th September, 1750. From the early age of eleven, at which he became a midshipman, he served in the navy, his thorough seamanship, coolness, and courage enabling him to rise rapidly in his profession. He distinguished himself in 1794, when Howe beat the French off Brest, and in the battle of Cape St. Vincent in 1797. Finally, at the battle of Trafalgar, in 1805, he broke the enemy's line, and completed the victory on the death of Nelson, whose devoted friend and admirer he had been throughout life. He was rewarded with a peerage. C. died at sea, 7th March, 1810, lamented by the country and his sailors, who called him their 'father.' His *Despatches and Correspondence* were published by his nephew (Lond. 1828).

Coll'ins, Anthony, a noted freethinker, born at Heston, Middlesex, 21st June, 1676, and educated at Eton and Cambridge. He produced various shrewd and acute works, and was the friend of Locke and Le Clerc. C., who led an upright and benevolent life, died 13th December, 1729. His chief work is a *Discourse on Freethinking*. He also wrote an *Essay concerning the Use of the Human Understanding* (1707), *an Inquiry concerning Liberty and Necessity* (1715), and a book on the *Grounds and Reasons of the Christian Religion* (1724), all of which provoked vehement controversies in their days.

Collins, William, one of the best English poets of the 18th century, was born 25th December, 1721, at Chichester, where his father was a hatter. He was educated at Winchester (where, according to Warton, he wrote his *Persian Eclogues* at the age of seventeen), and at Magdalen College, Oxford. On leaving the university he went to London as a literary adventurer, and passed twelve years in toiling and idling, starving and revelling, framing projects which were never realised, publishing poems which were not favourably received, until the death of an uncle raised him above urgent want. But his sufferings had unfitted him for intellectual effort; he became nervous and partially insane, and died 12th June, 1759, in his thirty-ninth year. Hazlitt declared that C. was the only one of the minor poets of whom it could not be said that he might not have done the greatest things. With the exception of Blake, he was the most purely poetic spirit of his century. His *Persian Eclogues* (first published in 1742, and again in 1757, under the title of *Oriental Eclogues*) won the praise of Goldsmith, but have not the glow and splendour of the East. His *Odes* (1746) awoke no response in the public, but they have always been favourites with poetic minds. Nothing more delicately imaginative, pensive, and musical, rich in colour and choice in diction, was produced in the 18th c. That on *The Passions* is unsurpassed for bold and vivid personification, and exquisite changes of melody; while the *Ode to Evening* is one of the sweetest, airiest pieces in the language. Every word is faultless, every tone is true. See Moy Thomas's Memoir, prefixed to the Aldine edition of C.'s works.

Collins, William, R.A., born in London, 18th September, 1787, first exhibited at the Royal Academy in 1807, and was elected Associate in 1814, and R.A. in 1820. After the death of his father in 1812 he found himself obliged to paint portraits, though the special branch of art in which, in the earlier part of his life, he took most delight, was landscape, with rustic or homely figures. In 1814, however, he commenced to paint coast scenery, and following this path, arrived at fame and fortune. C. died in London, 17th February, 1847. Among his works, which excel in truth of form, chiaroscuro, and colour, probably the best known are, 'Happy as a King' (1836), 'The Shrimpers—Evening' (1831), and the 'Fisherman's Widow' (1835). See his *Biography* (Lond. 1848), written by his son, **William Wilkie C.,** who attained high distinction as a novelist. He was born in London, January, 1824, and intended for a commercial career, but turned aside to literature, commencing with the biography of his father. Among his earlier fictions are *Antonina* (1850) and *Basil* (1852). C. became a fellow-worker with Dickens in *Household Words*, in which appeared *After Dark* (1856) and *The Dead Secret* (1857). An immense accession to C.'s popularity was given by his *Woman in White* (1859-60). Since then he may be considered to have held a leading place among English novelists. Later productions were *The Moonstone* (1868), *Man and Wife* (1870), *The New Magdalen* (1873), and *The Law and the Lady* (1875), &c. Several of these have been dramatised. All C.'s works are remarkable for vivid portraiture, startling incident, and a surprising intricacy of plot, which at once perplexes and captivates the reader. He died 23rd September, 1889.

Collis'ion of Vessels. To prevent collision of vessels, steering and sailing rules have been laid down by the Merchant and Shipping Amendment (1862) Act. In the Court of Admiralty it has been held that where loss arises from a tempest, or Act of God (q.v.), as it is termed, the loss falls where it lights; when there has probably been fault, but no one can say who has been chiefly to blame, the loss is divided equally, or in proportion to the respective value of the ships. If the fault be clearly on one side, the owners of the ship in fault are answerable for damage. The Common Law regarded the negligence of both parties contributing to the loss, neither could bring an action, but if either with ordinary care could have avoided the disaster then the loss must fall upon that party. The Judicature Act of 1873, however, provided that in this respect or in any other where the Common Law differed from the rule in the Admiralty Court, the latter should be followed. A steam-vessel is bound to keep out of the way of a sailing-vessel, and a sailing-vessel running before the wind is bound in all ordinary cases to give way to one beating up against the wind.

Collo'dion (formed from the Gr. *kollaō*, 'I cause to stick') is a solution of a particular kind of *gun-cotton* (see CELLULOSE and GUN-COTTON) in a mixture of alcohol and ether, and is largely employed in photography and surgery. C. was discovered by Maynard, a physician of Boston. The best kind of gun-cotton for C. is prepared by soaking 1 part of cotton-wool in a cooled mixture of 16 parts of nitre, 12 parts of fuming sulphuric acid (Nordhausen vitriol), and 12 parts of ordinary oil of vitriol. The wool should be stirred about in the mixture for five minutes, then washed for a long time in a current of cold water, squeezed, and allowed to dry in the air. To prepare C., 1 part of the gun-cotton is shaken in a bottle with 16 parts of ether; after some time 1-2 parts of absolute alcohol are added, and the mixture agitated till the wool disappears. The C. thus obtained should be filtered. C. is a clear, colourless, and more or less mucilaginous liquid. Its uses depend upon the fact that when spread over a surface and allowed to dry, a tenacious film is left, which adheres closely to the material on which the C. has been spread. Thus a wound or raw surface, if painted with C., becomes covered with an artificial skin, which completely protects it from the air. For surgical purposes *flexible C.* is employed. This consists of a mixture of 6 fluid ounces of C., 120 grains of Canada balsam, and 1 fluid drachm of castor oil. C. is also employed in making small balloons, and to protect caustic substances, &c., from the air.

Collodionised Paper Process, a photographic process, invented by Corbin, which consists in employing negative paper coated with gelatine as a support for the excited collodionised film, which is preserved by a thin layer of albumen and honey. To render the film sensitive it is immersed in a bath of aceto-nitrate of silver, after which it is washed and dried. Immersion in a solution of gallic acid to which a few drops of acetonitrate of silver have been added develops the picture.

Coll'ot d'Herbois, Jean Marie, one of the most sanguinary and ignoble characters of the French Revolution, was born at Paris in 1750. He was at first an actor and dramatist, but became prominent at the time of the Revolution, distinguishing himself as one of the most violent of the Jacobins. Sent (1793) by the Convention to Lyon after its surrender, he committed the most fearful atrocities, 1600 persons being, at his orders, destroyed by grapeshot or the guillotine. He contributed to the fall of Robespierre, but was nevertheless transported to Cayenne, where he died of fever, 8th January, 1796. The *Nouvelle Biographie Générale* gives a long list of C.'s comedies, which once, it seems, had some success, though they are now only remembered by the infamy of their author.

Collu'sion is a deceitful or fraudulent agreement between two or more persons to defraud someone of his right. When proved, it has the effect at common law of making void any transaction in which it occurs. Instances of C. frequently occur in arrangements between bankrupts and their creditors; and as the proof in such cases is often difficult, our bankrupt statutes have created certain legal presumptions of C. in cases of bankruptcy.

Col'man, George, the elder of two dramatists of the name (1733-94), was born at Florence. He was an industrious and successful writer, composing or adapting more than thirty plays, besides writing poems and publishing translations. He was for a time acting manager of Covent Garden Theatre, and subsequently purchased the Haymarket. Of his pieces, the *Jealous Wife* shows perhaps the most ability. His son, commonly known as 'the Younger' (1762-1836), educated at Westminster School, Christ Church, Oxford, and King's College, Aberdeen, was also an indefatigable writer of dramas, receiving large sums for many of them, one or two of which are still occasionally acted. He also managed the Haymarket Theatre, and for a time was Examiner of Plays. His latest work was a memoir of his life, which was published under the title of *Random Records* (Lond. 1830).

Col'mar, or **Kolmar,** formerly the capital of the French department of Haut-Rhin, fell to Germany in 1870, and is now the capital of Ober-Elsass. It stands on a plain at the confluence of the Lauch and the Fecht, about 2 miles from the foot of the Vosges Mountains. The most remarkable buildings are the cathedral (1363), Hôtel-de-Ville, and the college, which contains some pictures by Albert Dürer. It has a public library of 72,000 vols. Its chief manufactures are linens, calicoes, woollens, silks, paper, hosiery, and leather, and it is the entrepôt for cotton, iron, wine, and colonial produce for Switzerland. Under the Franks, C. was a royal court, called *Columbaria*, round which the town grew up. The Emperor Friedrich II. gave it municipal rights in 1226, and it was afterwards a free imperial city. Its fortifications, erected in 1552, were dismantled by Louis XIV. in 1673. The peace of Ryswick (1697) united it to France, in whose possession it remained till 1870. Pop. town 30,399, district 55,090.

Colne, a market-town in Lancashire, 32 miles N.E. of Manchester, on C. Water, a tributary of the Calder. Mousselines-de-laine and calicoes are manufactured, and in the vicinity, coal, slate, and lime abound. Archbishop Tillotson received the rudiments of his education at the grammar-school of C. Pop. reg. sub-dist. 53,369, and civ. par. 14,023.

Col'obus, a genus of Old World or Catarrhine monkeys, in which alone, of all the species, the thumbs are absent or at most very rudimentary. This genus is allied to *Semnopithecus*, and the *C. Ursinus*, *C. Satanas*, and *C. Guereza*, are familiar species. These monkeys exclusively inhabit Africa. See also MONKEY.

Colocolo, a large wild cat occurring in the N. of S. America. The back is grey, the belly white, and streaks of black are drawn along the body and legs. It feeds principally on monkeys. In size it is similar to the ocelot.

Colocolo.

Col'ocynth, a medicinal substance consisting of the dried pulp of the Bitter Cucumber, a plant which is a native of the S. of Europe, and bears some resemblance to the common water-melon. C. is a light spongy yellowish-white substance, intensely bitter, and about the size of a small orange. It is imported chiefly from Smyrna, Trieste, France, and Spain. Its active principle is *Colocynthin*.

Bitter Cucumber.

Cologne′, the French form of the German Köln (q.v.).

Cologne Yellow, used for lacquering, and generally as an oil or water colour, is a mixture of chromate and sulphate of lead with sulphate of calcium.

Colomba′no, San, a small town of N. Italy, province of Milano, in a hilly district, 9 miles S. of Lodi. In the vicinity are found felspar, red granite, and limestone.

Colom′bia, United States of, formerly **New Granada,** a federal republic of S. America, is bounded N. by the Caribbean Sea, S. by Ecuador and Brazil, E. by Venezuela, and W. by the Pacific. It is divided into nine states or departments, each of which has area, population, and capital town, as given in the following table:—

Departments.	Area in Sq. Miles.	Population.	Capital Town.
Antioquia . . .	22,316	466,200	Medellin
Bolivar . . .	21,345	286,060	Cartagena
Boyacá . . .	33,351	699,874	Tunja
Cauca . . .	257,462	623,480	Popayan
Cundinamarca . .	79,810	571,200	Bogotá
Magdalena . .	24,440	92,170	Santa Marta
Panama . . .	31,571	288,320	Panama
Santander . . .	16,409	571,000	Bucuramanga
Tolima . . .	18,069	309,220	Ibagué
Total . . .	504,773	3,907,524	

In the W. it is traversed by the great triple range of the Andes, alternating with lofty plateaux, while in the E. and S.E. it is spread out in magnificent *llanos*, covered with dense forests, and forming the basin of the upper waters of the Orinoco and Rio del Negro. Its great river is the Magdalena, which flows throughout the state from N. to S., receives the Cauca and many smaller tributaries, and enters the Caribbean Sea after a course of 900 miles. There is every variety of climate, from the tropical heat of the coasts to the intense cold of the region of perpetual snow. The soil is fertile, but, so far at present, only a small portion has been brought under cultivation; the chief products being vegetable ivory, rubber, dyewoods, tobacco (Ambalema and Palmira), sugar, coffee, mahogany, cinchona bark, ipecacuanha, &c. Its mineral wealth is more important, consisting of gold and silver, (£650,000 annually), platinum, copper, mercury, lead, cinnabar, manganese, iron, salt, and emeralds. The Muzo emerald mines alone yield about £20,000 worth of stones annually. The foreign trade of C. is mainly with Great Britain and the United States. England receives most of the precious metals, and Germany nearly all the tobacco. Besides the railway across the isthmus of Panama (q.v.), there is a short line between Sabanilla, on the coast, and Barranquilla, where the navigation of the Magdalena begins. The Magdalena is ascended by regular lines of steam-vessels for some 800 miles. Among the industries, which are all somewhat primitive, the chief are agriculture, cattle-breeding, and mining. The capital is Bogotá. The inhabitants of the interior are mostly Indians, while the total number of white men does not greatly exceed one million. The Colombians are Roman Catholics, but no form of religion is protected by law. In spite of the opposition of the Catholic clergy, a compulsory state system of education has been established, there being 1832 schools with 95,000 scholars. There are also a national university (1700 students), 4 departmental colleges (1100 students), and several public and private institutions for secondary education. The press is free, and Government has abolished the penalty of death for crime. Each state of the republic is no longer independent, but by the constitution of 1886 it has become simply a department of the republic and its president a governor appointed by the President of the Republic. Legislation is carried on by two Houses—Senate, consisting of three members from each department; the House of Representatives, having 66 members elected every 4 years, one representative for every 50,000 inhabitants. The President is elected for six years' tenure of office. The army consists of 5500, but all able-bodied men are liable to serve in case of war.

The country, originally occupied by a semi-civilised tribe, called *Chibchas* or *Muyscas*, was conquered by Ximenes de Quesado (1536-37), and in 1718 was formed into a Spanish viceroyalty, comprising the districts Panama, Bogotá, and Quito. In 1819 it became independent of Spain, and was formed into a republic along with Venezuela and Ecuador. This union was dissolved, however, in 1829-30, and C. was converted into a separate republic in 1833. After several 'revolutions,' the constitution was finally remodelled, and the country received its present name on the 8th May, 1863, instead of that of New Granada.

Colom′bo (a Portuguese corruption of *Kalambu*, itself an Arabic corruption of the Sinhalese *Kalan-totta*, the 'Kalany-ferry'), is the capital of Ceylon, on the S.W. coast of the island, near the mouth of the Kalany-ganga, on a spit of land protected by a fort. It is the residence of the English governor, the seat of a colonial bishop, and has a pop. of 126,825. Among the more notable buildings are the cathedral, and other Christian churches, Protestant and Catholic, a Mohammedan mosque, a military hospital, and an orphanage. The houses, both of the Europeans and natives, are so hidden in clumps of coco-palms and other tropical trees that the town presents the appearance of a forest. C. may be divided into the European or White Town in the neighbourhood of the fort, and the *Pettah* or Black Town, in which most of the magazines and warehouses are situated. The esplanade of Galle-Face forms the public park of the city. C. is the chief station for steamships in Ceylon, very few resorting to the southern port of Point-de-Galle. C. possesses a European society of considerable culture. There are a museum and a public library. C. is connected with Kandy, in the centre of the island, by a railway 75 miles long, and with other parts of the island.

Colonel (Fr. from the Ital. *colonnello*, a dim. of *colonna*, 'a column'; or, according to others, but with less probability, it is Lat. *coronalis*, from *corona*, 'a crown'), in the British army, is the highest officer attached to a regiment. Except in the Engineers and Artillery, the office is a sinecure, bestowed, presumably, as a reward for long service. Besides the regimental rank of C., there is the rank of brevet-C., through which every officer must pass before he becomes a general officer. See Brevet, General Officer.

Colo′nia do Santiss′imo Sacramen′to, a strong seaport of Uruguay (Banda Oriental), on the N. bank of the Plata, opposite Buenos-Ayres. In 1845 the combined English and French fleet retook it from Rosas, then Dictator of Buenos-Ayres, to keep the navigation of the upper part of the river free.

Colo′nial Corps were certain regiments forming part of the regular British army, but devoted to the service of the colonies. As the colonies became self-ruling, it came to be considered contrary to imperial interest to keep up forces not available for general imperial purposes. The C. C. have accordingly been disbanded, except the Malta Fencibles and two West Indian regiments.

Col′onies, Laws of England regarding. All persons charged in any colony with an offence committed on the sea, may be dealt with as if the offence had been committed within the jurisdiction of the colonial court, and shall receive the same punishment as would have followed on conviction in England. The term *colony* includes all possessions abroad in which there is a legislature, except the Channel Islands and the Isle of Man. Colonial law is void if contrary to Act of the Imperial Parliament made in respect of that colony, or if contrary to any order made under such Act; but mere inconsistency with instructions from the Home Government will not make it void. Statute 28 and 29 Vict. c. 63, provides for and defines generally all legislative powers of a colony.

Colonn′a, an illustrious Roman family, which takes its name from a small village on the Alban Hills in the old compartimento of Latium, now belonging to the Rospigliosi-Pallavicini family. It traces its origin to the Counts of Tusculum, who in the 10th and 11th centuries enjoyed the highest estimation at Rome, but it first came forward independently about the close of the 11th c., and from that time till far on in the 16th it played a part surpassed in distinction by no Roman family except its hereditary rival and foe—the Orsini. By numerous fortresses, built all along the Alban and Sabine Hills to the very borders of Naples, it became repeatedly a source of terror, both to the Popes and to the Roman people, while it was perpetually mixing itself up in the bloody feuds of the age. Usually the Colonni figure as the heads of the Ghibelline party, but occasionally they are also found on the side of the Guelphs. The sons of Giovanni C. (who about 1278 was a Roman senator, and in 1288 Marchese of Ancona), **Stefano** and **Agapito,** were the founders of the two still flourishing lines of the C. family, that of *Palestrina* (now represented by the branches of C. di Sciarra, and Barberini-C.), and that of *Paliano,* usually called the line of the Grand Constable, with which is joined the subordinate branch *C.-Stigliano* in Naples. Pope Martin V. (**Oddone C.**), with numerous cardinals, generals, statesmen, scholars, and authors, belong to it, whose names are conspicuous in the ecclesiastical, political, and literary history of Italy. We can only notice here **Vittoria C.,** the most famous poetess of Italy, who was the daughter of Fabrizio C., Grand Constable of Naples, and was born at Marino in 1490. In 1507 she was married to Ferrante d'Avalos, who soon after came to his father's title—Marchese de Pescara—and who died in 1525 of wounds received in the battle of Pavia. Overwhelmed with grief, the young widow sought consolation in solitude, in study, and in religion. She occupied herself with poetical composition, and her verse, which in her early widowhood musically bewailed her lost husband, drew its inspiration in later years from elevated religious feeling. Her poems, the best edition of which was published (with a memoir) at Rome (1840) by Ercole Visconti, are perhaps too faithfully modelled on the style of Petrarch, but evince an exquisite talent and genuine sentiment. Her beauty and talents, which are said to have attracted the affectionate regard of Michael Angelo, are celebrated by Ariosto in the 37th canto of his *Furioso.* It may here be noted that the C. Palace in Rome, at the base of the Quirinal, is world-celebrated for its gallery of art and its magnificent gardens. See Coppi's *Memorie Colonnesi.*

Colonna, Cape (anc. *Sunium Promontorium,* Byron's 'Sunium's marble steep'), a headland of Greece, the most southerly point of Attica, rising almost perpendicularly from the sea to the height of 269 feet. Sixteen columns of white marble, the remains of a temple of Minerva, crown the steep and give it its name.

Colonnade′, a series of columns, placed at intervals, and arranged according to the rules of art, and of the particular order to which they belong.

Col′onsay ('the island of Columba'), one of the Inner Hebrides, W. of Jura, between Mull on the N. and Islay on the S. Separated from it by a narrow channel to the S., of not more than 100 yards wide, and dry at low water, is the isle of Oronsay. Together they are 12 miles long, with a breadth of from 1 to 3 miles. Potatoes and barley are grown, and black cattle and sheep of a superior breed are fed on the pastures. Oronsay contains the fine ruins of a priory, founded by the Lord of the Isles. Pop. of C. 358; of O. 23.

Col′ony has been applied to a great variety of settlements. The limited space possessed by the states of ancient Greece suggested the Doric colonies of Italy and Sicily, and the Ionic and Æolic colonies of Asia Minor. This was voluntary emigration of persons who proposed to form themselves into a self-supporting society, and who therefore seldom retained any connection (except that of a common religion) with the mother country. Their origin was, however, frequently appealed to for a temporary political purpose, and they were liable to be involved in the wars between the democratic and the aristocratic parties in Greece. The Greek term *apoikia,* or 'departure from home,' is therefore different in meaning from the Latin *colonia,* 'plantation of tenant-farmers,' which was made necessary by the disuse of the agrarian law. The latter were chiefly in the conquered provinces of Italy; they were accompanied by the *augur* and the *agrimensor* (who overthrew the ancient and consecrated the new boundaries); they had duumvirs, quinquennials, and decurions, in imitation of the consuls, censors, and prætors of Rome; these magistrates regulated local affairs, but political sovereignty remained at Rome. The C. was regarded by the better class of plebeians as an exile, as a renunciation of the Roman for a municipal franchise, and the state regarded it as a nursery for soldiers. Fifty such colonies were founded in Central Italy before the second Punic War, and at least twenty more from 197 to 177 B.C. in Italian Gaul, Campania, Apulia, &c. Some of these colonies were purely military, and had an ensign on their coinage; others were purely civil, *Coloniæ togatæ,* and had a plough on their coinage. The Roman C. differed from the *municipium* in this, that the former was entirely governed by Roman, the latter frequently by local law and custom. Modern examples of the military C. are Gibraltar, Aden, Malta, and St. Helena. Carthage introduced a different system of colonisation in the commercial factories which she planted round the Mediterranean, and which were imitated in the French and Dutch settlements in the East. The modern policy, however, as in the Spanish colonies of S. America, and in the African and Eastern colonies of Portugal, was to conquer the native race, and keep them down by a strong government, the members of which were taken from the home country. After the Seven Years' War (1763), England gradually took the place of France in Eastern colonisation. The English C., *par excellence,* was, however, a private adventure, as in Raleigh's Virginia, or a movement of conscience, as when the Pilgrim Fathers sailed for New England. The question of the supreme power of the mother country, which had been speculatively raised by Molyneux with regard to the Irish woollen trade, was strikingly illustrated by the failure of the directors of the Indian and African Company to give coherence or permanence to the Darien expedition. That company had, by Act of Parliament, power to make colonies, to defend commerce, and to make reprisals when attacked. Nevertheless, it was found necessary to declare war against Spain, and, of course, the unassisted C. was destroyed. But the political doctrine of trade reciprocity was a stronger link between the colonies and the mother country than even the feeling of allegiance. It was held, even in the time of Adam Smith, that it was important to bind the colonies to buy the manufactures of the mother country, while the latter gave the colonies a preferential market for raw produce. This monopoly was no doubt advantageous to the colonial capitalist, who flourished at the expense of the British consumer. The practice of restraining manufactures in the colonies is curiously counterbalanced by the modern protectionism of colonies, who find it impossible to compete with the free trade of the mother country. At the present day there exist three kinds of British colonies:—(1) those possessing responsible government where the Crown appoints the Governor and retains its veto on legislation; (2) where representative government is in force, and the Crown has only its power of veto, but where the public officers are under the control of the Crown; and (3) the Crown colonies which are absolutely controlled by the Home Colonial Department. Appeals from the colonial courts are taken to the Judicial Committee of the Privy Council. The C. is, however, disabled from such acts of independent sovereignty as the initiative in war, alliances, and diplomacy generally. Colonists are British subjects, and are treated as such by British consuls. Great Britain expends about £2,000,000 annually, chiefly for military and naval purposes, on certain of her colonies, not including India, and in return obtains about £250,000 as contributions to the payment of this sum.

Col'ophon, anciently an Ionian city of Asia, on the river Hales, 8 miles N. of Ephesus, was of little historical note, though its trade in resin is mentioned by Pliny. Mimnermus, the elegiac poet, was a native of C., and it claimed to be the birthplace of Homer. The Greek proverb, 'He has put the C., *i.e.* the finishing stroke, to it,' has probably no reference to the city, though Strabo says it originated in the fact that victory was assured to the party on whose side the famed Colophonian cavalry charged. The C., or inscription at the end of old printed books, contained the printer's name and the date and place of printing.

Colora'do (Span. 'red'), the name of two rivers in the U.S.; one rises in the Rocky Mountains, and, after a course of 1200 miles, flows into the Gulf of California; the other rises in the interior of Texas, and, after a course of 800 miles, flows into the Gulf of Mexico.

Colora'do, one of the United States of N. America, is situated among the Rocky Mountains. It is bounded by Wyoming on the N., Kansas and Nebraska on the E., New Mexico on the S., and Utah on the W., and has an area of 103,645 sq. miles. The chief rivers are the Rio Grande del Norte and the Arkansas. Pike's Peak is 11,497 feet above the sea. The discovery of gold in 1857 led to its settlement. The mineral resources of C. are immense, including not only gold but silver mines of great value, also gypsum, coal, iron, and salt. The annual yield of minerals amounts to over 41 millions of dollars. The amount of gold and silver taken from the mines amounts to over 27½ millions of dollars annually. The total debt, less sinking fund, of C. is $7,811,176. C. was admitted as a 'state' in 1876. Pop. in 1870, 39,864, and now 412,198, of whom 7730 are described as coloured. The state capital is Denver; other towns are Golden City, Mountain City, and Central City.

Colora'do Bee'tle, a genus of beetles noted for effecting great destruction in potato-fields. It has committed great ravages in America. All efforts to check this pest have been unavailing, the plants speedily succumbing to the attack of these insects, which appear frequently in great numbers. See POTATO.

Colorim'eter, an apparatus of great value in the art of dyeing for ascertaining the strength of dye-stuffs. A known weight of the colouring matter to be tested is suitably dissolved, and the colour it produces compared with a standard solution. The colorimetric test is generally applied by the intensity of colour produced by an ascertained depth of the solutions in two different graduated test-tubes.

Coloss'æ, a city of ancient Phrygia, on the Lycos, now the *Ak-su*, a tributary of the Mæander. Its people were famed for their skill in dyeing wool, but what Strabo means by *Collossean-dyed* is now unknown. C. was one of the early churches of Asia, and to its members Paul addressed an epistle.

Coloss'us, a Greek word whose origin is not known, signified a statue larger than life, but was more frequently applied to those enormously large figures which were so famous in Egyptian, Greek, and Roman art. The most celebrated Egyptian C. was the vocal statue of Memnon, in the plain of Thebes. Among the colossi of Greece, the most celebrated was the bronze statue of the Sun, by Chares of Lindus, which all agree to have been upwards of 105 English feet high, and which stood at the entrance of the harbour of Rhodes, though there is no authority for the statement that it did 'bestride' the harbour mouth. This, like the statue of Memnon, mentioned above, was one of the Seven Wonders of the ancient world. Among the famous colossi of Phidias were the ivory and gold statues of Zeus at Olympia, and of Athene in the Parthenon, and the bronze statue of the latter on the Acropolis, the point of whose spear and the crest of whose helmet were seen by sailors from the promontory of Sunium. At Rome, the most famous colossi were the statue of Jupiter on the Capitol, the bronze statue of Apollo at the Palatine Library, and the statue of Nero, which gave the adjoining amphitheatre the name of *Colosseum.*

Colos'trum, the first milk of mammalia, distinguished from ordinary milk by its yellowish colour and greater thickness, due to a large proportion of fatty principles, casein, milk-sugar, and solid constituents. See MILK.

Colour, in art, means that combination or modification of tints which is specially suited to produce a particular and desired effect in painting. Among the old masters, the greatest colourists either belong to the Venetian school, founded by Giorgione at the close of the 15th c., or were the pupils and imitators of the leaders of that school. Titian, Correggio, Paul Veronese, and Rubens are recognised generally as the greatest colourists. The excellence of C. lies, in part at least, in the subtle harmony which is seen to exist between it and the action or suggested meaning of the picture. *Local Colours* are the natural hues of objects arranged in special localities of a picture for the purpose of producing a desired picturesque effect. *Positive Colours* are the natural views of objects unaffected by any modification, as that of distance, reflected light, or the neighbourhood of colours that weaken or otherwise affect them. *Neutral Colours* are those the natural force of which is modified or broken by the reflected colours of surrounding objects.

In June, 1895, a lecture was given by Wallace Rimington on the subject of the production of colours as an expression of emotion. The new art, as explained by the lecturer, presents colour in a way different from that in which nature and art have hitherto shown it, namely, as something formal and immobile. C. will now be subjected to the influences of time, rhythm, and immediate and boundless combination. A notation of colour must, of course, be compiled, which will inform the reader at a glance of the combinations of colours and tints, just as a sheet of music instructs the reader as to the combinations of sounds described thereon. In time, instruments will be invented for treating colour just as others have for centuries dealt with sound. Colour in itself is beautiful, quite apart from form, and there would appear to be no reason for doubting the possibility of affecting the emotions through the eye by combinations of colours as they have been, and are being, influenced through the ear by combinations of sound. A 'Colour Organ' has been invented, which casts combinations of colour upon a screen somewhat on the same principle as a musical organ discharges sounds. Its object is to practically illustrate the physical analogy between sound and colour, and to present to the eye the *colour interpretation* of existing music.

Colour-Blindness is a peculiar affection consisting of an inability to distinguish one colour from another. It is often termed *Daltonism,* after the celebrated philosopher Dalton, who was subject to this affection. The most common variety of it is that in which the person cannot distinguish red from green. Poppies among green corn, or ripe fruit on a cherry-tree, have to them the same hue. Others can only distinguish black, white, and grey (which is really a mixture of black and white), and to them nature presents neutral tints only. It is said to be more common in the male than in the female. A harmless defect in most persons, it may be very serious in others, as in pointsmen, railway-guards, engine-drivers, or sailors, who have to know the meaning of signals made by coloured lights. The cause of C.-B. is not known. Three theories have been advanced: (1) that it is a defect of the structure of the retina of the eye; (2) that it is a peculiarity in the absorptive power of some of the fluids or transparent media of the eye; and (3) that the defect is in the sensorial centre in the brain. According to Dr. MacGowan, who has spent many years in various parts of the world, there is a complete absence of C.-B. among the Chinese. The American Indians are said to be almost free from the affection. Among civilised nations between 3 and 4 per cent. of the males, and two-tenths of 1 per cent. of the females suffer from C.-B. See EYE.

Co'lours, Metals, and **Furs,** are the three tinctures in Heraldry (q.v.). The metals, which are *or*, gold, and *argent*, silver, represent yellow and white, and always take precedence of the C., unless the contrary is specified. The five C. are *azure*, blue; *gules*, red; *sable*, black; *vert*, green; and *purpure*, purple; their abbreviations being az., gu., sa., vert., purp. *Tenne* or *tawny*, an orange colour, and *murrey* or *sanguine*, a dark crimson, are sometimes used, but very seldom now, in English heraldry. In French heraldry vert is called *sinople*. C. and metals, when engraved, are represented by a very convenient system of dots and lines; *or*, by dots; *argent*, is left plain; *az.*, is indicated by horizontal lines; *gu.*, by vertical lines; *sa.*, by horizontal and vertical lines, like a small check; *vert*, by diagonal lines from dexter to sinister, or heraldic right to left; and *purp.*, the reverse of the latter. *Tenne* is represented by vertical lines down through those of *purp.*; and *murrey* or *sanguine* by diagonal lines from both dexter and sinister, crossing each other.

Colours, Military, are the standards and other flags carried by a regiment. They are sentimentally regarded as symbolical of the achievements and renown of the regiment, and as forming an important part of 'the pomp and circumstance of glorious war.' Their chief use is to serve as a rallying point to the troops who serve with them, or to show to the men, following in the rear, the direction taken by the commander or front ranks.

Colt, Samuel, inventor of the C. revolver, was born in Hartford, Connecticut, U.S., 19th July, 1814, and in early life was successively a sailor and a 'lecturer.' In 1835 he took out a patent for the invention which gave him fame and wealth. In 1837 his revolver was used successfully in the Florida war, and still later in the Mexican war. C. erected large works in Hartford, on the banks of the Connecticut river, reclaiming a great deal of waste land for this purpose. He died 10th January, 1862.

Colts'foot. (See TUSSILAGO.) Sweet C. is the American name for *Nardosma*. West Indian C. is *Pothomorpha*.

Colubri'na, one of the chief divisions of the order *Ophidia* (q.v.) or Serpents (q.v.), distinguished by the fact that all its members possess solid teeth in the upper jaw, in addition to the poison-fangs with which that jaw may be provided. The fangs, when present, are immovably fixed in the mouth, and they may be deeply grooved, but never form completely hollowed or 'canaliculated' organs. The head gradually tapers off into the neck, and is not markedly triangular. It is covered by large-sized scales or *scuta*. The C. are divided into the three sections, *Innocua*, or harmless snakes; *Suspecta*; and *Venenosa*, or venomous forms. The *Innocua* possess no fangs or poison-gland, solid teeth existing in both jaws. Of this group the Boas and Pythons (q.v.), and the genus *Coluber*, represented by the common ringed or British snake, afford good specimens. This latter snake, found in Britain and Europe, inhabits mossy places generally, averages 3 feet in length, and is coloured pale olive, spotted with black above and whitish beneath. The neck is spotted yellow. The *Coluber Elaphis* of S. Europe, the Æsculapian snake of Italy, the black snake of America, are also examples of the same genus. The section *Suspecta* includes snakes with fangs placed far back in the upper jaw, and having solid teeth *in front* of them. These are all Old World snakes (*Homolopsidæ*), &c., and but little is known of their habits. The Colubrina *Venenosa* have fangs in front of the upper jaw, with solid teeth *behind* them. To this group belong the Cobras (q.v.), the water-snakes of the E. Indies, and many others. As implied by the name *Venenosa*, they are all particularly venomous.

Colum'ba, St., the apostle of the Scottish Highlands, was born at Gartan in Donegal, on the 7th December, 521. Fedhlimidh, his father, was of the Cinel Connal, a branch of whom, the Hy Neills, gave several kings to the N. of Ireland. His mother, Eithne (*Aine*), was of the royal race of Leinster. He thus possessed the advantage, especially valuable among a Celtic people, of royal lineage. His uncle was king of Ulster, and he was related to the kings of Dalriada in Argyllshire, his adopted country. He was baptised *Colum*, and was subsequently, from his Christian zeal, called *Colum Cille*—*i.e.*, 'Colum of the Church.' He began his education at Movile (*Magh-bile*, 'the plain of the large tree'), under the celebrated bishop St. Finnian, who ordained him as deacon. After studying some time in Leinster under an aged bard, Gemman, he entered the monasteries of Clonard and of Glasnaoidhein (Glas Nevin) near Dublin, whence he returned to the N. When twenty-five years of age he founded the Church of Derry in Ulster (*Daire*, 'oak copse,' the foundation of the since famous Londonderry), and about seven years later founded the monastery of Durrow (*Daire-magh*, 'the oak copse of the plain or field'). He planted various other churches from this period to the year 561, when an event occurred which was the great crisis in his life. Various accounts are given of the matter, but the following is the best authenticated:—C. copied a psalter belonging to Finnian without asking the owner's permission. (This transcript afterwards became famous as the *Cathach*, and is said to be still preserved by the O'Donnels as a very valuable relic.) Finnian claimed the copy as his property, C. refused to give it up, and the matter was referred to Diarmat, King of Connaught, who, on the principle that every *cowie* (calf) belongs to its cow (or mother), ruled that every *son-book* (copy) belongs to its book (the original). Far from yielding to this decision, C. raised a number of his clansmen, attacked and routed King Diarmat, slaying several of his followers. For this affray, which was called the battle of Culdrevny, C. is said to have been excommunicated and banished for ever from Ireland by a synod of Irish bishops. This is improbable, as it is certain that he afterwards revisited Ireland, and exerted great political and ecclesiastical influence there. The battle of Culdrevny, however, seems to have induced him to leave Ireland, and to enter on his missionary labours. In 563, C., then in his forty-second year, accompanied by twelve attendants or friends, some of them relatives, set sail for the W. of Scotland. Tradition states that he first landed at Salen, in the island of Mull, but finding the water unhealthy, he crossed to the other side of the island, and fixed his abode on Iona (q.v.). This small island has, from his day, been called *I Challum Cille* ('the isle of Colum of the Church'). The name Iona is shown by Reeves to have arisen from the mere carelessness of a transcriber, and has nothing to do either with Hebrew or with the Latin C. Scotland was at this period mainly peopled by the Southern Picts, occupying Wigtownshire, &c., the Strathclyde Britons or Cymri, whose capital was Dumbarton, the Northern Picts, who occupied the country N. of Athole along with the Hebrides, and the Scots, who ruled in Argyllshire. Connal, C.'s near relative, reigned in Argyll, and gave him whatever right he himself had over Iona. His people had embraced Christianity in Ireland. St. Ninian had ministered among the Southern Picts; St. Mungo was at that time labouring in the kingdom of Strathclyde; but the most numerous people of the whole, the Northern Picts, were still heathen. St. Adamnan tells of C.'s reaching the dwelling of the Pictish king, Brude, near Inverness, and after being for some time refused an interview, at length converting that monarch. He also relates that Brochan, King Brude's chief Druid, had a slave whom C. ordered him to release. He refused, but falling dangerously ill, he besought C.'s intercession for his recovery, which was promised, but on the condition of the slave's release. This was granted, and along with similar incidents, must have greatly advanced C.'s moral influence. In the *Book of Deer*, written in the 11th or 12th century, we read that he and his pupil Drostan came to *Abedoboir* (Aberdour) in the district of Buchan, where the Mormaor (high steward) Bede, a Pict, gave him in perpetuity that town, and that the town of Deer (*Deur*, tear) was conferred on him owing to the recovery of the Mormaor's son through the prayers of the Christians. We hear of C. also in Skye, and it is probable that he visited the Orkneys, while some of his successors took up their abode in Iceland. His biographer gives neither a minute nor a consecutive account of his travels, but merely fragmentary details.

We learn that in the year 573 his friend Connal, King of Dalriada, died, and the selection of his successor seems to have been mainly left to the decision of C. He chose Aidan, who proved himself the most talented of all his race. Next year we find him and King Aidan at the celebrated convention of Drumceat in Ireland, where, through his influence, various disputes between Argyll and Ulster were settled, and Argyll was made a free and independent kingdom. At this convention a sentence of death was passed on the bards for their rapacity and scurrility; but C. generously pleaded their cause, and procured a reversal of the decree, consenting, however, to a great reduction in their number. He visited his churches and monasteries in Ireland, and speedily returned to his beloved Iona. Here he passed peacefully away very early in the morning of the 9th June, 597, at the age of seventy-six.

Many interesting questions must be briefly passed over. We read of his conversing with his Pictish cousins, yet needing an interpreter in preaching. This seems to prove that the old Pictish language was a middle dialect between the Gaelic and the Cymric, possessing words common to both, but in several respects differing from either.

His establishment in Iona was simple and primitive, but not so rude as is often supposed. There was a most methodical arrangement of outhouses—or farm-offices, in modern language—among others, a byre, showing the error of the common notion that C. permitted no cows on the island. We also have mention alike of a kitchen and a cook, a baker and a butler.

As to the Church constitution established at Iona, while it is clear that C. himself was a mere presbyter, yet since Bede affirms that the province, and even the bishops, were subject to the Abbot of Iona, we must conclude that something like apostolic authority was exercised by the great missionary, and descended to his successors, though there is no evidence that any definite 'system' of ecclesiastical government was ever adopted by them. He greatly advanced religion in Ireland, and his successors carried the gospel to the N. of England. C. was a man of great energy and determination, but liable to outbursts of violence. He seems to have possessed an athletic frame, and Adamnan describes him as being of 'angelic beauty.' His biography, written by St. Adamnan (q.v.), has been issued, with notes and illustrations of the highest value, by Reeves. See also *Historians of Scotland*.

Col'umban or **Columba'nus, St.,** a native of Ireland, was born in Leinster about the middle of the 6th c. The Christian religion at this period flourished in Ireland as it did in no other country, and Irish missionaries went out far and wide to propagate it. C. was among the most famous of these. After a training at the monastery of Bangor—whose abbot was then Congall, the friend of Columba—C. departed for France in 589 along with twelve companions, the customary number in such cases. Here he established religious houses at Fontaine, Annegray, Luxeuil in Burgundy. His reproofs, however, offended King Theodoric, and this, together with a dispute as to the celebration of Easter, compelled the Irish monks to leave the country in 610. After travelling through Switzerland, C. founded in 612 the celebrated monastery of Bobbio among the Apennines, on the river Trebbia, where he died three years later, having by his work aided much in advancing Western Christianity. His writings, which are in Latin, comprise twelve sermons, a monastic rule famed for its brevity and simplicity, some poems, and ecclesiastical treatises. M. Guizot has praised his sermons for their eloquence and power. C.'s works are contained in the *Collectanea Sacra* of Flemming (Louv. 1667), and his Life was written by Abbot Jonas, a successor in the abbacy of Bobbio. C.'s name is preserved in the Lombard town of San Colombano.

Columba'rium (Lat.), a dove-cot. The term was also applied to a sepulchral chamber fitted up with niches resembling the holes of a pigeon-house, for the reception of funeral urns, called *ollæ*, and formed of baked clay. In these the ashes of the freedmen and slaves of great families were frequently deposited. A very perfect C. was discovered at the Villa Rufini near Rome in 1822.

Colum'bia, or **Or'egon,** originally a vast region of N. America, on the Pacific slope, extending from California to Alaska. It was claimed both by Spain and England, and was for some time a cause of dispute between the U.S. and England. By the treaty of 12th June, 1846, the present boundary—49° and the Strait of Fuca—was agreed upon, and the original region is now divided into British C. (a province of Canada), the state of Oregon, and the territory of Washington.

Columbia, British, a province of the Dominion of Canada, is bounded E. by the Rocky Mountains, W. by the Pacific Ocean, S. by Washington Territory, and N. by the rivers Simpson and Peace. It includes Vancouver's Island (q.v.), and has an area of 382,300 sq. miles, and a pop. of 98,173. The province has a rugged coast-line of some 700 miles, along which are scattered numerous islands, the largest after Vancouver being Queen Charlotte Island, Pitt Island, and Prince Royal Island. The mainland is traversed from N. to S. by two westerly ranges of the Rocky Mountains, and is watered by the Fraser, with its tributary the Thomson, and by the Simpson, the Columbia, and the Skeena. The climate varies greatly, according to the altitude and distance from the sea, but in the most populous parts it is temperate and equable, the temperature ranging from 75° F. in summer to 22° in winter. There are occasional tracts of rich arable land, and the hills and plains everywhere afford excellent bunch-grass pasture. Immense forests of cedar, pine, oak, maple, &c., offer inexhaustible supplies to a rapidly growing timber trade. Sea-otters, black, red, and silver foxes, fur seals, martens, beavers, &c., yield costly furs, while there are also buffaloes, bears, deer, goats, and grouse and other game in abundance. The fish found on the coasts and in the rivers include whales, seals, sturgeon, salmon, cod, halibut, anchovies, &c. The Fraser is specially famed for its salmon and its small oily 'oulachans.' The fish produce for 1893 was valued at £888,972. But the importance of the province is mainly owing to its vast mineral resources. The mountains are composed chiefly of granite or mica-schist, with here and there masses of sandstone, limestone, and intruded trap, interbedded with clay-slate, containing auriferous quartz. To the N. coal-beds and iron pyrites occur, the latter in great quantities. Gold is found everywhere, and among the other minerals are silver, iron, and copper. Steam-vessels are now plying on the rivers, and the Pacific Canadian Railway with its terminus in Vancouver's Island, after passing through the province, was completed in 1885. The capital is Victoria, at which the imports in 1893 were valued at £636,546, and the exports at £410,821; and the other important places are New Westminster, Fort Alexander and Fort George. B. C. became a member of the Dominion of Canada in 1871. It sends six representatives to the Parliament at Ottawa, and has a local Legislature, consisting of 33 members, an Executive Council, and is presided over by a Lieutenant-Governor, appointed by the Governor-General. There are 150 schools of the higher grade, with 10,780 pupils under 230 teachers, and 282 public schools. The schools are entirely supported by Government. The revenue is estimated at £205,000, and the expenditure at £287,000, the net amount of public debt being over £339,000.

Columbia College, New York city, was founded in 1754, and is the fifth in regard to age in the U.S. It is controlled by the Episcopalians. C. C. has a law school, and a flourishing 'School of Mines.' In 1888 it was opened to women.

Columbia, District of, is the seat of the Federal Government of the United States. It lies on the left bank of the Potomac, at the head of sloop-navigation, and originally belonged to the state of Maryland. When it was found necessary to establish the general Government in a district free from any local state jurisdiction, Maryland and Virginia gave up for this purpose a piece of land 100 sq. miles. The part on the right bank of the Potomac was afterwards given back to Virginia, and the D. of C. is now 60 sq. miles. It is governed municipally by three commissioners appointed by the President, is not represented in Congress, and has no municipal legislative body. The citizens do not vote on national or municipal concerns. It is co-extensive with the city of Washington. Pop. of district is 230,392, of whom about one-third are coloured.

Columbia River, or **Oregon** (the latter is the Indian name), the largest river on the W. side of N. America, rises in the Rocky Mountains. It pursues a winding course, and with its large and numerous tributaries drains an extensive region. Latterly it flows almost due W., near the N. boundary of the state of Oregon, and after a course of 1000 miles, enters the Pacific between Cape Disappointment and Point Adams. It furnishes the only harbour on the Pacific slope between San Francisco and Port Discovery, but although the mouth is 5 miles wide, there are only 4 or 5 fathoms of water at the bar. Navigation is open both to English and Americans, but vessels can only ascend about 100 miles. The river was discovered by Captain Gray of Boston in 1792, who gave the name of his vessel, C., to it.

Colum'bidæ, a group of birds usually included among the sub-orders of the Insessores or Perchers, but occasionally considered a separate order of the class *Aves*. The C. are represented by the various groups of doves and pigeons. They perch on trees, a habit which ordinary Rasores do not exhibit. The upper mandible is horny, and arched at its apex, whilst it is also arched at its base, where the nostrils, covered by a cartilaginous plate, are situated. This plate is usually covered by a soft vascular membrane, which may appear in the form of a wart-like process. The wings of the C. are more powerful than those of ordinary Rasores. The hinder toe is as well developed as the three front toes, and is placed on the same level as the latter digits. These birds are all monogamous, and generally pair for life. Their young are born in a naked, helpless state, and thus differ from the young of Rasores. The crop is double, and of large size. The C. inhabit both warm and temperate climates, and from their susceptibility of domestication present innumerable varieties. The rock-dove is the progenitor of our domestic breeds. See also CARRIER PIGEON, DOVE, FRUIT PIGEON, GOURA, GROUND PIGEON OR DOVE, PASSENGER PIGEON, &c.

Rock-Dove.

Col'umbine, a genus of plants of the natural order *Ranunculaceæ*. There are various so-called species—many no doubt only varieties of each other—of which the best known is the common C., long a favourite garden flower, and at one time esteemed in medicine as a diuretic and aperient. Most of the species of it are natives of the temperate and colder regions of the northern hemisphere.

Colum'bium, or **Nio'bium,** a rare metal, discovered in 1801 in *Columbite* from Massachusetts, and since then in a few other minerals. C. is identical with Rose's niobium, and not with tantalum, as supposed by Wollaston.

Colum'bus (the Latinised form of the Ital. *Colombo*, Span. *Colon*), **Christopher,** born at Genoa in 1436, was the son of a woolcomber, and was sent at an early age to school at Pavia, where he showed a taste for geography, geometry, and astronomy. At the age of fourteen he went to sea, and after having made a number of voyages in the Mediterranean, he made the bolder venture of a voyage to Iceland in 1467. About 1470 he settled in Lisbon, and married Phillipa Palestrello, the daughter of an Italian navigator, who, dying soon afterwards, left to his son-in-law all his charts, maps, journals, instruments, &c. These C. turned to account by constructing globes and maps for sale to support his family. About this time also he joined several successful expeditions to Guinea. At what period he at first conceived the idea of a passage westward to the shores of India it would be difficult to determine. His expeditions, however, to Iceland (where he *may* have read the record or heard the story of the earlier Norse discovery), to Madeira, the Canaries, the Azores, and the Portuguese settlements of Africa, suggested to him the possibility of crossing the Atlantic. His magnanimous spirit rose to the conception of the sea-passage to India, and he proposed his plans for the discovery of this W. passage successively to the states of Genoa, Portugal, Venice, France, England, and Spain. His project was regarded for many years as the hallucination of a visionary; but amid all his disappointments the magnificence of his scheme, and his firm conviction that he was the destined instrument of Heaven to carry the banner of the cross to all the ends of the earth, comforted and fortified his spirit. Years spent in pressing a disregarded suit, however, exhausted his means; and when, in 1480, he was travelling with his little son, Diego, in Andalusia, resolved to turn his back on Spain and appeal to France, he found himself destitute of the bare means of subsistence. Stopping before the convent of La Rabida, he begged for bread and water for his child. This act of paternal solicitude directly opened up the hitherto closed path to success, to the most splendid discovery in the annals of the race, to never-dying fame. Attracted by C.'s distinguished appearance, the superior of the convent entered into conversation with him, discussed his scheme for crossing the Atlantic, and furnished him with means and credentials to the court of Spain. Queen Isabella, after some time spent in hesitation and reflection, declared herself 'ready to assume the undertaking.' The arrangements between C. and the Spanish sovereigns were concluded 17th April, 1492. Appointed admiral, viceroy, and governor-general of all such lands as he should discover, C. set sail with three vessels—two of them barques—and 120 men from Saltes, near Palos, on the 3rd August, 1492, and after a voyage of seventy days (during one-third of which he was detained refitting at the Canaries), he discovered the New World on the 12th October. The land first seen was one of the Bahama Islands, upon which C. landed, and with tears of joy and devout thanksgiving he solemnly planted the cross upon it, and named it San Salvador. He also discovered the islands of Cuba, Santo Domingo, &c., after which he set sail for Spain, and arrived there 15th March, 1493. After this time C. made three successive voyages, discovering the Caribee Islands, Puerto Rico, Jamaica, Trinidad, and the N.E. coasts of S. America. The victim of misrepresentations, and driven by his officers and crews to abandon his legitimate object of discovery for the search for gold, and for the illusory El Dorado, the latter years of C.'s life were wasted; he lost the favour of King Ferdinand, and on 20th May, 1506, he died at Valladolid in poverty and neglect. His remains were buried with great pomp at the King's expense, and over his grave a superb monument was raised.

A short but interesting biography of C. by his son, Don Fernando Colon, is printed in Barcia's *Historiadores primitivos* (Madr. 1749). The diary of C. on his voyage of discovery is to be found in Navarrete's *Viages de los Españoles* (Madr. 1825-37), and has been translated into French, with annotations and additions, by Rémusat, Balbi, Cuvier, &c., under the title *Relations des quatre Voyages enterpris par C., suivies de divers Lettres et Pièces inédites, &c.* (Par. 1828). Latterly (Lyon, 1864) Torre prepared a *Raccolta completa* of C.'s writings. We may also note the biographies of C. by Bossi (Mil. 1818), Irving (Lond. 1828), Sanguinetti (Gen. 1846), Reta (Tur. 1846); and the discussion of disputed points in Humboldt's *Cosmos*, and *Examen Critique de l'Histoire de la Géographie, &c.*

Columell'a, L., Ju'nius Modera'tus, the most copious and best-informed writer among the Romans on rural affairs, was born at Cadiz, and flourished in the early part of the 1st c. Any knowledge that we possess respecting him is derived from casual notices scattered through his writings. He died, probably at Tarentum, about A.D. 42. C.'s great work, *De Re Rustica*, in twelve books, is a systematic treatise on agriculture. He also wrote *De Arboribus*, in one book. The most complete edition of C. is that of J. G. Schneider (Leipz. 1794-97), in the *Scriptores Rei Rusticæ*, containing an account of the various MSS. and of the gradual emendation of the text. Translations of C. exist in English, French, German, and other tongues.

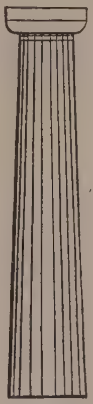
Columellia'ceæ, a small order of Dicotyledonous plants, consisting of *Columella*, a genus of plants from the Andes, comprising two or three species. It is most nearly allied to the *Saxifragaceæ*, among which it may probably in time be allowed to take its place.

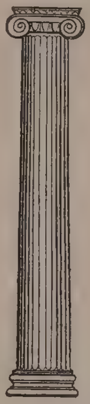
Col'umn (Lat. *columna*), a pillar of various materials, either standing alone, or supporting a superincumbent mass of building, or itself merely an architectural decoration. The solitary C., set up in memory of some person or event, is a structure of great antiquity. Jacob set up a pillar on Rachel's grave, and Absalom in his lifetime reared one for himself, because he had no son to keep his name in remembrance. It was not uncommon for the kings of the ancient East to inscribe their deeds on a pillar of stone, the latest discovered and most important of these being the Moabite Stone (q.v.), above 3 feet high, and about 2 feet in breadth as well as in thickness. As famous specimens of the solitary C., Pompey's Pillar, near Alexandria in Egypt, the columns of Trajan and Antonine in Rome, the London Monument, the Alexander monument in St. Petersburg, and, latest and grandest, the C. of Victory erected at Berlin in 1873, may be mentioned.

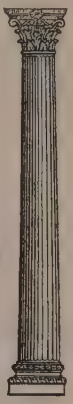
The C. in architecture which supports a roof or entablature presents a special aspect of the civilisation of every country which has ever found time to enjoy and cultivate the arts of peace. In the architectural monuments of ancient *Egypt*, the C. is always found forming a portico inside the building, has no fixed proportion between the diameter of the shaft and its height, and frequently resembles the trunk of a palm-tree. The shaft of the *Assyrian* C. was tall and slender, and the capital sometimes terminated in two half bulls placed back to back. Rawlinson, in his *Five Great Monarchies*, gives an engraving of two capitals, one of which is very like the Ionic, and the other rather resembles the Corinthian style. The C. of the historical remains of India, has a massive shaft surcharged with ornamentation; the capital is sometimes spheroidal, at other times it exhibits a sculpture of the lion, the bull, the elephant, or some fantastic animal. The kind of C., however, to which our attention must mainly be directed, is that which originated in Greece, and which with modifications has been reproduced in all countries to which Greece transmitted its civilisation and its arts. The Greek C. may be described as a pillar of wood, stone, or iron, circular on the plan, and rarely polygonal; either a truncated cone—that is, with the diameter of the shaft diminishing upwards, but having a slight swelling, called the *entasis*, about a third of its height from the base; or cylindrical—that is, with the diameter of the shaft the same from base to capital. It is divided into three principal points, the *base*, *shaft*, and *capital*—respectively its foot, body, and head.

There are three styles or orders of the Greek C.—the *Doric*, the *Ionic*, and the *Corinthian*; and to these the Romans added two other orders—the *Tuscan*, which is only a modification of the Doric, and the *Composite*, which is a combination of the Ionic and the Corinthian. The Doric and the Ionic columns were in use as early as the 30th Olympiad, B.C. 656, while the Corinthian is not known to have existed earlier than the 4th c. B.C.

The *Doric* is said to have been invented by the Dorians; it was frequently employed by them in their temples, and corresponds with the dignified and serious character traditionally assigned to them. It has no base, the foot of the C. resting immediately on the base of the rest of the temple. The shaft is a circular stem on which the entasis is very observable. Only on rare occasions was it monolithic; it was usually composed of drums laid on each other without mortar, but fastened to one another with dowels of cedarwood. Lengthwise this C. was striped with circular indentures, called *whippings* by the Greeks, *flutings* by us, the edges of which form sharp angles. On the shaft rests the chief characteristic of every style—the capital. It consists of three parts—the *neck*, a continuation of the shaft, from which it is separated by one or more indentures, called *amulets;* the neck widens in its upper part, and is generally ornamented with several amulets. Above this is the principal feature of the capital, the *echinus*, a circular ledge projecting forcibly all round. It is the supporting power of the C. under the weight of the beams and roof resting upon it. Above it there is the third part of the capital, the formal-looking beaver, or *abacus*, a square slab with square edges, which receives the chief beam or architrave. The height of the Doric C. is usually only four or five lengths of the diameter at its base.


Doric Column.


Ionic Column.


Corinthian Column.

The *Ionic* C. is more slender than the Doric; this and its more ornamental appearance being supposed to give expression to the lighter and more versatile character of the Ionic people. Its height on the average is equal to eight diameters. The base has the *plinth* as its lowest part, and above it there are two or more bolster-like prominences, each called a *torus*, which are separated from each other by a round groove called the *scotia*. The length of the diameter diminishes less upwards than that of the Doric, and between the flutings there are small flat bands called *fillets*, in place of the sharp angles of the massive Doric C. The neck is embellished with ornaments; the echinus or *ovole* is less prominent, and shows the 'egg-and-arrow' carving which gives it the latter name. But the capital is rendered most striking by its *volutes*, which look like the abacus drooping under the weight of the architrave. There are two volutes to the face of the Ionic C., and two to the back. Sometimes, however, the volutes are placed diagonally, especially on the C. at the end of a row. Above them is a small slab, also ornamented, which receives the architrave.

The *Corinthian* C. resembles the Ionic in the proportions and mouldings of the base and shaft, but its capital is very strikingly peculiar to itself. It takes the shape of an open chalice formed by acanthus leaves. There are two rows of leaves, one above the other, eight in each row, the stems of the upper leaves rising from the same level as those of the lower. In the interstices between these masses of leaves are seen stems with smaller chalices at their tops, from which are developed two stalks, each of which droops like a volute under the weight of the abacus. The sides of the Corinthian abacus are concave in plan, being curved out so as to form a sharp point at each corner, which is cut off.

No authentic examples of the *Tuscan* C. have been left for observation; but it has been constructed according to a description given by Vitruvius in his work *De Architectura*. It differs from the Doric in having a base which consists of a plinth and tones; the shaft is not fluted, and the neck or collaring of the capital is separated from the shaft by a small convex moulding, called an *astragal*. Like the Doric, it has, as its chief feature, the echino-abacus capital.

The C. of the *Composite* order differs from that of the Corinthian mainly in the details of its capital, which is of a mixed character, blending the Ionic volutes with the Corinthian foliage. The outline of the leaves of the acanthus is, however, bolder than that of the Corinthian, and instead of two rows of leaves, there are sometimes three, between which volutes appear other flowers also, and the forms of men and animals. The order to which this C. belongs was specially affected by the Romans, the greater number of their large edifices being built in the Composite style. See ORDER, ENTABLATURE.

Column, Military, is a mass of soldiers several ranks in depth. A C. is said to be *open* when the spaces between the ranks composing it permit of their wheeling into line; otherwise it is a *close* or *half-distance* C. In action, authorities are not agreed as to the relative advantages of *line* and C.; English commanders have generally been in favour of the former, the French of the latter.

It is stated of the great Duke of Wellington that, while as Colonel Wellesley, he was still serving in India, he was observed by his brother officers to be in a restless and perturbed state of mind, and was heard to mutter at times during the day 'I feel sure they can do it,' and 'if they can they will whip the world.' Some of his friends began to fear that the climate had affected his brain; at length one of them ventured to ask for an explanation; whereupon he cried out excitedly, 'Why, fight in line! If ever I have a command in Europe, I'll make my men fight in line, and drop the column altogether.' He was as good as his word, and the result of the tactical change upon the British troops was another proof, if any were wanted, of the sagacity of the great commander.

Col'ure, a semi-obsolete term in astronomy, applied to any great circle of this sphere passing through the equinoxes and solstices.

Colym'bidæ, a family of *Natatores* or Swimming birds, represented by the Grebes and Loons or Divers, the latter being the typical forms. They have the three front-toes united by a web, and inhabit the coasts, seeking their food in the sea. In the grebes, the toes are united only at their bases by a membrane, and present broad lobes. The beak in all C. is conical and pointed, and the legs are placed far back on the body.

Col'za Oil is obtained by means of crushing-mills from the seeds of the Colza or summer rape. Other species of cabbage yield a similar oil. The plant is largely cultivated in France, and the N. of Europe generally. C. O. is yellow, and the quantity procured averages about one-third the weight of the seed. It is used chiefly for purposes of illumination. *Rape-cake*, the residue after expression of the oil, is useful for manure.

Co'ma (Gr. *kōma*, 'a deep sleep') is a term used in medicine to describe a state of more or less insensibility, from which a patient can with difficulty, if at all, be roused. In severe cases of C. there is on the part of the patient not only obliviousness to all around him, but dilated pupils, strong stertorous breathing, and flaccid hands and legs. C. may be caused by Apoplexy (q.v.), in which case the person cannot be roused at all, and one or both pupils are dilated; by Concussion (q.v.), in which the breathing is easy and the pupils natural, while the patient in general soon awakes to partial consciousness; by opium poisoning, in which case the pupils are contracted, the breathing slow and stertorous, and the patient at first can be partially roused; or by intoxication, in which case there is generally an alcoholic smell in the breath. The treatment depends on the cause.

Coma Bereni'ces ('hair of Berenice'), a small and inconspicuous constellation of the northern hemisphere, situated between the tail of Ursa Major and the head of Virgo.

Comac'chio (the ancient *Comacula*), a fortified town and bishop's see, in the province of Ferrara, Central Italy, between 2 and 3 miles from the Adriatic, in the midst of an unhealthy lagoon, 140 miles in circumference, and famous for its eel culture. Across the narrow belt of mud, which separates the lagoon from the Adriatic, canals have been constructed which admit the fry of the eel, mullet, &c., into the lagoon, where they fatten, and in due time are captured and sold. About a million pounds weight are caught annually. The eel-harvest is in autumn, and the men employed in it are lodged in barracks. There are rich saltworks in the neighbourhood. Pop. 10,464.

Comay'agua, a town of Honduras, a republic of Central America, on the river Ullua, near the S. edge of the plateau of C., noted for its beauty, fertility, and fine climate. The town was founded in 1540, became the seat of a bishop in 1561, but was almost destroyed in the civil broils that followed the 'emancipation' of the country from Spanish rule. It is now recovering, but its commerce is still unimportant, though a railway to Puerto Caballos, and to Fonseca Bay, on the Pacific, foreshadows a future prosperity. The only building of mark is the cathedral, and even of it nothing is fine but the outside. Pop. 6240.

Comayagua.

Comb (Old Eng. *camb*, Dutch *kam*, Fris. *kaem*, Low. Sc. *kaim*, Ger. *kamm*), an instrument with a series of teeth for arranging or fastening the hair, as well as for dressing and cleansing wool, flax, &c. Combs, as an article of the toilet, are of great antiquity; the Greeks and Romans used boxwood, ivory, and metal in their construction, but there is no evidence to show that women in early times employed combs to support the hair. Ancient burial-places in England have furnished examples of bone and ivory combs belonging to the Roman and Anglo-Saxon periods. In mediæval inventories of ecclesiastical treasures, combs are frequently mentioned, for it was customary for the priests before celebrating mass to wash their hands and arrange their hair. These ceremonial combs are usually carved or otherwise ornamented An ivory C., which belonged to St. Cuthbert is preserved at Durham, and that of St. Loup, of ivory, jewelled, and carved with symbolical animals, is to be seen at Sens. The materials used in C.-making are horn, bone, wood, ivory, tortoise-shell, hardened india-rubber, and metal. Horns, having their tips cut off, are rendered pliant by heat, split up in the direction of the grain, and pressed flat. In the manufacture of side and ordinary dressing-combs, a piece of horn of the required size is stamped out, and from it two combs are made at once by means of the *parting-engine*. This ingenious machine is provided with a tooth-cutter, having a vertical movement, and by means of a cogged wheel, the plate of horn is shifted, as the cutter is rising, through a space equal to the interval between one tooth of the C. and the next. When all the teeth are cut, two complete combs, the teeth of the one fitting exactly into the spaces of the other, are *parted* by a dexterous pull. The teeth are then finished off with wedge-shaped files, called the *graille*, *carlet*, *topper*, &c., and the whole smoothed, buffed, and polished. Tortoise-shell is similarly operated on. Imitation tortoise-shell combs are made by treating the horn with nitric acid, and staining it with a composition of soda ley, quicklime, red-lead, and dragon's blood. Small-toothed combs are cut with a circular saw. Cheap and durable combs are now extensively made from vulcanite, in much the same manner as those from horn.

Combe, Andrew, M.D., an eminent physician, was born in Edinburgh, 27th October, 1797. After studying medicine there and in Paris, he commenced to practise in Edinburgh in 1823, was appointed physician-in-ordinary to the King of Belgium (1836), which he was unable to retain on account of his health, and afterwards a physician-in-ordinary to the Queen in Scotland. He died at Edinburgh, 9th August, 1847. Three years later his *Life and Correspondence* were published by his brother George. C., who was in every sense a most excellent, amiable, and benevolent man, has enriched medical literature with various valuable works, of which may be mentioned *The Principles of Physiology applied to the Preservation of Health* (1834, 15th ed. 1860.) **George C.,** brother of the preceding, a phrenologist and philosopher, was born 21st October, 1788, at Edinburgh, where he was educated, and became a Writer to the Signet in 1812. In 1816 he made the acquaintance of Dr. Spurzheim, the well-known phrenologist, and ultimately adopted his principles. The fruit of this conversion was seen in his *Essays on Phrenology* (1819), and *Elements of Phrenology* (1824), which became very popular. In 1828 appeared his *Constitution of Man considered in Relation to External Objects*, which caused a considerable amount of hostile criticism. The real objection to C.'s philosophy is not what he says, but what he leaves unsaid. In 1833 C. married Cecilia, daughter of the famous Mrs. Siddons. In 1837 he retired from the practice of his profession in order to give himself up to scientific and philosophical study, and from his active pen proceeded numerous books, not only on Phrenology, but on Popular Education, Moral Philosophy, Criminal Legislation, and Prison Discipline, while he delivered courses of lectures on subjects with which he was familiar, in Great Britain and the United States, and on the Continent. His last work was published in 1857, entitled *The Relations between Science and Religion*. C. died 14th August, 1858. See Gibbon's *Life of G. C.* (Lond. 1878).

Com'bermere, Stapleton Stapleton-Cotton, Viscount, an English general, son of Sir Robert Salisbury Cotton, was born 14th November, 1773, at Llewenny, in Denbighshire. He entered the army in 1790, distinguished himself in India, especially at the siege of Seringapatam, and in the Peninsular War. In 1810 he received the command of the whole allied cavalry under the Duke of Wellington, and fought in most of the Peninsular battles, being wounded at Salamanca. He was raised to the peerage as Baron C. in 1814. Among the numerous offices he filled subsequently to Waterloo were those of Governor of Barbados, Commander of the Forces in the West Indies, Commander-in-Chief in Ireland, and Commander-in-Chief in India, in which last position he captured the famous fortress of Bhurtpore in 1826. In the same year he was made Viscount; in 1852 he succeeded the Duke of Wellington as Constable of the Tower, and in 1855 was made Field-Marshal. C. died 21st February, 1865.

Combina'tion (in sociology). This word has lately come into use, legally and politically, and denotes the union of persons having a common commercial interest, with the view of promoting that interest. It is chiefly employed in relation to the proceedings of the working classes for retaining monopolies and advancing the rate of wages. The promotion of these ends is chiefly sought after by means of what are called *trades unions*. In former times combinations, whether of workmen against their masters or of masters against their workmen, were illegal, and punishable summarily by justices of the peace. This state of law was modified by statutes 6 Geo. IV. c. 129; 9 Geo. IV. c. 31; and 22 Vict. c. 34 and very much altered by statute 38 and 39 Vict. c. 86, called The Conspiracy and Protection of Property Act 1875. An agreement or combination by two or more persons to do or procure to be done any act in contemplation or furtherance of a trade dispute between employers and workmen cannot now be indicted as a conspiracy if the act be not punishable as a crime. Trades unions and combinations, with the laws relating to them, were the subjects of a Royal Commission, which issued its report in 1869. The report gave a complete view of the recent alterations and working of the law regarding the subjects of inquiry. It is now provided that the purposes of trades unions shall not be held illegal because they are in restraint of trade, so as to render void or voidable any agreement or trust executed under them. Trades unions may be registered. The law repeats former enactments and provides against violence and coercion on the part of unionists, and criminal unions and illegal contracts are defined.

To render C., when not accompanied by intimidation of others, illegal, is plainly an infringement of personal liberty. If two or two hundred men—for the principle is the same in both cases—agree not to work for their masters under a certain rate of wages, they have just as much right to do so as their masters have to agree not to sell the produce of their workmen's labour under a certain price; the right in each case being unquestionable. It is equally plain that, when those who combine also try to force others to join them, *they* are infringing on personal liberty.

Combreta'ceæ, the Myrobalan order, a natural order of Dicotyledonous plants, natives of the tropics of America, Africa, and Asia, containing about 200 species, remarkable for their astringency. Myrobalans are produced by various species of *Terminalia*. See BEDDA NUTS.

Combus'tion may be popularly defined as the consumption of a substance with evolution of heat and light, when it is raised to a sufficiently high temperature in air or oxygen. The phenomenon of C. depends upon the union of the combustible body with oxygen, which, like other chemical actions, causes the disengagement of heat, and if sufficiently intense, of light also. Thus when charcoal is raised to a red heat, it continues to glow until it has burnt away, providing that sufficient air is present to support its C. On examining the substances which have been produced, it is found that they are wholly gaseous, and consist either of carbonic oxide or of carbonic acid, according as the supply of air has been limited or excessive. Candles, coal, gas, &c., contain hydrogen in addition to carbon, and when burned produce water as well as the oxides of carbon. The process of respiration is another and very beautiful instance of C. Venous blood, highly charged with effete and useless matters rich in carbon, is pumped by the heart into the lungs, and is there exposed over a large surface to the action of the oxygen of the air. The useless materials of the blood become oxidised to carbonic acid and water, and escape from the body during the act of exhalation, while a new supply of oxygen is taken into the lungs again during inspiration: the heat produced by this oxidation or slow C. is carried off to all parts of the system by the purified (arterial) blood, and serves to maintain the temperature of the body.

The term C. is sometimes used in a more general sense by the chemists to denote other chemical actions than those of oxidation, attended with extrication of heat and light. Thus when copper or antimony in a state of fine division are thrown into chlorine gas, they become red-hot and burn away, and in the same manner when a lighted candle is plunged into chlorine it continues to glow.

The theories regarding C. have varied from time to time, and have played an important part in the history of chemistry. Perhaps the most remarkable of these theories is that of *Phlogiston*, first brought forward by Stahl. Stahl believed that all combustible substances contained an inflammable material, which received the name of *Phlogiston*, *terra secunda*, or *terra inflammabilis*, and which was lost when they were consumed. Lead, for instance, when heated in air, smoulders away, and is eventually converted into a yellow powder (litharge). This yellow powder Stahl and his followers believed to be lead deprived of its phlogiston, or *dephlogisticated*. On heating litharge with charcoal, metallic lead is separated and the charcoal disappears. To account for this, it was assumed that the dephlogisticated lead took phlogiston from the charcoal and thus returned to its original state, whilst the charcoal lost its phlogiston and was converted into a gas. This theory was overturned by Lavoisier, who proved conclusively that a substance did not lose anything when burnt, but, on the contrary, gained in weight, and moreover gained in weight by an amount equal to that of the air consumed. The discovery of oxygen by Priestley paved the way for Lavoisier, and enabled him to explain the conversion of lead into oxide of lead or litharge when heated in air, and the subsequent *reduction* of the litharge by the charcoal, which removes the oxygen and forms with it the gaseous compound carbonic oxide.

Come'nius (*Komensky*), **Johann Amos,** an educational reformer, was born at Comna, near Brünn, 28th March, 1592. After completing his university studies, he travelled in Holland and England, and thereafter resided at Lissa, in Poland. The most important of his ninety-two works are *Janua Linguarum Reserata* (1631) and *Orbis Sensualium Pictus* (1658). Their object was twofold—to facilitate the acquisition of the power of speaking and writing Latin by weaving numerous Latin words, not exclusively classical, into paragraphs, in which they might be easily learned; and to combine the knowledge of things with that of words, by treating in the lessons of subjects readily intelligible by the pupils, such as animals, trades, sports, and so on. These works were widely popular both in Germany and other countries, and have been frequently translated, imitated, and extended. From his high reputation C. was invited to England, to Sweden, and to Hungary, to aid in organising public instruction. Towards the close of his life he settled at Amsterdam. He died at Naarden, 15th November, 1671. A Life of C., with his *Essay on the Education of Youth*, has been published by Mallalieu.

Com'es (Lat. 'companion') was the name given in the later times of the Roman Empire to a state official. Thus we find in the 4th c. an imperial officer in Britain called *Comes littores Saxonici* ('warden of the Saxon coast'), *i.e.*, of the E. coast of Britain, already exposed to the ravages of Low German pirates. In the Teutonic system the C. was originally one of the *comitatus*, or personal following of a chief, the Old English name for whom was first *Eorl* or *Gesith*, the latter of which means exactly the same thing as C.; but as the power of the kings grew, *Gesith* was dropped for *Thegn* ('servant'), which gradually took the place of the older *Eorl*. The result was that *Eorl* then became distinctively a title of higher rank, and implied greater power and authority. Under the form of Earl (q.v.), it now denotes a particular grade in the peerage, and is held to be the equivalent of Count, for the wife of an Earl is a Countess. See Freeman's *Norman Conquest*, vol. i. c. 3.

Com'ets are celestial bodies, distinguishable from planets and stars by their rapid motions, their usually irregular forms, and the more or less hazy definition of their edges. Before astronomy was established as an exact science, these phenomena were regarded with superstitious dread, and each received the credit of having occasioned any dire calamity which occurred after its appearance, such as famine, pestilence, war, the death of some great person, &c. The only danger, however, which can possibly ensue from the presence of a comet is that arising from a collision with our earth; but as to the consequences of such a chance we cannot, in the present state of our knowledge, do more than speculate.

The striking feature of C. when seen with the naked eye, and a feature which at once distinguishes them from other celestial bodies, is their hairy-like appendage or *tail*—hence the name, from Lat. *coma*, 'hair.' The rest of the comet, or the *head*, is of a nebulous appearance, consisting of a hazy *envelope*, and a more or less bright *nucleus*. These characteristics are, however, not universal, some C. presenting merely a globular nucleated mass, without any tail, others not even a nucleus. In several instances, more tails than one have been observed, and it has been remarked that these appendages, when present, are generally turned away from the sun. The orbits in which C. move never approach the nearly circular form of those of the planets, but are distinctly elliptical—sometimes so eccentric as to be undistinguishable, for the comparatively brief time the comet is visible to us, from a parabola. There are also authenticated instances of hyperbolic orbits, the C. describing which cannot return to the solar system, unless perhaps the course be permanently altered through the perturbing influence of some of the larger planets. Again, C. are found to move in planes inclined at all angles to the ecliptic, and to revolve round the sun with a motion as often *retrograde* as *direct*. As a comet approaches the sun, it diminishes in bulk, though to us, whom it also approaches, it may appear to increase. The tail is a later development, and is not present when the comet is first observed by the telescope. It is subject to constant changes and pulsations, sometimes seeming to sweep through space at a speed to which the planetary velocities are scarcely comparable. The head, when viewed through a telescope, not unfrequently presents the appearance of a series of concentric luminous rings, with a bright nucleus in the centre; while at other times the nucleus emits on the side next the sun jets as it were of flame, moving and vibrating as if in a region of conflicting currents.

One of the most interesting C. of modern times is Halley's—interesting especially as being the first whose periodic revolution was recognised, and whose return was boldly predicted by that celebrated astronomer. Noticing the great similarity between the elements of the C. of 1531, 1607, and 1682, Halley fixed the reappearance of the 1682 comet for the year 1759. As the time approached, Clairaut, calculating from the observations of 1682, and taking into account the possibly perturbing influence of Jupiter and Saturn, fixed its perihelion passage for 13th April, 1759. The true date was 12th March. Messrs. Damoiseau and Pontecoulant calculated its next return for 7th November, 1835, and the calculation differed from the observed time by less than a week. Its next appearance will be 1910, and the same comet has been identified with those of 1456 and 1378, the latter of which was observed by the Chinese. It is noticeable that this comet has been diminishing in splendour at each reappearance, and probably after a few more returns it will become invisible to the naked eye. The comet of 1744 is remarkable as having had six tails. The present century has been uncommonly rich in brilliant C., of which we may mention the two great ones of 1811; those of 1819, 1825, and 1847; that of 1843, whose head was only 96,000 miles from the sun's surface at its perihelion passage, and whose tail, not less than a hundred million of miles long, seemed to sweep through two right angles in two hours; the brilliant appearances of 1858 (Donati's) and 1861, both remarkable for the rapid evolutions and dissipations of their envelopes, and the latter further interesting from the now almost settled fact that the earth passed through the extremity of its beautiful fan-shaped tail on the evening of 30th June; and, lastly, Coggia's second comet of 1874. This list, however, gives little or no idea of the numerous C. visible by telescopic aid, and far less of the myriads which probably exist, but which have hitherto escaped detection. In 1894 four comets were observed. On 26th

March, Denning discovered one of faint light and possessed of a short tail, which Krueger thinks may be identical with the brighter comets of 1231 and 1746. On 3rd April, Gale at Sydney discovered a bright comet with a faint double tail, which in May became visible to the naked eye. The spectrum of this comet resembled that of Rordame-Quénisset's of 1893. On 8th May, Temple's comet, No. 2, of 1873, was observed from the Cape. It possessed no tail. On 1st November, Encke's comet was observed; it was very faint. The most interesting of these telescopic C., possessing as they do short periods, and therefore belonging more to our system than their farther-reaching brethren, are Encke's (period 3·29 years), De Vico's (5·46), Winnecke's (5·51), Brorsen's (5·58), Biela's (6·61), D'Arrest's (6·64), Faye's (7·44). Biela's comet was discovered by that astronomer in 1826, and identified with the C. of 1772 and 1805, in which latter year it was seen by Olbers with the naked eye. In 1846 it was observed to split into two portions, which were still distinct on its next appearance in 1852. In 1859 and 1866, though eagerly looked for, no signs of its existence were detected, and it was regarded by many as a thing of the past. Mr. Hind, however, calculated its perihelion passage for 6th October, 1872, from Dr. Michez's orbit of 1866, and prepared sweeping ephemerides for September and October, with variations of ± 8 days in perihelion passage. It escaped observation, however, till 30th November, when Mr. Pogson, Madras Observatory, received a startling telegram from Professor Klinkerfues, which ran thus: 'Biela touched earth on 27th; search near Theta Centauri.' After two mornings of vain search, a glimpse of it was obtained. Circumstances were more favourable on 3rd December, when the comet was seen with a bright nucleus and a faint but distinct tail. It has been doubted, however, whether this comet was really Biela's, and was not rather another and quite a distinct body. Coggia's small comet of 1873 has been identified by Professor Weiss of Vienna with the first of 1818, discovered by Pons at Marseille, the plane of whose orbit was so nearly parallel to that of Biela's, that by some it was supposed to have been derived from the latter by a splitting analogous to what was observed in 1846. Every year several of these hazy telescopic bodies are discovered, but they possess little interest save to the astronomer.

The first step towards the true comprehension of what C. really are was made by Tycho Brahé, when he demonstrated in 1577 that they were extraneous to our atmosphere. Not much more than a century later, Newton showed them to be subject, like planets, to the law of gravitation; and some time after the lapse of another century, Arago discovered that part, at least, of cometary light was *polarised by reflection*. This last discovery has been fully borne out by the spectrum investigations of Huggins, Donati, Secchi, Vogel, and others. It is apparent that C. shine partly by reflection, partly by their own light. The characteristic bright lines in Winnecke's comet coincide very closely with the bright lines in the spectrum of carbon taken in olefiant gas; but, in the majority of cases hitherto observed, there is *no* similarity in constitution to any such hydrocarbon. At the present stage of our knowledge, we cannot reason further concerning the composition of the gaseous portion of C.; but this at least is made out, that probably a comet consists of a cloud of solid particles, held together more because their individual orbits are somewhat similar, than because of their own mutual gravitation, and that therefore as it approaches the sun it shrinks in bulk, the orbits of the component meteorites rapidly converging, and the particles themselves coming into frequent collisions, thus generating sufficient heat to volatilise a part of the matter, and giving rise to all the varied changes observable in a comet's head by telescopic aid. This theory is supported by the coincidence, first noticed by Ochiaparelli, which seems to exist between the orbit of the August meteors and that of the second comet of 1862, and the further seemingly similar connection between the November meteors and the comet discovered by Klinkerfues and Pogson, and believed by them to be Biela's. When the meteor-cloud is sufficiently dense it is visible as a comet; and the extremely eccentric orbits which these bodies describe round the sun, the sometimes great inclinations to the ecliptic, and their frequently retrograde motions, show that, if the nebular hypothesis be granted, C. and meteors did not belong originally to the solar system, but are later importations caught up from surrounding space by the attraction of the sun and planets. All this is an evident inference; but when we come to the consideration of the tail, a new and greater difficulty meets us. It is scarcely possible that this tail can be one and the same material *appendage*, for that matter should be translated with a velocity of more than 30,000 miles per second—the velocity of the extremity of the tail of the comet of 1843 during its perihelion passage—is inconceivable. To meet this difficulty, Sir John Herschel has speculated on the possibility of a '*negative shadow*, a momentary impression made on the luminiferous æther behind the comet.' Professor Tyndall worked upon this idea, and explained the momentary impression as due to the decomposition by the concentrated rays of the sun of some chemical compound surrounding the comet—the head acting in some mysterious way as a lens. But if it act as a lens to sunlight, why not to starlight also? Further, whence comes the necessary organic compound? By assumptions of such a nature, any curious phenomenon could be plausibly explained; but no simplicity or better comprehension of the facts is gained. Professor Tait, however, merely discarding the once prevalent idea that C. must have extremely small mass—an idea *taken for granted* upon the ground that *one* comet in 1779 became entangled among Jupiter's satellites, which were not perceptibly perturbed by the encounter—has explained the whole mystery as an optical condition. He likens a comet to a swarm of sea-larks, viewed at such a distance that the birds are not *individually* visible; and in the remarkable changes of form which such a swarm seems to undergo, a consequence of the relative changes of position of the line of sight and the surface in which the birds are situated, he discovers an explanation for all the varied transformations observable in a comet's tail. There is no limit to the size of the component meteorites, but the smaller we suppose the integral fragments to be, the greater must be the average distance between contiguous ones in order to secure transparency to starlight—the less therefore the mass. Upon this hypothesis, the passage of the earth through the *head* of a comet would be fraught with great danger; but the probability of such an occurrence is evidently extremely small, if we assume that C. may approach the sun from any direction. This assumption, however, may require modification, if future research bear out the discovery of Houzeau, that of 209 C. considered by him, the major axes show a tendency to arrange themselves parallel to the double heliocentric meridian 102° 20′ and 282° 20′, being only 28° long. from the point towards which the solar system is moving.

Com'frey, a genus of plants of the natural order *Boraginaceæ* (q.v.), natives of Europe and the N. of Asia. There

Comfrey.

are only a few species known. *C. officinale* and *C. tuberosum* are natives of Britain, not uncommon in moist shady places. The former was at one time greatly valued as an application to wounds, and the young blanched shoots are sometimes used as a potherb, or as a substitute for spinach. The root contains a good deal of starch and mucilage; accordingly, when finely scraped 'and laid on calico to the thickness of a crown-piece, it forms an excellent bandage for broken limbs,' &c. (Bentley). A large-sized species—*C. asperrimum* of the Caucasus—may yet become of some value as a fodder plant for pigs and cattle, analysis showing it to be rich in flesh-forming principles: it contains much gum and mucilage and but little sugar. It was introduced into this country in 1811, but is as yet only cultivated as a garden plant.

Comines′ or **Comynes, Philippe de, Sieur d'Argenton,** a famous French chronicler, was born near Lille in 1445. In 1464 he entered the service of Charles, Comte de Charolais, afterwards Charles the Rash of Burgundy, but in 1472 he attached himself to Charles's rival, Louis XI., who, within five years, made him one of the richest nobles of France. Louis found in C. an astute and unscrupulous agent of his cruel and perfidious policy. After the death of Louis, Anne of Beaujeu banished C. from the court; but though a decree of Parliament of 24th March, 1488, had condemned him to lose a fourth of his estates, and to ten years' banishment, we find him as early as 1493 again engaged in important missions. He was employed both by Charles VIII. and Louis XII., the latter of whom restored his pensions, but withheld his confidence from the minister of Louis XI. He died, 17th October, 1509, at his castle of Argenton. C.'s *Mémoires* show him to have been a sagacious, clear-headed statesman; but, though admirably written, they offend modern feeling by the cold-bloodedness with which they detail the most iniquitous and revolting transactions, the sole merit of each of which seems to be its success. The first edition, which is imperfect, was published at Paris in 1523, in folio. C. plays an important part in Scott's *Quentin Durward.*

Comi′so, a town of Sicily, province of Siracusa, 43 miles W.S.W. of Syracuse, with manufactures of paper. Pop. 20,327.

Com′itas or **Com′ity of Nations,** a term of international law, signifying the effect given in one country to the laws and institutions of another in questions arising between the natives of both. See International Law.

Comi′tia (Lat. *cum*, 'together;' *eo*, 'I go'), were the great constitutional assemblies of the Roman citizens, duly summoned by a magistrate for the election of magistrates, the enactment of law, the declaration of war, and the trial of citizens on criminal charges. The *Comitium* was the part of the Forum where the C. met in early times, though afterwards their meetings were usually held in the Campus Martius. The C. were of three kinds, *C. Curiata*, *C. Centuriata*, and *C. Tributa*, in which the people voted respectively in curiæ, centuries, and tribes, according to the three modes of their political organisation. Each citizen voted in his own curia, century, or tribe; but each curia, century, and tribe had only one vote on the question submitted, and its vote was determined by the majority of voters within it. Thus, as some centuries, for example, contained a much larger number of voters than others, the decision might not be the opinion of the gross majority of the assembly. The C. Curiata were the most ancient, and were composed entirely of patricians. The C. Centuriata, instituted by Servius Tullius, were truly national assemblies, comprehending all citizens, whether patricians or plebeians, who had property to a certain amount. The C. Tributa were originally confined to the plebeians, and were convened for the first time in the trial of Coriolanus, B.C. 491. The word *C.* often means *elections*, as the C. were yearly convened under the republic to elect magistrates. The C. Calata were assemblies convened by the college of pontiffs, at which the people, sometimes in curiæ, at others in centuries, did not vote, but listened to and witnessed the proceedings, which consisted chiefly of the proclamation of the nones, the consecration of priests and kings, and the making of wills.

Comma, in music, a small interval (generally corresponding to a vibration-ratio of 81 : 80) occurring between the true pitches of two notes, which are represented by one only in the organ, pianoforte, and other tempered instruments. See Temperament.

Commandant′ is an officer of the army in merely temporary command. The designation is more frequently applied in foreign armies than in the British.

Command′er, in the British navy, is an officer next in rank above a lieutenant and under a post-captain. He ranks with a lieutenant-colonel in the army, and is unofficially addressed *Captain*. The full pay of a C. is £1 per day: when in command of a sea-going ship, an extra allowance is made, rising to as much as £141. A C. may either serve as second in command, or command independently, according to the rate of the ship.

Commander-in-Chief is the highest appointment in the British army. There is not, however, necessarily an officer of this rank in command of the home army, there having been no C.-in-C. since the death of the Duke of Wellington in 1852. At present the administration of the army is, by the War Office Act of 1870, vested, under the Secretary of State for War, in three officers, one of whom has the title of 'Commander-in-Chief.' The office has been held by Field-Marshal the Duke of Cambridge, his department being that of command and discipline. Though in theory all appointments and promotions are made by the crown, on the responsibility of the Secretary of State for War, the officer commanding-in-chief has practically the control of all these, except, perhaps, the very highest. He is responsible for recruiting operations, and for the allocation of the troops. The commander of the forces in India has the title of C.-in-C.

In June, 1895, it was announced in Parliament by the Secretary for War (Sir H. Campbell-Bannerman) that the Duke of Cambridge was about to retire from his post, and on the 19th August, 1895, the Marquess of Lansdowne, as Secretary for War, stated that the Duke would retire on 1st November, 1895, and would be succeeded by Field-Marshal Viscount Wolseley.

Comm′andite, Société en, is the French equivalent term for what we call a 'sleeping partner.' By the common law of France, a partner of this kind may, by agreement with his associate, determine the extent of his liability to the public. The justice of the legal principle has to a great extent been recognised by ourselves in the passing of the Limited Liability Act (q.v.). The French term arises from the commercial meaning of the word *commander*, to command. It is applied to the authorising of one person by another to transact business on his account.

Commelyna′ceæ, the Spiderworts, a natural order of Monocotyledonous plants, natives of the E. and W. Indies, Australia, Africa, and N. America. The underground stems of many of these, on account of the starch which they contain, are used for food. In the jointed hairs of the Virginia spiderwort, a common garden flower, and other species, the singular movement known as *Gyration* (q.v.) can be well examined. Altogether sixteen genera and more than 260 species are described. Some are accounted astringent, and therefore useful as applications to wounds; others are emmenagogue, &c.

Commen′dam. When a beneficed clergyman is promoted to a bishopric, he vacates his benefice by the promotion; but formerly the sovereign could give him the right to retain it. He was then said to hold it *in C.*, that was, ostensibly, until some one else should be provided for it. Future grants in C., whether of benefice, office, or dignity, were abolished by 6 and 7 Will. IV. c. 77.

Commendator.—In Scotland, in Roman Catholic times, the revenues of a benefice during a vacancy were collected by an officer called a C. He was properly a steward or trustee;

but the Pope, who was entitled to grant the higher benefices in *Commendam* (q.v.), abused the power, and gave them to commendators for their lives. This abuse led to the prohibition of all commendams, excepting those granted by bishops for a term not exceeding six months.

Commen′surable, a name applied to two numbers or quantities of the same kind, which are both divisible without remainder by a third number.

Comm′entry, the chief town of a canton in the department of Allier, France, in a hilly region on the Œil, 45 miles S.W. of Moulins by railway. It owes its great and sudden prosperity to large coal-mines in the vicinity, and to an extensive iron-work, employing several hundred men. Pop. 12,618.

Comm′erce, the exchange of produce and manufactures between persons of two or more different nations, either for other commodities or for money. When the exchange takes place between persons of the same nation it is called trade.

Commina′tion (Lat. *comminatio*, 'a threatening') is the name of a penitential service used in the early Christian Church. It is still read in the Church of England on Ash Wednesday. It purports 'to read the general sentences of God's cursing against impenitent sinners, gathered out of the seven-and-twentieth chapter of Deuteronomy and other places of Scripture.' See Bingham's *Eccles. Antiquities*.

Commissa′riat is the name given to the system by which armies are supplied with the necessaries of life. In the wars of Queen Anne's reign the troops were supplied by contract, a plan which is said to have led to considerable peculation on the part of the famous general who conducted them. In 1793 a commissary general was appointed, his duty being to superintend the contracts for supplying the army with food. In 1858 and 1859 a new organisation was introduced, the C. being made a department of the War Office. In 1870 it was merged in the 'Control Department,' by which the civil affairs of the army were administered, but now the C. and Transport Staff are united in the Army Service Corps, in which the former ranks of Deputy Commissaries General, Assistant Commissaries General, Deputy-Assistant Commissaries General, have given place to those in use in the other branches of the services.

Comm′issary, in ecclesiastical law, is an officer who acts for the bishop in a remote part of the diocese. In Scotland, following the abolition of papal authority in 1560, the supreme C. court was instituted by Queen Mary in 1563. It had jurisdiction in matrimonial cases, and had a double jurisdiction, one *diocesan* over the three Lothians, the other universal, by which it confirmed the testaments of all who died in foreign countries, or who died in Scotland without a fixed domicile. It also reviewed the judgments of inferior commissaries, of whom there was one in most of the principal towns of Scotland. The powers of the supreme court (abolished in 1836) were gradually transferred to the Court of Session; those of the inferior courts partly passed to the Court of Session and partly to the sheriff courts; but 'even yet,' says Sheriff Dove Wilson, 'the transference of jurisdiction is in form incomplete. In certain actions the sheriff assumes the style and title of C., and uses a seal decorated with the episcopal mitre.' See *The Introduction to Practice of the Sheriff Courts*, by J. Dove Wilson (Edinb.).

Commis′sion is in trade or commerce a writing or implied authority by which one, or more than one, person exercises the duties and powers belonging to another or to others. C. in law also is the warrant of authority by which any person acts judicially or otherwise. There are various legal operations conducted by C., of which the following are the most important :—

Commission of Oyer and Terminer.—This, in English law, is a C. directed to the judges and other gentlemen of the county to which it is issued, directing them to hear and determine in cases of alleged treasons, felonies, and trespasses. It is in virtue of this C. that the judges on circuit dispose of criminal cases. In urgent cases, a special C. of O. and T. is granted. It may be extended to Scotland, provided three Lords of Justiciary be in the C. See ASSIZE.

Commission of the Peace. See JUSTICES OF THE PEACE.

When a witness is out of the jurisdiction of a superior court, or is too ill to attend the summons of the court, his evidence can, by order of the judge of the court, be taken by an officer of the court, or other appointed person, the counsel of both parties being present, and the evidence being taken just as if the witness were in court. A commission is said to issue from the court to take the evidence.

Commission, Army, is the crown's warrant constituting a commissioned officer in the army. Formerly, under what was called the *Purchase System* (q.v.), the various ranks were mostly obtainable at a fixed price. But this system was abolished by royal warrant in July, 1871. Commissions in the probationary ranks are now given to the successful candidates in competitive examination. The limits of age for candidates for admission by competition to the cavalry and infantry are seventeen and nineteen; for students of universities who have passed certain examinations, the limits are seventeen and twenty-two; for B.A. or M.A. graduates, seventeen to twenty-three; and for candidates, who are officers in the militia and are nominated for commissions, the limits are eighteen and twenty-two. In the Artillery and Engineers, candidates, selected on examination (limits of age, sixteen to eighteen), are trained at Woolwich Academy. Lieutenancies are given to cadets who have passed an examination on the subjects of instruction. Further examination must be passed before getting a captain's C. in any branch of the service. Promotion is now by 'selection, tempered by seniority,' up to the rank of lieutenant-colonel (see COLONEL, BREVET) in the cavalry and infantry. In the Artillery and Engineers it is by seniority alone. Non-commissioned officers are the sergeants-major, sergeants, trumpeters, drummers, buglers, and in the Life Guards and Horse Guards the corporals. They mess by themselves, and rank between a commissioned officer and a private soldier.

Commiss′ionaire is an attendant attached to Continental hotels, but not forming a part of the establishment. Thus his services are not charged in the bill, and must be arranged for with the C. himself. No one is, of course, obliged to employ him. A corps of commissionaires was founded in London in 1859, chiefly through the instrumentality of Capt. Sir E. Walter, K.C.B. At first the admission to the corps was only open to wounded soldiers who had served in the Crimea and in India during the mutiny. Owing to the demand for commissionaires, the corps was increased to over 2000, the number at which it now stands. They are now to be found in all the principal towns of the United Kingdom, but every division is under the control of the Commandant, whose chief office is at 419, Strand, London, where persons who may be desirous of employing a well-trained, intelligent, and responsible officer, should apply for further particulars on the subject. The members are discharged or pensioned soldiers, and are employed as messengers, watchmen, timekeepers, &c.

Commission del Crederé is an Italian expression, used to denote the extra premium charged by an agent or factor for guaranteeing the solvency of a purchaser, and so making himself personally liable for the value of the goods which he has sold for his principal.

Commission Merchant is a merchant who sells goods on account of some one else. The C. M. is paid by a percentage, called *commission*, on the value sold.

Commis′sioner in Scotch Bankruptcy. Under the Scotch Bankruptcy Act, three commissioners are chosen without caution at the meeting for election of trustee. Their duty is to superintend, to advise, and assist the trustee, audit his accounts, and to fix his remuneration. They also declare the dividends. They are not themselves entitled to any remuneration. No one can be a C. who is disqualified to be a trustee.

Commissioners, Land, were appointed under the General Enclosure Act of 1845, and it became their duty to decide whether any common in England and Wales should be enclosed or not—greens of villages and towns, and lands in the Forest of Dean and the New Forest being outside the statute, as also were lands within fifteen miles of Charing Cross and within certain radii of some large towns. Many other powers were conceded to the Commissioners by the same statute as regarded allotments, roads, footways, burial grounds, &c. The Commissioners have been restrained by the Metropolitan Commons Act of 1876 from allowing an enclosure within fifteen miles of Charing Cross, unless it should be in their opinion for the good of the neighbourhood as well as for private persons. The Law of Commons Amendment Act of 1893 renders it necessary to obtain the consent of the Board of Agriculture before any enclosure of common land, purporting to be under the statute of Merton of 1236, or the statute of Westminster 2nd of 1285, can be held valid. It is estimated that at least 1,000,000 acres have been in this way brought under cultivation since 1845, yet no addition has been made to the amount of land cultivated owing to the fact that railways, towns, and roads have absorbed as many acres, if not more.

Commissioner of Police is the officer who has the supreme command of the Metropolitan police, and whose district embraces London and all places within a radius of fifteen miles of Charing Cross, not inclusive of the City of London, which has its own police. The C. of P. is appointed by, and acts under the control of, the Home Secretary. Sir E. Bradford, K.C.B., is C. of P., and under him are three Assistant Commissioners and five Chief Constables. The C. of P. and his subordinates are empowered to enforce regulations of the Police Acts respecting houses of public resort, driving vehicles and cattle, nuisances in thoroughfares, &c. They have also power to act on the river Thames, and they may at any time go on board vessels, and take cognisance of the conduct of persons on board.

Commit'ment for Trial. When a supposed offender is arrested, the justice before whom he is brought is bound immediately to inquire into the circumstances of the alleged crime, and to take the examination of the prisoner, and the evidence of those who bring him, in writing. If the charge appear groundless, the prisoner must forthwith be discharged; otherwise he must be *committed*, or give Bail (q.v.) for his appearance to answer the accusation at the adjourned inquiry or at next sessions or assize, and the prosecutor or person injured by the crime charged is bound over to prosecute. In Scotland the information is generally at the instance of the Procurator-Fiscal (q.v.), and C. for T. or discharge is given after the declaration of the accused and the Precognition (q.v.) have been taken before a magistrate. See IMPRISONMENT.

Committ'ee. When an assembly or body of men appoints a few of its members to do special acts, or to make special inquiry, those so appointed form what is called a C. It may, however, consist of only one member; or it may be formed of the whole body making the appointment by its assuming the functions usually discharged by a C. Thus, in Parliament, when the various clauses of a measure which has been passed on second reading—and thus been virtually adopted in its leading principle—come to be considered, a 'C. of the whole House' is formed for doing so. The Speaker leaves the chair, which is taken by the Chairman of Committees. (See PARLIAMENT.) Select committees are also appointed in the House of Commons and in the House of Lords for the consideration of private bills.

Commix'tion, a term of Scotch law, indicating the mingling of two or more substances. C. may produce a new subject, as where wine is mixed; or it may not alter the nature of either substance, as where grain is mixed, though the mixture may not be separable: in either case the whole becomes common property of the owners of the things mixed and their shares are in proportion to the amounts contributed by each. If the things mixed be capable of separation, as two flocks of sheep, the property continues distinct. This distinction is of some legal weight in questions which sometimes arise as to right of property.

Comm'odate, in Scotch law, is a gratuitous loan, the borrower being bound to restore the subject lent in the condition in which he received it. The *property*, therefore, remains all the time of the loan with the lender, and the only right acquired by the borrower is the use of the thing lent.

Comm'odore. A captain in the navy, when in command, has this title. He hoists a pennant indicative of his rank. Red indicates a C. of the first class, blue a C. of the second. He ranks with a brigadier-general in the army. The pay of a C. of the first class is £3 per day; of a C. of the second class, in addition to full pay, as a captain, and command money as captain and allowance as C. abroad, £1 per day; if not, 10s. per day.

Comm'odus, Lucius Aurelius, a Roman emperor, born A.D. 161, the son of M. Aurelius Antoninus, who educated him with unavailing care. On his father's death in March, 180, C. concluded an inglorious peace with the Marcomanni, and repaired to the capital to share in its dissipations. His character immediately exhibited itself as one of boundless licentiousness, cruelty, cowardice, meanness, and perfidy; and distinguished virtue, or conspicuous excellence of any kind, soon proved fatal to its possessor. Resigning the government into the hands of a succession of worthless favourites, he gave himself up to a life of gross wickedness and levity, and gratified a childish vanity by exhibiting himself as a dancer, a charioteer, a buffoon, and especially as a gladiator. He even claimed divine honours as Hercules. Marcia, a favourite, with Lætus and Eclectus, two officers of rank, learning that they were marked down on the tyrant's tablets for instant death, administered poison to him; but this operating slowly, they introduced Narcissus, a famous athlete, into his chamber, and he was strangled on the night of 31st December, A.D. 192.

Comm'on. This is a term of English and Scotch law, but the meaning in the former differs from that in the latter. In England, C. is the privilege of use which one man, or the public, has of the property of another; such as the right to walk over or to fish from the land of another, or to dig turf upon another's land, or to take wood, required for using in or upon, or furnishing, a house or farm, from another's estate; hence lands over which such rights exist are called *commons*.

Statute 39 and 40 Vict. c. 56, the Commons Act 1876, provides most stringently for the preservation of commons in opposition to the provisions of the Inclosure Acts wherever any inclosure meets with no approval from the Commissioners or Parliament.

In Scotland, where the legal nomenclature is that of the Roman law, C. rights are called *Servitudes* (q.v.), while a C. or commontry is a piece of ground belonging to several persons, frequently to the inhabitants of a district or village, the right of each usually amounting to nothing more than a servitude. Nice questions sometimes arise as to whether a right be of C. property or of servitude merely.

Common Agent is, in Scotch legal practice, an agent or solicitor before the Court of Session, employed to conduct a case in which several parties have a common interest. The two most important occasions for the appointment of a C. A. are in the process of Ranking and Sale (q.v.), and in the process of augmentation and locality. (See AUGMENTATION.) But a C. A. is also sometimes appointed in a process of Multiplepoinding.

Common Assurances.—Whenever an estate is transferred, the recipient is supplied with legal evidence of the transfer, so that he may not incur doubt, difficulty, or controversy in the enjoyment of the estate.

Common Debtor.—When the effects of a debtor have been arrested, and several creditors claim a share of them, the debtor is, in Scotch law, called the C. D.

Common Forms.—By this term is meant, in English law, the technical forms of expression used in legal writings. Statutes have been passed to substitute simpler and more generally intelligible expressions for many of these. But the fact that conveyancers were paid for the length of their work, not according to its value or difficulty, has rendered difficult the substitution of intelligible brevity for unintelligible prolixity.

Common Good.—In law this term is used to denote the property of a corporation, over which the magistrates have a right of administration solely for behoof of the corporation.

Common Informer.—Any person who to obtain the whole, or part, of the penalty prosecutes, or supplies evidence against, those who break the penal laws. In some instances the permission of the Attorney-General must be obtained before any prosecution can take place.

Common Interest.—This term is used in Scotch law to denote the interest which one person sometimes has in the preservation of that which is otherwise absolutely the property of another. Thus, the proprietor of a house may have a C. I. with the proprietor of a contiguous house in a chimney-can which is the property of the latter, if the falling of the can would injure the property of the former.

Common Property, in Scotch law, is property, whether heritable or movable, belonging to two or more proprietors *pro indiviso*. (See INDIVISIBLE.) The proprietors share the profit or loss according to their respective interests, and the consent of all is required in the management and disposal of the subject. Each joint-owner may sell his right, the purchaser taking his place; and the right may be adjudged (see ADJUDICATION) by the creditors of the C. proprietors, or of any of them.

Common, Tenancy in.—This term of English law corresponds to that of C. Property (q.v.) in Scotch law. It denotes the rights of property vested in two or more persons, no division having been made of the property. Each tenant, in law, has a distinct tenement and a distinct freehold. The estate is divisible by deed of tenants voluntarily, or by union of interests of all the tenants in one, or by compulsion of any one or more tenants.

Common Bench was a name given to the Court of Common Pleas.

Common Counts, short statements of the cause of an action made in a Declaration, which have been now displaced under Judicature Acts of 1873 and 1875 by Statement of Claim and Joinder of Causes of Action.

Common House, or **Common Room,** was an apartment in a monastery, presided over by a monk, called the *master*. A fire was constantly kept in it for the benefit of the monks, who were not usually allowed to have one anywhere else.

Common Law. The laws of England, like those of most countries, are largely regulated by customs resulting from experience, and confirmed by judicial decisions. Law so constituted is called C. L. It is to be distinguished from law created by statute, from the law of merchants, from the Civil and Canon law, and also from law as created or modified by Equity (q.v.). C. L. is overruled by statute law, and may be set aside or modified by equity, except in matters criminal. These involving public security, no judge can be allowed to administer them otherwise than according to the letter and to established authority. 'Immemorial usage' in C. L. does not refer to a period so remote as to be beyond historical record. The Common Law system in England is the application of the rules of law, derived from legal principles and judicial precedents, to any new combination of circumstances; and such application is usually made unless contrary to statute, reason, and convenience. The mere appearance of being unreasonable or inconvenient is not sufficient excuse for rejecting the Common Law. The Common Law as opposed to Statute Law may be said to consist of (1) military, maritime, academical and ecclesiastical laws; (2) local customs; (3) general customs.

By the Judicature Act, 1873, the Courts of Chancery, Queen's Bench, Common Pleas, Exchequer, Admiralty and Probate and Divorce were consolidated into 'The Supreme Court of Judicature,' to consist of two divisions, 'Her Majesty's High Court of Justice,' and 'Her Majesty's Court of Appeal,'—the former having original jurisdiction, with certain appellate jurisdiction from inferior courts; the latter appellate jurisdiction, with certain original jurisdiction incident to the determination of any appeal. The branches of the Supreme Court were by this Statute directed to administer Law and Equity concurrently.

The judges of the High Court consist of the Lord Chancellor, president, and the five justices of the Chancery division; the Lord Chief Justice, president, and the fourteen justices of the Queen's Bench division; the two judges of the Probate, Divorce, and Admiralty division, and the judge of the Court of Arches. It is a superior court of record, and exercises the jurisdiction previously pertaining to all or any of the Courts of Chancery and Common Law, Court of Admiralty, Common Pleas, Commissions of Assize, &c. For the convenient despatch of business it is divided into the Chancery, the Queen's Bench, and the Probate, Divorce, and Admiralty divisions.

The Court of Appeal consists of the Lord Chancellor, the Lord Chief Justice, and the President of the Probate, Divorce, and Admiralty, the Master of the Rolls, and two Ex-Lord Chancellors, *ex officio*; besides five Lords Justices of Appeal. It also is a superior court of record, exercising the powers and jurisdiction formerly held by the Courts of Appeal in Chancery and Bankruptcy, and in appeals from the County Palatine Court of Lancaster, the Stannaries Court, the Exchequer Court, Admiralty, Lunacy, and other Courts whencesoever appeals did spring. The jurisdiction of the House of Lords as a final Court of Appeal, however, remains practically unchanged.

In 1881, on the union of the three common law divisions in the Queen's Bench Division, the titles and offices of the Lord Chief Baron of the Exchequer and the Chief Justice of the Common Pleas were abolished. The division of the legal year into terms, as far as the administration of justice is concerned, has ceased; judges may sit and act at any time or place during or after term.

On 4th December, 1882, the Royal Courts of Justice, Strand, were opened by the Queen, when the Common Law Courts were finally removed from Westminster.

The above constitute the superior courts of common law. There are also inferior courts, as the County Court (q.v.), to which the corresponding court in Scotland is the Sheriff Court (q.v.); the Mayor's Court (London), the Court-Baron, the Borough Civil Court, the Hundred-Court, &c.

Common Prayer, the Book of, is the liturgy of the Church of England (and Ireland formerly). Till the time of the Reformation there was no such book in the vernacular, the only thing of the kind being the Latin liturgy, originally derived from the Gallican (see LITURGY), and revised by the Bishop of Salisbury, 1085. During the reign of Henry VIII., in 1537, Convocation published a book entitled *The Godly and Pious Institution of a Christian Man*, and containing the Lord's Prayer, 'Ave Maria,' Creed, Ten Commandments, Seven Sacraments, &c. Of this a second edition was published in 1540, under the title of *A Necessary Doctrine and Erudition for any Christian Man*. These, however, were more of the nature of a confession of faith than a liturgy; but the same year a commission was appointed to reform the rituals and offices of the Church, and the next year the prayers for processions and litanies were ordered to be translated into English and publicly used. In 1545 the *King's Primer* was published, containing the whole morning and evening prayer very nearly the same as in the present B. of C. P. In 1547, under Edward VI., a committee of divines was appointed, who composed, first, a *liturgy* proper, or order for the Communion (1547), and then public offices for Sundays and holy-days, and for Baptism, Confession, Matrimony, Burial, &c. This liturgy was approved by Convocation, and confirmed by Parliament and the King, 1548. To obviate certain objections, the book was revised under Archbishop Cranmer, when the Sentences, Exhortation, Confession, and Absolution were added at the beginning of the morning and evening services, the Commandments were added at the beginning of the Communion office, and some rites and ceremonies considered idolatrous were removed; and thus revised, it was again confirmed by Parliament, 1551. Interdicted under Mary, it was again introduced, with slight alterations, under Elizabeth. Nothing more was done till after the Hampton Court conference under James I., when some trifling alterations were made, such as the adding of some forms of thanksgiving at the end of the Litany, and an addition to the Catechism regarding the sacraments. After the Restoration, at the instance of the Presbyterians, another revisal was made, the chief alterations then made being that the Epistles and Gospels were taken out of the authorised version of the Bible, and that the office of Baptism for those of riper years and the forms of prayer at sea were added. The B. of C. P. as it now stands was then approved by Convocation, 1661, and confirmed by Parliament next year. See *Annotated Book of Common Prayer* (1875), and *An Introduction to the History of the Successive Revisions of the Book of Common Prayer* (Parker & Co., Lond.)

Commons. The dinner of members in colleges and inns of court is so called. There are separate tables for the Benchers (q.v.), for the barristers, and for the students and other members.

Commons, House of. See PARLIAMENT.

Common Sense, the Philosophy of, was the name given by Thomas Reid to the theory by which he hoped to avoid the sceptical conclusions which Hume had drawn from the idealism of Locke and Berkeley. The scepticism of Hume had indeed no connection with, but was opposed to, the idealism of Berkeley strictly so called, viz., the substantial existence of the ideal world in an all-perceiving mind; but it was undoubtedly founded on what has been called the representative theory of Locke, as extended by Berkeley to the primary qualities of matter. The general statement of Reid was that there are in the mind certain self-evident principles which cannot be proved by any arguments, but which must be accepted as the ultimate grounds of certainty. General acceptance, and the impossibility of explaining them by early training or false reasoning, may confirm this view, but the authority of these principles lies in the simple consciousness of them. They are either *Contingent;* for example, 'those things do really exist that we distinctly perceive by our senses;' the probable uniformity of nature; 'there is a certain regard due to human testimony in matters of fact:' or *Necessary*, consisting of grammatical, logical, mathematical, moral, metaphysical, and æsthetic principles; for example, every proposition is either true or false; whatever begins to exist must have a cause. This procedure of affirming with regard to every unexplained mental fact not merely that it could not be explained, but that it was unscientific to attempt its explanation, had already been adopted by Père Buffier, who declared that, among others, it was the deliverance of C. S. that 'my soul produces motions in my body;' a proposition which is declared to be inconceivable by some modern physiologists. The C.-S. philosophy was largely modified by Dugald Stewart, who introduced the phrase 'Fundamental Laws of Belief,' but it owes its final statement to Sir W. Hamilton. On the leading question of a belief in an external world, he says: 'We are immediately conscious in perception of an ego and a non-ego, known together and known in contrast to each other. This is the fact of the *duality* of consciousness.' This view he calls Natural Realism. All other views, Nihilism, Idealism, Materialism, &c., he declares to proceed on the non-recognition of this ultimate *dualism*, or primitive incomprehensible belief that a material world, solid and extended, exists, and that a perceiving subject also exists. Hamilton's doctrine of C. S. on this question is therefore quite different from the 'irresistible suggestion' of an external world which Reid declared to follow upon sensation. On other points Hamilton accused Reid of having, like Beattie and Oswald, regarded C. S. as an appeal to 'the undeveloped beliefs of the unreflecting many.' C. S. requires strict *universality* and *necessity* as well as *incomprehensibility* or *simplicity* in its principles. Necessity may be the result of a power or of an impotence of the mind. The Cartesian *cogito, ergo sum,* and the intuitions of space and time, are examples of the former; the law of the conditioned as applied to the notions of causality and moral freedom and substance affords examples of the latter.

Common Time, in music, is a rhythm in which strong and weak accents occur alternately, each bar or measure usually taking either the form strong, weak, or the form strong, weak, medium, weak. These primary subdivisions may be indicated indifferently as crotchets, quavers, or minims, the first being by far the most common, and having the time signature $\frac{2}{4}$ and $\frac{4}{4}$ or 𝄴. Each of them may be again subdivided into two or four parts, the relative accentuation of which is the same as that of the primary subdivisions. Rarely these secondary subdivisions are *three* in number (*i.e.*, each crotchet is divided into three quavers, &c.), in which case the rhythm is really changed into what is known as Compound C. T. (q.v.).

Commu'ni Dividen'do Ac'tio, in Roman law, was an action for the division of what was possessed in common by two persons or more. The principles of the Roman law on this subject are adopted in the law of Scotland.

Commun'ion, or **Holy Communion,** is one of the names given to the sacrament of the Lord's Supper, doubtless derived from the language of Paul in 1 Cor. x. 16, 17, although he does not call the sacrament by the name of C., but only says what it is or does. C. also meant the fellowship of the Church, expulsion from which, therefore, was called 'excommunication.'

Communion Elements (in law). In Scotland, in a process of Augmentation (q.v.), the court may allow for C. E., payable out of the Teinds (q.v.) of a parish.

Comm'unism means the negation of private property: it describes a society in which the land and instruments of production would be held as joint property, and used for the common account, industry being regulated by a magistrate, and the produce being publicly divided in equal shares, or according to wants, or on some other principle of distributive justice. Socialism does not involve necessarily the abolition of private property: it merely insists, as in St. Simonism and Fourierism, that the land and instruments of production should be the property of the association or of the Government; as was the case in the original Teutonic 'mark' and Indian 'village-community,' and would be partially the case if the state were to appropriate the 'unearned increment' of rent—*i.e.*, the increase of rent due, not to expenditure of capital, but to the fact of inferior soils being forced into cultivation by the pressure of population. Of C., on the other hand, the monasteries and the Moravians give examples on a small scale. In most cases, however, as with the Essenes of Palestine, the American Shakers (except the Inspirationists of Amanda and the Separatists of Zoar), the American Harmonists and Rappists at Economy and Beaver Falls, marriage is entirely given up, the society being recruited from converts or from adopted children. Robert Owen, on the other hand, the Scotch Communist, who founded the abortive experimental communities of Orbiston in Lanarkshire (1823) and Harmony Hall in Hampshire (1843), connected with his C. a scheme of selection and alteration in the family relations, by which the human character (believed by Owen to be wholly the product of education and not of heredity) was to be indefinitely modified into a form which would then be the natural support of C. This idea, found also in the *Republic* of Plato, is not characteristic of C., which, in the economical sense, was advocated by Louis Blanc, Cabet, and Proudhon: these men would not have admitted the 'mobility of the affections,' on which the projects of St. Simon, Fourier, and Enfantin were based. It is objected to C. that individuals would be tempted to shirk work. But under the present social system most work, even superintendence, is done for fixed wages or salaries—a state of things which would no doubt be altered by the general adoption of piece-work and the association of workmen in profits. C. would have as many checks against laziness and fraud as the present system. Nor, although marriage has been renounced by some Communists, does there seem much ground for supposing that, if it were retained, the society would unduly multiply. It is difficult to conjecture the force and direction of public opinion on such a matter. But the real difficulties in the way of C.

are the distribution of employments and their remuneration. Here the actual inequality of human beings comes strongly out. If the subdivision of labour is to be maintained, the selection of work cannot be a matter of indifference. Then, are wages to be exactly the same for the teacher of science and the hodman, who both honestly do their '*possible*'? This Blanc calls 'the point of honour of industry;' and Cabet, 'fraternity.' We have no example of a Communistic society with the fundamental institution of marriage. The American Shakers are successful economically, but the members become dull and stupid, and are unable properly to train the adopted children. The *ateliers* or national workshops of the French Revolution of 1848, as that of the tailors at Hôtel Clichy, failed from want of management. The bonus-paying concerns of Leclaire (painters), Dupont (printers), Briggs (colliers), have not been successful.

Commun'ity. Voluntary associations have no *persona standi in judicio*, but by special statute it is made lawful to establish societies for raising funds to relieve and maintain members during sickness, and to provide burial. Joint-stock banks may by statute sue and be sued in the name of their principal officer, on certain conditions prescribed in the statute.

Commuta'tion of Small Penalties. The Act 28 and 29 Vict. c. 127, provided a scale of equivalent terms of imprisonment for failure to pay penalties between 10s. and £5. This statute has been repealed by the Summary Jurisdiction Act, 1879, 42 and 43 Vict. c. 49, in which the following scale of equivalent terms of imprisonment are set forth:—sums not exceeding 10s. (seven days); from 10s. to 20s. (fourteen days); from £1 to £5 (one month); from £5 to £20 (two months); and above £20 (three months). The time specified in each case is the maximum, and any less term, as in the opinion of the court will satisfy the justice of the case, may be ordered.

Comne'nus, the family name of a dynasty of Byzantine emperors (1057-1204) and of emperors of Trebizond (1204-1461). See BYZANTINE EMPIRE, section headed *The Comnenian Dynasty*; also Christian names of individual rulers—*e.g.*, ALEXIUS COMNENUS, ANNA COMNENA, &c.

Co'mo (anc. *Comum*), a city in the province of the same name, N. Italy, and connected with Milan by railway, is situated at the S.W. extremity of Lake C. (q.v.), in a beautiful valley, encircled by hills and clothed with groves of olive and chestnut. The city itself is ill-built and filthy, but the suburbs contain some magnificent palaces and imposing public buildings. C. is surrounded by double walls, pierced by four gateways, splendid specimens of the military architecture of the Middle Ages. The Byzantine cathedral (1396) is faced with white marble, and contains some interesting monuments. Iron foundries and marble quarries are in the vicinity; there are manufactures of silks, woollens, hosiery, gloves, and soap; and a considerable trade is carried on with Italy and Switzerland by means of the lake. Pop. 25,518. C. was the birthplace of the younger Pliny, who enriched it with public works, a library, and other institutions.

The *Lake of C.* (Ital. *Lago di Como*, Lat. *Larius Lacus*) lies at the foot of the Alps, 700 feet above the level of the sea. It is 35 miles long, with a breadth nowhere exceeding 3 miles, but generally considerably less, and a depth of from 40 to 600 feet. The lake is formed by the river Adda, and divided in its southern portion into two great arms by the rocky peninsula of Bellagio. The scenery is singularly beautiful: hence the lake is much visited, and is traversed in all directions by steamers. The younger Pliny, who had several villas on its banks, speaks of it with much affection.

Comodo', an island of the Malayan Archipelago, in the Strait of Sapy, between the islands of Sambawa and Flores. It is 35 miles long, with an average breadth of 16 miles.

Com'orin, Cape, the S. extremity of Hindustan, a low sandy point, invisible to the mariner till he is within 10 or 12 miles of it. Eighteen miles inland is the Peak of C., which serves as a beacon to the passing ship; and towering aloft and stretching for miles behind this peak are massed the terminal heights of the Western Ghâts.

Cape Comorin.

Com'oro Isles, a group of four large and four small islands of volcanic origin, in the middle of the N. entrance to the Mozambique Channel, between Madagascar and the E. coast of Africa. They were discovered by Houtman in 1598. The names of the larger ones are Great C., Mohilla or Little C., Mayotta, and Anjuan. They rise to a great elevation, and can be seen at a distance of from 50 to 60 miles. The soil is fertile, and a tropical vegetation is everywhere seen—coco and areca palms, fine timber for shipbuilding, yams, bananas, mangos, ananas, citrons, &c. Rice, maize, cotton, indigo, and sugar are cultivated. The inhabitants are a mixed race of Arab and African descent, the majority being Mohammedans. A British consul resides there. The other islands are under French protection. Mayotta has been a French possession since 1848, and is valuable for the production of sugar. Mohilla is the most important from a commercial point of view; it carries on a considerable trade with Madagascar and the mainland. Area of group is estimated at 758 sq. miles; pop. at 62,500.

Company of a Ship includes all persons engaged in the working and management of the affairs of a ship, officers as well as Crew (q.v.).

Compari'son, in grammar, is the name given to the mode of marking the degree in which a quality is attributed to an object. It is customary to say that there are three degrees of C., *positive*, *comparative*, and *superlative*. Exception may be taken to this division on the ground (1) that the 'positive' does not *express* though it may *imply* C., and (2) that the kind of C. which it implies is quite different from that which is expressed by the second degree. Similar objections may be urged against calling the third or highest degree one of C. Admitting that the phrase 'degrees of quality' would be more logical and more simple than 'degrees of C.,' little or no harm can ensue by retaining a nomenclature which is easily interpreted by common sense. In English, German, and some other languages, there are two ways of expressing these degrees—(1) By inflection, which is the prevalent mode in Greek and Latin, as *bright*, *brighter*, *brightest*; (2) By using another word expressive of increase or decrease of the quality, as *conspicuous*, *more* (or *less*) *conspicuous*, *most* (or *least*) *conspicuous*. The former mode is preferred in words of one syllable, or in words of more than one where euphony would not be impaired. As a rule, it is only adjectives of quality that can be compared, and not all even of these. Such as express a quality not admitting of degrees—*e.g. round*, *square*, *whole*, &c.—cannot be compared.

For C. in rhetoric, see FIGURES OF SPEECH and SIMILE.

Com'pass, an instrument for indicating the magnetic meridian at any locality. As this meridian lies in a generally N. and S. direction, the C. is of special use in giving bearings of any object from a fixed place, and is of invaluable service to the mariner and traveller as a guide over unknown regions. All such instruments consist essentially of a magnet suspended so as to have as complete freedom of motion in azimuth as possible. The *Mariner's C.* is familiar to all, the only portion visible from above being the large circular card which is attached to the bar magnet, and marked with the so-called *points* of the C. Each quadrant contains eight points, which are named according to the following plan :—Beginning at N. and going towards E., we read N., N. by E., N.N.E., N.E. by N., N.E., N.E. by E., E.N.E., E. by N., E.; and the other quadrants are divided in precisely a similar manner.

The magnetic needle is subject to a variation with latitude, owing to the non-coincidence of the magnetic and geographical poles, so that it usually points to the W. or E. of the true N. This deviation is easily corrected; but a much more irregular deviation is produced by the reaction of the ship's iron upon the magnet. Various schemes have been proposed to remedy this, such as fixing the needle at the mast-head, thus reducing the action to a minimum, or by using two parallel magnets. The method employed in the British navy at present is to have the C. at a sufficient elevation above the bulwarks, so as to allow of it having an uninterrupted sweep of the horizon. By setting the vessel in the various directions, the variations of the needle may be obtained and tabulated for future use. Sir W. Thompson showed that if two masses of soft iron, large in comparison to the size of the needle, be placed at opposite sides of the magnet, the effect of other more distant portions of iron will be very small indeed; and accordingly he constructed a very sensitive C., differing from those ordinarily in use at sea in not having the card fixed to the needle or needles, which are here not more than 1½ inch in length, and which are as nearly *dead-beat* as they could be wished, and in having two spheroid masses of soft iron fixed close beside the double needle.

Mariner's Compass.

In 1894 an electric steering C. was invented by Bersier, a lieutenant in the French navy. No man is required at the wheel. A secondary circuit of an induction coil connects the needle of the C.-card, which emits an electrical stream of sparks. These pass to metal plates placed around the C.-bowl, and to whichever plate the needle points, that receives the sparks and acts upon an electric motor connected with the rudder. So that when the officer of the watch has set the course, he can leave the vessel to steer itself, as any movement of the needle to the port or to the larboard causes the electric stream to fall upon the lateral plates and thus to set in motion the electric motor, and restore the vessel to its original position by movement of the rudder.

Compass'es, instruments for measuring and transferring distances. The *Common C.* consist of two legs, joined together at one end by a pivot-joint, and may be used for describing circles. The *Beam C.* serve the same end, but are more accurate, and better capable of measuring greater distances. The points slide along a straight beam, and are clamped securely at the required distance. *Proportional C.* have two pairs of opposite legs, whose lengths, and therefore the distances between the points of each pair, can be altered to various proportions.

Compass'ionate Allow'ance. Certain annuities to children of deceased British military and naval officers, given by the state, are so called. They are tenable by boys up to eighteen years of age, by girls till twenty-one or marriage. They range from £14 to £40 per annum. A special C. A. was granted in 1855 and 1856 to the widows and children, or, in some cases, to other specified relations, of military officers killed in the Crimean war.

Com'pass Plant, a plant of the western prairies of America, so called because it is said to turn the faces of its leaves uniformly in a N. or S. direction; 'the leaves on the developed stems of the flowering plants taking rather an intermediate position between their normal arrangement on the stem and their peculiar meridional position. The settlers, when lost on the prairies on a dark night, get their bearing by feeling the direction of the leaves' (Brown). The reason of this is, that owing to the Stomata (q.v.) being more equally distributed on both sides of the leaf than is usual in other plants, both sides are equally sensitive to light.

Compear'ance, a term of Scotch law, denoting the appearance made for a defender in an action.

Compearer.—Any one not called in an action in Scotland may *compear* and claim to sist himself on the ground of having an interest in it. If his claim is sustained he is called a C.

Compensa'tion, in physics, a method for eliminating or neutralising unavoidable errors, by introducing others equal but opposite. See PENDULUM and BALANCE-WHEEL for common instances.

Compensation, in law. Where two persons are indebted to each other, their debts, if equal, are held by law to extinguish each other; if unequal, to leave only a balance due. In England the allegation of trespass or wrong done by the plaintiff cannot be pleaded by the defendant in an action as a *set-off* against the claim of damage. The defendant's remedy must be by a cross action. This is greatly the doctrine of Scotch law also.

By a legal anomaly no action used to be maintainable against a person who, by wrongful act, neglect, or default, caused the death of another, while the offender was liable if the sufferer was merely hurt. But this defect has been remedied by Lord Campbell's Act, which provides that any one who has caused the death of another, even under circumstances which make the offence felony, shall be liable in damage at the instance of the executor or administrator of the deceased for behoof of the wife, husband, parent, or child, provided that, if death had not ensued, the offender would have been liable. The action must be begun within twelve months after death, and not more than one action can lie in respect of the same subject matter of complaint.

Competi'tion (which, like its French equivalent *concurrence*, suggests the idea of a struggle for a prize) has been denounced by socialists as a principle of social disorder, and lauded by optimist writers in political economy as the force which overrules private interest for the general good. Practically, however, C. may be best described as the absence of restriction upon individual judgment in industrial affairs. The restriction may be enforced by either law or custom. Thus the usury laws (demolished in this country by Bentham) prohibited the taking of interest beyond a certain rate; the land-custom of India fixed the rent payable for occupancy. In fact, only in modern times has free C. under contract generally superseded the rule of *status* and custom among advanced nations. Another form of C. which was frequently either excluded or hampered by treaty was that between different countries in the same market. Either the privilege of exclusive importation was conceded to a favoured colony or neighbour, or native industry was bolstered up by prohibitory duties on importation. But no more striking change has taken place than with respect to wages, which were formerly regulated either by statute or statutory magistrates, but are now fixed by agreement between capitalists and trade societies or individuals, both parties looking to the actual and probable state of trade. Some of these restrictions were no doubt suitable to a stationary society isolated from other societies, but with regard to them all, there is no doubt that they were incompatible with the progressive movement in industry and trade which has marked the last century. Each country devoting itself to the department in which it has either the 'greatest superiority or the least inferiority;' each producer endeavouring by ingenuity or economy to secure a sale by furnishing his commodity at a less cost to society; each capitalist bidding for the labour he requires, and bidding more highly for the more skilled labour: such is the picture presented by perfect C. As Bastiat says, its tendency on the whole is to give every one a larger share of the 'gratuitous utility' of nature, by the advantages which science and invention have attained from nature. But the ideal C. nowhere exists. Manufacturers and traders combine to preserve prices and to sink wages; in particular industries and particular nations enormous vested interests oppose the introduction of new methods; trades unionism endeavours to identify the individual workman with his class. It is only where, as in the case of railway and gas companies, &c., a practical monopoly in a district exists, that the state can wisely even specify a *maximum* price or a *maximum* profit.

Compiègne (Lat. *Compendium*), a town in the department of Oise, France, on the left bank of the Oise, a mile below its junction with the Aisne, and 60 miles N.N.E. of Paris by railway. Boatbuilding, hosiery, ropemaking, are among the principal industries; and there is a trade in coal, wood, and grain. The chief edifice is the palace, originally built by St. Louis, and rebuilt by Louis XIV. Here, on the 27th March, 1810, Napoleon I. received his bride, Maria Louisa, Archduchess of Austria. It was also a favourite hunting seat of Napoleon III., and is surrounded by a vast park. Jeanne d'Arc was made a prisoner before the walls of C. in 1430. Pop. 14,498.

Com'plement, the amount by which a given magnitude falls short of some fixed magnitude. Thus the arithmetical C. of a number is the difference between it and the next higher power of ten; the C. of an angle or arc is the amount by which it falls short of a right angle or a quadrant; the C. of a common logarithm is found by subtracting it from ten.

Compo'nee, Compony, or **Gobony,** in heraldry, is a term describing the field of any charge divided into a single row of small squares, alternately a metal and a colour. When there are two such rows, the field is said to be *counter-C.;* when more than two, it is *Checky* (q.v.).

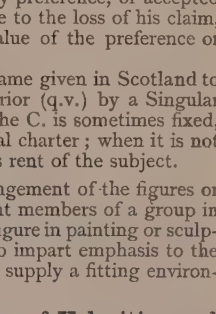
Compos'itæ, Synanther'eæ, or **Aster'aceæ,** the most extensive natural order of Dicotyledonous plants, belonging to the subdivision *Corolliflora* (or, according to others, to the *Calyciflora*), herbs or shrubs, universally distributed. In the northern regions these plants are all herbaceous, but in the southern hemisphere they are occasionally shrubby or even arborescent. There are now 9000 species known. They have been usually divided into the following sub-orders:—(1) *Tubulifloræ*, most abundant in hot climates. *Senecio*, Daisy, &c., are good examples. (2) *Labiatifloræ*, almost entirely confined to the extra-tropical regions of S. America. *Mutisia* is an example. (3) *Liguliflora*, most abundant in cold countries. The Chicory (q.v.) and Dandelion (q.v.) are examples. Their properties are variable, though it may be said that the whole order is pervaded by a bitter principle, so that most of them are tonic. Some, owing to the presence of a volatile oil, are aromatic, and diaphoretic. Acrid stimulative properties are possessed by others, while most of the *Liguliflora* abound in a milky juice, which is bitter, and sometimes narcotic. To enumerate all the economic plants of this great and important order would be impossible within our space. Wormwood (q.v.), Chamomile (q.v.), Elecampane (q.v.), Tussilago (q.v.), Arnica, &c., are among the medicinal plants furnished by it. The Artichoke (q.v.), salsify, endive, lettuce, &c., are eaten. The safflower and sawort supply dye-stuffs. The sirrehout of the Cape of Good Hope furnishes a close-grained beautiful wood, valued by cabinetmakers.

Composi'tion. The creditors of an insolvent person are said in law to accept of a C. when they agree to give him a discharge in full, on his paying them a part instead of the whole of the debt he owes them. In England, the creditors of one who is insolvent may, without any proceedings in bankruptcy, resolve to accept a C.; but, to make the resolution binding on the minority, it must be carried by a majority in number and three-fourths in value of the creditors, at two meetings convened in a prescribed manner. By the Deeds of Arrangement Act of 1887, 50 and 51 Vict. c. 57, arrangements outside the bankruptcy law must be registered with the Registrar of Bills of Sale within seven days after the first execution of the deed by either of the parties, otherwise such arrangements are void. In Scotland, no creditor can be compelled to accept a C. until the bankrupt has been examined under sequestration. All preferences and collusive agreements for concurring in settlement by C. are void, and under the Scotch Act a creditor who has obtained any preference, or accepted any payment for his consent, is liable to the loss of his claim, and to repayment of double the value of the preference or payment which he has accepted.

Composition to a Superior is the name given in Scotland to the entry-money paid to the Superior (q.v.) by a Singular Successor (q.v.). The amount of the C. is sometimes fixed, or taxed, as it is called, in the original charter; when it is not so, the superior is entitled to a year's rent of the subject.

Composition, in art, is the arrangement of the figures or objects of a picture, or of the different members of a group in sculpture, or of the lines of a single figure in painting or sculpture, which is found best at once to impart emphasis to the prominent idea of the work, and to supply a fitting environment of harmony and grace.

Composition and Resolution of Velocities and Forces constitute the most important and fundamental principles of dynamical science. Suppose a body to receive an impulse in a northerly direction, which would produce a velocity of 10 miles an hour; and suppose it further to receive a simultaneous and equal impulse in an easterly direction; the question immediately arises, In what direction and with what velocity will the body move? At the end of an hour the body will obviously have proceeded 10 miles N. and 10 miles E.; and therefore it will have travelled in a N.E. direction with a velocity of $10\sqrt{2}$ miles an hour. This principle is easily extended to the general case of any two velocities making any direction with each other. Let O A and O B represent in direction and magnitude two velocities, which are communicated simultaneously to a body at O; then it appears by a simple inspection of the figure, and a knowledge of Newton's first law (see MOTION, LAWS OF), that the body will move with a velocity represented in direction and magnitude by O C, the diagonal of the parallelogram whose sides are O A and O B. O C is termed the *resultant* of the two *component* velocities O A and O B. The reverse problem, to *resolve* a given velocity in two given directions, follows as an immediate deduction from this. Thus, to resolve O C along O P and O Q, we have simply to draw through C, C B and C A parallel respectively to O A and O B. Forces are compounded and resolved in precisely the same way, as is at once deducible from Newton's second law, that 'change of motion is proportional to the impressed force, and takes place in the direction of the straight line in which the force acts;' and accordingly we may take O A and O B as representing in direction and magnitude the forces which produced these velocities. Hence the resultant force is what would produce the resultant velocity



O C, therefore is represented by O C in both direction and magnitude. See VELOCITY.

Compostell'a, Order of St. James of, a Spanish order of knights, founded at Santiago de C., in the N.W. of Spain, and sanctioned by the Pope in 1175. The original founders were thirteen noblemen in conjunction with the canons of St. Eloy; and their immediate object was to protect against the Moors the numerous pilgrims who visited C. in honour of the relics of St. James the Elder, patron of the city and of Spain, which were believed to be built into the foundations of the cathedral. The affairs of the order were controlled by a council of thirteen, and vows of poverty, obedience, and celibacy were taken by the members; but the order being entitled to retain whatever was won from the Moors, its wealth became enormous; and its power grew so formidable as to excite the fears and jealousy of the crown. The Pope accordingly transferred the grand-mastership of the order permanently to the crown in 1522, which led to a rapid decline of its importance.

Com'posts, a kind of manure consisting of lime, earth, and organic refuse matter gathered into a heap to promote fermentation or decay, the mass being turned over at regular intervals to render it homogeneous before transferring it to the land. C. available for one or more of the cultivated crops may be made with all kinds of farm refuse, as potato-haulms, weeds, leaves, hedge clippings, as well as scourings of ditches, road scrapings, &c., mixed with lime, in the proportion of one load of lime to five loads of refuse. The refuse of manufactures, as wool and flax waste, hair and horn clippings, soap waste, ammoniacal liquor, &c., mixed with earth, constitutes excellent C.

Com'pound An'imals, the name given to animals which are composed of a greater or less number of distinct forms. The included organisms of a compound animal—of which the Tapeworms, *Polyzoa* (q.v.), or Sea-mats, the *Hydroid* zoophytes, and the compound *Tunicates* (q.v.) form good examples—are termed *zoöids*, whilst the entire compound form, however numerous its zoöids, is itself named the *individual*. Any *individual* animal in zoology is defined as the result of the *total* development of a *single* egg. Whatever a single egg gives rise to is an individual, and this latter may be *simple*, or consist of one animal, as in higher forms; or be *compound*, as in the examples given. The compound form at first consists of a single *zoöid*, which by a process of *gemmation* or budding gives rise to the compound organism.

Compound Common Time, in music, is a rhythm in which the primary subdivisions of each bar are accented as in Common Time (q.v.). Each of them, however, is indicated (in ordinary musical notation) by a dotted crotchet, minim, or semibreve—generally the former (for which the time signature is $\frac{6}{8}$), and is subdivided into three parts, which have the relative accentuation:

Strong. Weak. Weak.

Each of these secondary subdivisions becomes, according to the notation of the primary, a quaver, crotchet, or minim, and are frequently again subdivided into two parts, upon the first of which the stress falls.

Compound'ing of Fel'ony, or **Theft Bote.** When one who has been robbed takes back the article stolen on an agreement not to prosecute, he is guilty of C. of F., and is punishable at common law by fine and imprisonment. By 24 and 25 Vict. c. 96, if anyone advertise a reward for the return of any property '*lost or stolen*,' and in such advertisement use any words purporting that *no question will be asked* or that the reward will be given or paid for any property stolen or lost without seizing, or making inquiry after, the person producing such property, or if any one promise or offer by public advertisement to recoup any pawnbroker or other person who may have advanced money upon, or bought, the property stolen or lost, he, as well as the printer and publisher of the advertisement, is liable in a penalty of £50, with costs, at the instance of any one suing for the same. No action for the penalty can be raised without concurrence of the Attorney, or Solicitor, General. Any one taking a reward for helping the owner to recover stolen property, unless he cause the thief to be brought to trial, is guilty of felony and liable on conviction to penal servitude for a term of three to seven years or to imprisonment for any term not exceeding two years with or without hard labour and with or without solitary confinement, and if a male under 18 years, with or without whipping.

Compound Interest, in law, or interest with *Annual Rests*, is never allowed on the sum in the original obligation or agreement; but there is commonly a posterior contract to accumulate interest and make it a principal bearing interest. This is a general rule of law; but in cases of hardship, annual rests may be allowed, and the House of Lords is empowered by statute to allow C. I. on appeal from Scotland, if it shall think fit to do so.

Compound Triple Time is a rhythm bearing the same relation to Triple Time (q.v.) that compound common time (above) bears to common time. Its primary subdivisions are generally noted either as dotted minims or crotchets, for which the time signatures are respectively $\frac{9}{4}$ and $\frac{9}{8}$.

Compressed-Air Bath, an apparatus invented by M. Laburié of Paris, in 1832, and since introduced into hydropathic establishments, which is efficacious as a cure for asthma, bronchitis, phthisis, &c. The increased pressure of the atmosphere produced by its means seems to invigorate the lungs, compelling them to more rapidly perform their functions of inhalation and exhalation, and thus to purify the blood and restore the body, and especially the breathing organs, to a healthier and more natural condition.

Compressibil'ity, one of the properties of matter, in virtue of which a body is diminished in volume under increased pressure. It is usually accompanied by evolution of heat, and in such cases the application of heat is attended with expansion. All gases are easily compressible, but the name *compressible* gas is restricted to such as have been compressed to the liquid state. Liquids for long resisted all attempts at mechanical compression, and their C. is exceedingly small, being measurable only by the most refined processes. Solids present various degrees of C., but its existence proves either that matter is porous, or that the ultimate particles are capable of compression, the former at any rate being probably true.

Com'promise, in English law, is understood to be a mutual promise of parties to submit matters in dispute to arbitration, or is actually the adjustment of the claims of the parties who agree to the arrangement. In Scotland the analogous terms are *Submit* and *Refer*.

Compto'nia, a genus of Deciduous bushy shrubs belonging to the natural order *Myricaceæ*, natives of N. America, and named in honour of Henry Compton, Bishop of London about the year 1714, and the introducer of many exotic plants into England. *C. asplenifolia*, known in the U.S. as the 'sweet fern,' is employed in that country as an astringent and tonic. In France it is sometimes called *Liquidambar à feuilles de Ceterach*, though it has no connection with the true Liquidambar.

Computation of Time, in law. The question of whether or not a particular period of time has legally expired may have a most important effect on the rights of parties. Thus, in Scotland, where the grantor of a deed challenged under the law of Deathbed (see DEATHBED, LAW OF) lived for fifty-nine days and three hours after executing the deed, the court held it to be reducible, on the ground that the law requires the grantor to have lived for sixty days, without counting the day on which the deed was executed. This decision was affirmed by the House of Lords. Had the grantor lived to the morning of the sixtieth day, the legal maxim, *Dies inceptus pro completo habetur*, would have been applicable, and the deed would have been good. There has been a decision in accordance with this principle.

Com'rie, a village on the Earn, Perthshire, 20 miles W. of Perth, in one of the most beautiful districts of Scotland. Slight earthquake shocks are frequently felt here. C. has distilleries and some manufactures of woollens and cottons. Pop. of village 870.

Comte, Auguste, the founder of the school of 'Positive Philosophy,' was born at Montpellier, 19th January, 1798, of Catholic and royalist parents, and early gained a place in the *École Polytechnique* through his mathematical talent. Expelled from that institution for insubordination, he taught mathematics privately, became secretary to Casimir Périer, and from 1818-24 was associated with St. Simon, who no doubt inspired him with the idea of reconstructing social order, expressed in the *Plan des Travaux Nécessaires pour Réorganiser la Société.* In 1824, in an essay in the *Producteur*, C. published his theory of progress from the military offensive *régime* through the military defensive to the industrial pacific; this, he said, depended on the transition from theological conceptions through the abstractions of metaphysics to positive conceptions. Spiritual reorganisation must be based on demonstrated truth, not on faith in the invisible. Next year he made an unhappy marriage, when he had only one pupil, General Lamoricière; and in 1826, before an audience containing Carnot, Humboldt, Poinsot, De Blainville, &c., he began that course of seventy-two lectures on Positive Philosophy, which was interrupted by his insanity. The course was resumed in 1828, and afterwards appeared in six elaborate volumes between 1830 and 1842. During that period he was in easy circumstances, but the character of his doctrines drove him from office and employment, and after receiving aid from Grote, Molesworth, and other admirers for some time, he gave up working for bread, and lived for the rest of his days on an annual subscription from his disciples. In 1845 began his friendship with Mlle. de Vaux, which seems to have infused a depth and tenderness of moral and æsthetic feeling before unknown to his nature. This appears in his second great work, *Système de Politique Positive*, in four volumes, which appeared between 1851 and 1854, and still more in the *Catéchisme Positiviste* (1852). His latter years were full of religious mysticism, almost asceticism. He died, 5th September, 1857. The object of the Positive Philosophy has been described 'as the condensation of all knowledge into a homogeneous body of doctrine, capable of supplying a faith and consequently a polity.' The value of C.'s *Hierarchy of the Sciences* has been violently disputed among eminent *savans*, but with the exception of a few disciples (of whom Congreve, Bridges, Beesly, and Harrison are the most prominent in England), all have joined in condemning the artificial and prosaic ceremonialism which he wished to substitute for a religion growing naturally out of human devotional feeling. Thus the *Catechism* includes a Trinity, consisting of (1) Humanity, or *Grand Être*; (2) Space, or *Grand Milieu*; and (3) the Solar System, or *Grand Fétiche.* This has been wittily called 'Catholicism *minus* Christianity.' On the other hand, his view of the sciences as abstract and concrete; his treatment of sociological questions as requiring a combination of historical generalisation with deductive reasoning from the truths of psychology; his warnings in the *Politics* against the dangerous notion of an indefinite power of variation in human nature, are entitled to great praise. Minor peculiarities of C.'s system are that he does not recognise psychology as a distinct science, because mental life is merely a counterpart of cerebral function, and the introspection of consciousness is untrustworthy; and that he does not discuss the general subject of scientific evidence. Comtism, as a philosophy of knowledge is widely accepted; as a practical faith it is absolutely stationary. Littré, the author of the French dictionary, is certainly the most illustrious, perhaps the *only* illustrious name associated with the system.

Con or **Col** (Ital. 'with'), a word used often in music, as *C. fuoco*, with fire; *C. Spirito*, with spirit, &c.

Con'can or **Kon Kan,** a maritime territory in the province of Bombay, now subdivided into the districts of Thana, Kolaba, Ratnágiri, and Kánara, having an area of 13,639 sq. miles, and a pop. of 537,983. The history of C. begins about the third century B.C., when the Mansies ruled over the country. Since then C. has changed hands several times, passing from the Hindus to the Mohammedans, the Portuguese, the Maratthas, and finally to the British. Greek merchants traded with C. Beni-Israel, supposed to be the lost tribes, settled here, and in the 7th c. crowds of Parsees flocked to the district, and their descendants may be seen in numbers at the present day, at Bombay and all the smaller towns, busily engaged in commerce. The country is heavily watered (100 inches) during the monsoon, and intersected by many streams from the W. Ghâts, yet during the dry season the soil is parched up and unproductive.

Concave' and **Convex',** two relative terms applied to curved surfaces; the former when an intersecting plane lies between the surface and the spectator, the latter when the plane lies on the further side. See LENS, MIRROR, OPTICS.

Concentai'na, a town in the province of Alicante, Spain, 4 miles N.E. of Alcoy, with manufactures of linen and woollen fabrics, of soap, paper, and bricks, of wine, oil, and brandy, and a trade in cattle and grain. Pop. 7758.

Concen'tric circles and spheres are those which are described with the same centre. C. central curves and surfaces of the second order have the same foci. These latter possess many curious mutual properties, which are discussed in Salmon's analytical treatises.

Concep'cion, a city of Chili, on the right bank of the Biobio, near its mouth, with a pop. of 25,120. Its port, Talcahuano, on the bay of C., is, after Valparaiso, the best in the republic, exporting largely hides, tallow, wool, and salted beef. The imports in 1894 were estimated at £1,715,654, and the exports at £1,128,316. The *province* of C. has an area of 3535 sq. miles, and a pop. of 237,844.

Conception of Our Lady, an order of nuns founded in Portugal in 1484 by Beatrix de Sylva, sister of the first Count of Poralegro, and confirmed by Pope Innocent VIII. in 1489. At first they followed the rule of the Cistercians, but after the death of Beatrix de Sylva, Cardinal Ximenes imposed on them the rule of St. Clara. The order spread into Italy and France. Their habit is a white robe with a figure of the Virgin holding the Child, and a blue mantle.

Con'cert, a name given to any musical performance except that of an opera. The first regular series of concerts seems to have been instituted by 'the Academy of Ancient Music,' an English society, which was formed in 1710, and existed until nearly the close of the last century.

Concerti'na, a musical instrument in which the sounds are produced by the passage of air through reeds, the wind being supplied by bellows which form part of the instrument, and can be extended and compressed by the hands while the fingers are left free to manipulate the keys. The C. has no importance musically.

Concer'to, a musical composition in symphony form, for a solo instrument with orchestral accompaniment. The solo parts in the modern C. are generally for the pianoforte or the violin.

Conchol'ogy (Gr. 'the science of shells') is now obsolete as a separate branch of zoology, since to understand the shell-structure of any animal we must have an idea of the animal itself. The name is mainly characteristic of the *Classificatory* period of zoology, when *Taxonomy* was deemed everything in natural history, and when *Structure* had a subsidiary place. See MOLLUSCA and SHELL.

Con'clave (Lat.) is the place in which the cardinals of the Roman Catholic Church meet for the election of a new pope, or the assembly itself. The cardinals, with not more than two attendants (called conclavists) to each, or three to a prince, are *locked* (hence the name) into a large room which is generally in the palace of the Vatican, till the election is over, having their food passed in through a small opening, and living in small cells within the room. The canon appointing these regulations was passed by the Second Council of Lyon, 1274.

Concord, a pretty town in Massachusetts, near the Concord river, 18 miles N.W. of Boston. On the 19th of April, 1775, the first skirmish of the Revolution took place here, and a monument, on the banks of the river, marks the spot where two English soldiers fell. C. is famous as the residence of Ralph Waldo Emerson; and it has, at different times, been a favourite residence of American *literati*, as Hawthorne, Thoreau, Alcott, and Hoar. Pop. 4427.

Concord, the capital of the state of New Hampshire, on the right bank of the Merrimac river, 59 miles N.W. of Boston. It was formerly called Rumford, and here Benjamin Thompson, afterwards Count Rumford, resided for a while. The town extends along the river for two miles, and contains the state-house and some other handsome public buildings. It has a thriving business in iron, steel, carriages, leather, and woollen goods. Pop. 17,004.

Concor'dance is an index of all the words in a book arranged alphabetically, with references to all the passages in which they occur, which may also give the different shades of meaning in which the words are used. A C. was first felt to be useful or necessary for the Scriptures, which were continually made the subject of appeal in learning, teaching, and disputation on religious matters. The first attempts at a C. were made by Antony of Padua (1195-1231), and Hugo de St. Chers (died 1262), both being from the Vulgate. The first Hebrew C. was written by R. Nathan (1448); the best is that of Fürst (1840), based on Buxtorf's (1632). The first Greek C. to the New Testament was written by Birck, a Lutheran clergyman (1500-54). The first C. to the English New Testament was made by Thomas Gybson (before 1540), and to the entire Bible by John Marbeck (1550). All were superseded by Cruden's, 1737, which is yet the best. Young's C. (1880) is also most valuable.

There are also *secular* concordances, such as Clarke's *C. to Shakespeare*, &c.

Concor'dat is a treaty regarding ecclesiastical affairs between the Pope, as representing the Catholic undivided Church, and a particular temporal sovereign. The matters treated of from time to time have been such as the right to nominate, and the right to confirm, bishops; the right to nominate to benefices while a bishopric is vacant; the right to the income of vacant benefices; and the particular taxes of *annates*, tenths, &c.; appeals to Rome; the authority of councils and of national customs against the Pope individually. The rights or claims of the national Catholic Churches used to be expressed in pragmatic rescripts, as in the French Pragmatic of St. Louis (1258); and these national claims were generally modified by concordats, as in that between Leo X. and François I. in 1516, the effect of which, however, was postponed by the Ampliative Dispositions. Questions of the treatment of heretics, of the Papal power of excommunication, and of the reception of Papal nuncios, and of the *Pase*, *Placito*, *Exequatur*, Letters of *Pasatis*, or *Placitum Regium* (the authority given by a sovereign to the publication in his territory of Papal bulls or briefs), also occurred in concordats. In 1682 the French clergy, founding on the Decrees of Constance, issued their celebrated declaration as to the *Régale*, which was acted on through the 18th c. In 1801 a C. was arranged between the Consul Napoleon and Pius VII., the nomination of bishops being by the first, the institution by the latter. Under the Revolution the institution of the constitutional bishops had been by the Metropolitan. The organic articles of the same year carefully provided for an examination of bulls coming into France. The earliest German C. is the Calaxtinum between Emperor Heinrich V. and Calixtus II. in 1122. The writings of Van Espen and the vigour of Joseph II. greatly weakened the power of the Papal nuncios in Germany in the 18th c. The German C. of 18th August, 1855, was, of course, destroyed when the N. German Confederation came into existence in 1867. In Spain a C. in 1753 vested all 'patronatos' in the home authorities, the Pope reserving fifty-two benefices, and receiving twenty-two million *reales* as compensation for *annates* and fees on briefs. The concordats of 16th March, 1851, and 25th August, 1859, were more favourable to Rome. In fact, Spain has always been at arm's length with the Pope on the Ultramontane question. Philip II. instituted a council, 'Concejo de la Camara,' to protect the constitution of the national Church, and Philip V. appointed a general agent at Rome, through whose *Visto Bueno* communication with the Vatican on certain matters must be made. In 1760 Benedict XIV. finally admitted the right of presentation to exist in Portugal. Carvalho strongly resisted Papal encroachment in the beginning of the 19th c. There was a Portuguese C. of 21st February, 1857. The Sardinian and Neapolitan concordats have now lost their interest. The Papal Encyclical, named *Quanta Cura*, published with a syllabus, 8th December, 1864, and the bull named *Pastor Æternus*, published 18th July, 1870, indicated what sort of C. the Papal power desires to make at the present day. Under the Italian Statute of Guarantees, the Pope is merely a spiritual power. The Austrian C. was practically abolished in 1874.

Concordia, the goddess of Peace, to whom several temples in Rome were dedicated. Camillus erected a shrine to C. to commemorate the happy conclusion of the feud between patricians and plebeians, the result of the passing of the Licinian rogations. The representations of C. were the figure of a matron holding in one hand an olive branch and in the other a cornucopia. Two hands clasped together and two serpents entwined symbolized C.

Concordia.

Con'course, a term of Scotch law. —*Concourse of Actions* means the right, by Roman law, accorded to a person of bringing more than one action on the same ground of right. The law of Scotland knows of no such concourse.—*Concourse of the Lord Advocate* means the necessary concurrence of the Lord Advocate in a criminal prosecution at the instance of a private individual.

Concrete (Lat. *concretum*, 'grown together') is a term in philosophy used to denote the opposite of Abstract. It means that an object is considered not merely in reference to pure essence, but as we find it in actual existence, invested with accidental qualities and attributes from which it can be dissociated in thought by an exercise of the reason. There are degrees of concretion as well as of abstraction. Take 'man' as an example of an abstract notion. The idea expressed by the word is stripped bare of everything but the mere attribute of humanity. We begin the process of concretion when we advance to the conception of an 'Aryan,' still further when we reach a 'European,' an 'Englishman,' a 'Londoner,' &c.; but the proper C. is none of these; it is the particular individual of whom we think, and in whom the various properties or peculiarities cohere.

Con'crete, a mixture of mortar with coarse materials, such as gravel, flint, pebbles, &c. At one time the French term *Beton* was used where the matrix was *hydraulic* mortar, and C. in other cases, but the latter word has now the more general meaning. The base of the mortar used is, in the best C., a hydraulic cement. For inferior C. lime is sometimes used, in which case 'poor' limes are better than 'rich.' The mortar should be made first, and the additional sand, &c., added afterwards, although in England sometimes the whole of the sand required to make both the mortar and the C. is frequently added at once. In the best C. Portland Cement (q.v.) is generally used, in the proportion of 1 part of cement to from 5 to 10 parts of aggregates in ordinary cases. C. is chiefly used for the foundations of buildings and masonry structures in general, and of late years it has found more and more extended application, both in foundations and superstructures in harbours, breakwaters, and other marine works. For these purposes huge blocks of C., weighing in some cases hundreds of tons, have been constructed in suitable moulds on shore, and when hardened conveyed to their destination by floating or travelling cranes. In this way the labour of erection and building below the water-line is very greatly reduced, while the greatest possible stability is attained.

Concre′tion, in medicine, is the formation of a solid substance either in some tissue or in the stomach, &c. In certain diseases salt of lime is deposited as a solid mass in the lung or the tissue, but the name is generally applied to a solid substance found in the stomach, &c., formed either by the undigested food matting together so as to cause an obstruction, or by some indigestible substance having been swallowed. Concretions are much more common in ruminating animals than in man. In the latter they sometimes consist of hair, cotton, or other substances. They are often found in concentric rings arranged round a nucleus. Concretions are apt to be originated by the use of certain medicines, as magnesia. When they become very large they require prompt measures on the part of the medical practitioner.

Concurr′ent Jurisdic′tion. Where jurisdiction may be exercised at the choice of the suitor in the same cause by two courts, or more, they are said to have C. J. The rule, then, is that the court which first exercises its jurisdiction excludes that of the others. In civil cases, the plaintiff may cite a defendant to appear before any competent court or judge.

Concus′sion (Lat. *concussio*, 'a shaking') is a term in medicine used to denote an injury to the nervous system brought on suddenly by external violence. Sometimes there is no lesion of the nervous substance or of any other structure; at other times there is laceration of the brain or other serious injury. C. is followed by insensibility and loss of all voluntary motion; the patient lies quite helpless; the pupils are unaffected by light; the pulse is feeble, and the breathing slow and scarcely perceptible. There are degrees of C. from the slightest interference with the functions of the nervous system, to that severe case in which the patient dies instantaneously. In the former cases he soon recovers consciousness, but for some time afterwards he suffers from confusion of ideas, often accompanied with noises in the ears. The proper treatment consists in keeping the patient perfectly quiet in bed, and in attending carefully to the wants of nature.

Con′dé, a name common to several French towns. Of these, the best known are—(1) **C.**, or **C. sur l'Escaut,** a town and border fortress in the department of Nord, at the confluence of the Haine and Scheldt, 7 miles N.N.E. of Valenciennes, with an arsenal and sluices for the defence of the town. It is a great entrepôt for coal. Pop. 4772.—(2) **C. sur Noireau,** a town in the department of Calvados, 25 miles S.S.W. of Caen, where the Noireau and Durance meet, with manufactures of cotton, nails, cutlery, and leather, and a trade in flax, thread, horses, cattle, &c. It came to the house of Bourbon in 1487, and gave name to a famous branch of that house. Pop. 6764.

Con′dé, a famous French family, which takes its name from the town of C. (q.v.), can be traced as far back as the close of the 12th c. In the year 1200 a certain Godfrey obtained part of the barony of C., and was thenceforth known as Godfrey de C. His great-granddaughter, Joanna de C., in 1335, married Jacques de Bourbon, Comte de la Marche. Their second son, Louis de Bourbon, Comte de Vendôme, received as his inheritance the barony of C. His great-grandson, **Louis de Bourbon,** in virtue of his relationship to the royal family, took the title of Prince of C., and is regarded as the founder of the new house of that name. Louis was born 7th May, 1530. He was a son of the Duc de Vendôme, and brother of Antoine, King of Navarre, and first distinguished himself in arms under De Brissac. He defended Metz against the forces of Charles V., assisted in the capture of Calais, and fought on the field of St. Quentin. At the conspiracy of Amboise he resolved to head the Reformed party against the Guises, and was only saved from execution by the death of François II. When civil war broke out on the massacre of Vassy, C. led the Huguenot forces from the Loire to Paris, and afterwards to the battle of Dreux (1562), which brought temporary peace. On the renewal of the war at St. Denis (1567) he and Coligny were still the recognised leaders. C. fell at Jarnac, 15th December, 1569, after maintaining a furious but unequal contest with the Duc d'Anjou's army. Although chivalrously brave, C. had no other quality of a commander; he was of licentious life, although he professed deep attachment to the Reformed Gospel.—**Louis II. de Bourbon, Prince de C.,** known as 'the Great C.,' born 8th September, 1621, was great-grandson of the preceding, and son of the feeble prince, whose wife attracted Henri IV., and the nephew of Prince Henri of C., who fought so bravely in the closing scenes of the civil war of the Huguenots. The Duc d'Enghien, as he was called, received a careful education; his mother, Charlotte de Montmorency, then holding a sort of literary court at the Hôtel de C. Marrying a niece of Richelieu, he obtained high command in the army, and just as Louis XIII. died he made his reputation by the brilliant victory of Rocroy (19th May, 1643), in which the Spanish army of Fuentes and Albuquerque was completely routed, a result to which C.'s strategic skill, decision of movement, and personal bravery all contributed. He next co-operated with Turenne in the Fribourg (Baden) campaign against Mercy, and repaired the losses of the former at Marienthal by the defeat of the latter at Nordlingen (Bavaria). The capture of Courtray and Dunkirk marked his first campaign in the Netherlands, to which, after an unsuccessful attack on Lerida, in Catalonia, he returned in 1648, and by his crushing defeat of the Archduke Leopold at Lens brought about the Peace of Westphalia. In the Fronde C. supported Mazarin and the queen-mother against the Frondeurs, but falling himself into disgrace, he afterwards attempted to organise a still greater rebellion, in which he was assisted by Nemours, Lorraine, and Le Rochefoucauld, &c., and opposed by his companion Turenne, who was successful at Gien, but defeated at the Faubourg St. Antoine. C. was in 1652 declared a traitor; he entered the service of Philip IV. of Spain, and for six years conducted a brilliant war in French Flanders against Turenne, whose victory of Dunes (1658) was followed by the Peace of the Pyrenees, C. being received back into the favour of Louis XIV. The enmity of Louvois and Turenne gave C. the chief command of the French army in Franche Comté (1668) and Holland (1672-74), where he measured his skill without disgrace against that of the Prince of Orange in the bloody field of Senef. His old age was spent at Chantilly, where La Bruyère lived with him, and Boileau and the other literary stars of the period were frequently seen. He died 11th December, 1686. Bossuet, who latterly had great influence over him, pronounced a magnificent funeral oration. Very different estimates of C.'s character, his political ambition, and his behaviour to his friends, have been formed. His military genius lay chiefly in daring, persistent assault, and he was therefore not sparing of human life.—**Louis Joseph de Bourbon, Prince de C.,** born at Chantilly, 9th August, 1736, was the son of the Duc de Bourbon, minister of Louis XV. He first distinguished himself at Johannisberg (1762), and other engagements in the Seven Years' War. Army and financial reform and a splendid hospitality occupied his attention till the Revolution, when he emigrated. The corps which C. then formed served in the campaigns of Wurmser, in the Austrian service; in the English service at Ober-Kamlach and Biberach (1796); and in the Russian service at Constance (1799). It was discharged in 1801, and C. came to England, where he remained at Malmesbury till the Restoration. He died 13th May, 1818. C. was the grandfather of the Duc d'Enghien, whose official murder so much injured Napoleon's reputation. He was concerned in the Pichegru conspiracy.

Conden′ser, an apparatus for cooling vapours down to the temperature at which they become liquid. There are various kinds of condensers in constant use, differing considerably in detail; but all work upon the same principle—namely, that of passing the vapour through a tube surrounded by material at the temperature required for the condensation. (See DISTILLATION.) The name C. is also applied to an electrical apparatus, by means of which a charge of low tension, distributed over a conductor, is concentrated, so that its otherwise insignificant effects are rendered visible to the experimenter. Its action depends upon the theory of electric induction, and may be simply conceived of as follows. Suppose two equal flat disks, A and B, formed of a good conducting material, to be placed close to each other, with only a thin layer of some non-conductor between. Let A be put in connection with the source of electricity, B. with the ground. The charge on A induces an opposite charge on B, which reacts upon the charge on A, thus, as it were, disguising a portion of it. Now, the whole charge on B is disguised, but only a portion of the charge on A; that quantity being free with which A would be charged if the C. B were not present. The more nearly equal the induced charge is to the inducing charge, the more effective the C.; and the ratio between the charges is dependent to a great extent upon the specific inductive capacity of the non-conducting separating layer. See DIELECTRIC, ELECTRICITY.

Condescen′dence is the name given in Scotch law to a judicial pleading. The Summons (q.v.) sets forth the name and designation of the pursuer (plaintiff) and defender, and the conclusions of the action. The statement of the grounds of action are set forth in the C., with a note of pleas in law subjoined. The C. is annexed to the summons, and forms part of it. The Defences (q.v.) must be in the form of answers to the C., with statement of the defender's allegations of fact, if necessary, and a note of his pleas in law. The summons is signed by a Writer to the Signet (q.v.), and the defences by counsel. If the pursuer do not choose to close the Record (q.v.) upon summons and defences, he revises his C., and the defender revises his defences. The record is then adjusted before the Lord Ordinary (See ORDINARY, LORD) in Chambers, and closed.

Condic′tio Indibiti is a term of Roman law for the reclaiming of money paid under an erroneous belief of its being due. It has been decided by the House of Lords (Wilson *v.* Sinclair, 7th December, 1830), that when a person pays money under an error, he has no right to recover unless the error be as to fact. Error as to law is not a valid ground for recovery.

Condill′ac, Étienne Bonnot, Abbé de, a French philosopher, was born at Grenoble in 1715. In the course of a studious life he published several essays and treatises on philosophy and logic. He also wrote upon Grammar, Ancient and Modern History, &c. His friend, Mademoiselle Ferrand, suggested many of his ideas. C. died 3rd August, 1780. At first a disciple of Locke, describing with special care the function of language in the formation of complex ideas, and in the development of mental faculty, C. afterwards maintained that innate faculties were as much a mistake as the 'innate ideas' which he ridiculed in Descartes, Malebranche, and Leibnitz, and that all knowledge and all mental faculties were derived from sensibility, being in fact only 'sensations which transform themselves differently.' Thus memory, attention, judgment, &c., were merely sensations persisting in a certain way. Similarly all the emotions were transformed desires, and desire was simply the withdrawal of sensation. It followed that the lower animals have not such vivid sensations as man (an exceedingly doubtful matter). C.'s philosophy, partly adopted from Gassendi and Hobbes, and enthusiastically applied by Diderot, De Tracy, and the other *idéologues*, consisted (1) in nominalism, (2) in the confusion of sensation with ideation. His analysis of the faculties, proceeding on this confusion, becomes merely verbal, his language constantly assuming the separate laws of mental growth which his theory denies. While, however, he conceived of the operation of (*e.g.*) memory as a mere mechanical tendency to motion, growing up through repeated motions, he also conceived the soul as a perfectly distinct entity, of whose life nervous motions were only the occasional cause. His theory led him to attach exaggerated importance to language, of both artificial and natural signs, which, if properly arranged, he regarded as being an accurate register of human experience. Reasoning was, therefore, speaking properly. C. is remarkable for the clearness and simplicity of his style, and is perhaps best seen in his criticism of the abstract systems, such as the Leibnitzian monads, the ideas of Descartes, &c.

Con′diments are agents used at table to aid the alimentary functions, and to give relish to such articles of food as are difficult of digestion, as fish, veal, vegetables, &c. The simpler C. are salt, butter, sugar, pepper, mustard, vinegar, and pickles. In hot countries, where the digestion is more liable to languish, stronger C. (*e.g.*, betel and curry) are in extensive use.

Condi′tion. In logic, conditions are the antecedents which combine to produce a certain effect, the antecedent which directly brings about the effect being termed the cause. Thus, a spark of fire might be termed the cause of an explosion, though, in reality, it is only the apparent occasion, and the nature of powder a C. necessary to produce the effect. 'The real cause,' says Mill, 'is the whole of the antecedents. Though we may give the name of cause to that one C. which brings about the effect without further delay, this C. has no closer relation to the effect than any of the other conditions has.' See Mill's *Logic*, book iii. chap. v.

Condition. In the real property law of England, it was at one time held that the gift of an estate by the lord to a vassal and the heirs of his body was a gift on C. of his having heirs of his body, and that if he died without having had heirs of his body the estate must revert to the lord. The C., however, was so far fulfilled by the vassal having heirs of his body, that, even though they predeceased him, he might alienate the land. An estate so bestowed may now, by certain legal procedure, be made an absolute gift.

Conditio si sine liberis decesserit.—By Roman law, a gift of estate made when the donor had no children became void on his having children. The principle of this law is recognised in Scotch law in testamentary settlements and in donations *mortis causa*.

Conditional Institute, a Scotch legal term. Under destinations of real property, the immediate disponee of the grantor is called the *institute*. Those to whom the property is destined, failing the institute, are called *substitutes*. When the destination to the immediate disponee is conditional, he is called a C. I. A C. I. takes the property as disponee, but a substitute takes as heir.

Conditional Legacy. When a bequest be made dependent on the occurrence or non-occurrence of some uncertain event, it is called a C. L.

Condi′tional Obliga′tion. An obligation depending on a condition has no force until the condition exist, but the grantor cannot revoke the ground of hope which he has given. Contracts are null if illegal or impossible conditions are annexed. But such conditions, or frivolous conditions, annexed to a legacy, are merely held *pro non scriptis*, and non-compliance does not affect the right of the legatee.

Condi′tioned. The philosophy of the C. is the name given by Hamilton to a particular application by him of the doctrine of the relativity of human knowledge. 'There is no ground,' he says, 'for inferring a certain fact to be impossible, merely from our inability to conceive its possibility.' This arises, not merely from the limitations of human experience, which, by creating certain powerful associations, exclude others, but because the human mind may be naturally incapable of conceiving many things. Besides the two ordinary meanings of inconceivability, however, viz., impossibility of representing the thing as an image, and impossibility of realising the thing as possible, Hamilton adopted a third, viz., impossibility of explaining, proving, or comprehending under a more general notion. He then states his theory: 'The C. is the mean between the two extremes—two unconditionates, exclusive of each other, neither of which can be conceived as possible, but of which, on the principles of contradiction and excluded middle, one must be admitted as necessary.' This he applies to the antinomies of space, time, free will, &c., maintaining that limited and unlimited space are alike inconceivable, but yet one is necessary.

Condona′tion in the law of England and of Scotland means *forgiveness*. A plaintiff may condone an offence either by an act implying forgiveness, or by complicity with the wrong-doing of the defendant. C., as accessory or accomplice, bars the suit of the plaintiff. The word is chiefly used in actions of divorce.

Con'dor, an American species of Vulture (q.v.), inhabiting elevated parts of the Andes, and of large size, the average length being between 4 and 5 feet, and the expanse of wings being about 14 feet. The tail is wedge-shaped. The plumage is black; the males have white wings, and their heads are combed and provided with wattles. The beak is curved at its tip. The food consists of carrion, and these birds consume large quantities of food. The King Vulture, another species of this genus, inhabits Brazil and Guiana. Its plumage is red above and white beneath, with black tail and wings. The Californian vulture is a third species of the genus to which the C. belongs.

Condor.

Condor'cet, Jean Antoine Nicolas de Caritat, Marquis de, a French philosopher, born at Ribemont, Picardy, 17th September, 1743, of a noble family, was educated by the Jesuits of Reims, and at the College of Navarre, Paris. His talent was chiefly mathematical, and his *Mémoires* on the integral calculus, probabilities, and the higher analysis generally, won the admiration of D'Alembert and Lagrange, the former of whom secured, in 1773, C.'s election as secretary to the *Académie des Sciences*, though Buffon's friend Bailly was a candidate. In this position he wrote many of the finest *éloges* in French literature, notably those of Buffon, D'Alembert, Franklin, Lafontaine, &c. He pled warmly against religious distinctions in scientific societies, asking whether a society containing the Atheist Aristotle, the Catholic Descartes, the Unitarian Newton, the Calvinist Huyghens, the Deist Leibnitz, the Jansenist Pascal, the Mahommedan Al Hazen, &c., &c., would not be the best of its kind. Drawn by his friendship for Voltaire and Turgot into social discussions, C. wrote against Necker for free trade in corn and against the feudal taxations. From 1776 to 1791 he held a position resembling the Mastership of the Mint. The lives of Turgot and Voltaire, the slavery abolition question, and religious equality, occupied his attention as well as his official duties. His activity in writing on political questions immediately before and during the first years of the Revolution was great. As member of the Legislative Assembly of 1791 and the Convention of 1792, he prepared reports on the question of peace or war, was influential in taking the custody of registration from the clergy, strongly opposed the capital sentence of the King, and was consulted on all constitutional points of importance. On the expulsion of the Girondins, however, he was denounced by the Committee of Public Safety, and compelled to hide for six months in the house of Mme. Vernet, where he composed his famous *Esquisse des Progrès de l'Esprit Humain*, afterwards printed by order of the Convention. Leaving this shelter, which exposed his friend to the penalty of death, C. escaped from Paris, but was retaken, and died by poison, self-administered, at Bourg la Reine, 28th March, 1794. C. had a noble wife, who strengthened him greatly in his separation from the aristocratic party to which he by birth belonged, and in his persecution by the Terrorists, whose constitution of '93 he had opposed. She was the sister of Marshal Grouchy and the sister-in-law of Cabanis. She translated Adam Smith's *Theory of Moral Sentiments* into French. During her husband's concealment she supported herself by painting portraits, the Government having sequestered C.'s property. C. himself was a man of delicate sensibility and warm affections, and undoubtedly one of the greatest intellectual figures in the Revolution. His theory of human progress has been blamed as establishing a rather inconsistent division of history into periods; one being political, another scientific, another religious. His conclusions that equality, or *equal freedom* of nations and classes (as regards trade, wealth, education, government, &c.), will be established, and that human nature is indefinitely perfectible morally, physically, and intellectually, have excited much mistaken ridicule. C. in fact announced the truth that the mental acquisitions of one generation are not dissipated, but transmitted to its successor; he insisted that this might take place with regard to morality as well as intellect; he did *not* suppose that medical science would ever make man immortal.

Condottïe'ri, soldiers of fortune of the 14th c., whose services in warfare were sold to the side that promised most plunder. The quarrels of the petty Italian states gave these mercenaries constant occupation. Among their celebrated chiefs were Francis of Carmagnola, and Sforza, who became Duke of Milan.

Battles were fought by *arrangement*: a general who could not, or would not, pay his C., found himself deserted at the most critical time of the campaign. Commanders of opposing bands of C. would compare notes and talk the matter over quietly before the battle, deciding amongst themselves to which side victory should fall, and that *without bloodshed*, so far as they were concerned, although there usually followed much slaughter of those unconnected with the C., and of the people in whose territory operations were proceeding.

Conductiv'ity, thermal or electric, of a given substance, is the amount of heat or electricity which flows through a cube of unit volume in unit time, the difference of the temperature or potentials of the opposite sides being unity. The late Principal Forbes has shown that the thermal C. of pure metals is probably inversely proportional to the temperature from absolute zero, and the same law seems to hold in the case of electric conduction. This law is deducible from theory, upon the hypothesis that heat, during its conduction, arranges itself exactly as it would do if let down from the hotter to the colder part by a perfect engine, *i.e.*, so disposes itself that the least possible amount of work can be got from it during the operation. (See THERMODYNAMICS.) Non-metallic substances are in general bad conductors of heat, and frequently non-conductors of electricity; and these increase in conducting power as their temperatures rise. Liquids are of small conducting power as compared to solids, and the experimental determination of their C. is a matter of considerable difficulty, in the one case owing to the disturbing effects of the thermal convection currents produce, and in the other, if the liquid be a chemical salt or compound, to the electrolytic action and polarisation which generally supervene. The C. of gases is still more difficult of determination, radiation and convection playing by far the most important part.

Conduc'tor, in music, the director of a performance. The C. generally stands in front of the performers, and marks the time for them with a baton, while at the same time he indicates the expression and the entrances of the different parts or instruments. The C. of an orchestra must be distinguished from the *leader*, who is the principal first violin.

Cone, the solid formed by drawing lines from every point of a closed plane curve to a given point not in the plane of the curve. If the C. be cut by a plane parallel to the base, the curve of section is similar to the base, and the solid bounded by these parallel planes is called the *frustrum*. The most important C., however, is the *right C.*, which may be generated by the rotation of a right-angled triangle about one of its sides. If it be intersected by a plane perpendicular to the axis of rotation, the curve of intersection is a *circle;* if by a plane inclined at any angle, but cutting both sides of the C., an *ellipse;* if by a plane making with any side an angle equal to the vertical angle of the C., a *parabola*; and if by a plane making any inclination less than this, a *hyperbola*. For the special properties of these conic sections, reference must be made to the several articles.

Conegliaʹno, a town of N. Italy, province of Treviso, 28 miles N. of Venice by railway, with several churches, a hospital, and manufactures of silks and woollens. Pop. 9260.

Cone-Shell, a genus of Gasteropodous mollusca, belonging to the family *Conidæ*, in which the shell is inversely conical, the aperture long and narrow, and the outer lip notched near the suture. The *operculum* is minute and of lamellar structure. This family belongs to the *Siphonostomatous* (or 'siphon-mouthed') division of Gasteropoda, and to the order *Prosobranchiata*, in which the gills are placed anteriorly to the heart. These molluscs are common in the Mediterranean and in tropical seas.

Confarreaʹtion, a Roman form of marriage ceremony, deriving its name from the *panis farreus* (bread made of spelt) used on the occasion. The children of parents so married were alone eligible for certain offices of the priesthood.

Confecʹtionery. Under this name are included the various manufactures of sugar for use as sweets, or *bonbons*, as they are called by the French. The simplest form in which sugar is prepared for eating is when it is crystallised from a solution into candied sugar. It is generally prepared from raw sugar, and has a brown colour; but when tinted, refined sugar is employed, and the colouring material added to the solution. The crystallisation takes place around thin slips of wood or pieces of twine, which are always found in the core of the material. Sugared almonds, cloves, caraways, corianders, &c., and sweets having a core either of fruit or baked sugar, as in the case of 'pan drops,' all of which are included in the French *arages*, are thus prepared. The cores of fruit or sugar are placed in a large copper pan, revolving at an angle of about 45°, heated by steam admitted to circulate between its outer and inner surfaces. The revolution of the pan at this angle causes the materials within it to be in constant motion tumbling over each other. A gentle stream of sugar solution is allowed to trickle continually into the pan, and the continual motion of the materials secures a proportion to each separate piece, and at the same time keeps them from adhering to each other, while the heat dries off the superfluous moisture. Thus the cores become gradually and uniformly encrusted in pure sugar, and the longer the process continues, the thicker becomes the coating. Ordinary lozenges (*trochisi* of druggists) are prepared from loaf-sugar broken, and ground to a fine powder. This is baked up into a stiff cake with a pure solution of gum arabic, rolled out to the required thickness, and the lozenges cut out by hand or machine. They are then put aside to harden and dry in trays. The paste may be tinted with any colouring material, and flavourings such as peppermint, ginger, clove, rose, musk, &c., are introduced in the baking. Medicated lozenges are an elegant and pleasant form of administering minor remedies for coughs, children's ailments, &c., when suitable ingredients are introduced into the paste; but the use of lozenges containing morphia, codeia, and other narcotic substances should be carefully guarded. Pastilles are preparations containing a large proportion of gum, in which the sugar is wholly dissolved, and they are usually tinted and flavoured with fruit essences. Preparations of boiled sugar form a distinct class by themselves, and occur in a variety of forms, such as 'drops,' barley-sugar, rock, balls, &c., variously tinted and flavoured. The sugar is dissolved by heat over a fire, care being taken to keep it from burning, and when poured out in thin layers it is worked up into its various forms, after it has acquired such a plasticity as enables it to be handled. Toffee or butter-scotch is made by boiling up sugar, honey, and butter together, but frequently the honey is altogether omitted from the preparation. The French excel in the preparation of various sweets, and their *fondants* have often an exquisite flavour, and are manufactured in a very attractive manner.

Confederaʹtion of the Rhine, a confederacy formed by Napoleon when he destroyed the Holy Roman Empire in 1806. It consisted of sixteen German princes, who disowned connection with the ancient empire, allied themselves with France, and acknowledged Napoleon as protector of the league. It undertook to furnish him, in war, with 63,000 soldiers. This unpatriotic alliance was dissolved in 1813, on the fall of Napoleon, and the Germanic Confederation was constituted in its place in 1815.

Conʹference, in English, means the professional interview of an attorney or solicitor and counsel. When barristers meet professionally for friendly deliberation, the meeting is called a *consultation*.

Conferʹva, the type of the division of green-spored Algæ (q.v.), called *Confervaceæ*. They are exceedingly delicate, thread-like, articulated, cellular plants, found mantling the surface of stagnant pools, and constituting much of the 'scum' of such collections of water. When dry, the masses of confervæ look like cotton, and, indeed, have been used as a packing instead of tow, to support fractured limbs. It has been proposed to apply these cotton-like masses to economic purposes, but the project has not yet taken any tangible shape.

Confesʹsion, in the ecclesiastical sense, means the acknowledgment of sin, accompanied with submission to penitential discipline, and the reception of an authorised sentence of reconciliation. All Christians admit that they are to confess their sins to God. The sacrifices or 'sin-offerings' which, from the first, were offered to Jehovah for pardon of sin, always implied C. of that sin, whether openly expressed or not. According to the Jews, repentance could not be complete without C., of which their Rabbis enumerated three kinds. The ministry of John the Baptist was based on the same principle. In the early Christian Church, C. was practised, along with other exercises, as a preparation for baptism; and this C. was sometimes public and sometimes private. In the case of public, scandalous offences, transgressors were obliged particularly to promise to forsake them; but no public or particular C. of private offences was required of men at baptism, beyond what was implied in the general renunciation of Satan, and all his works. Those who were guilty of public, notorious, and scandalous crimes after baptism had to undergo public Penance (q.v.) before being again admitted to the communion. As to private offences, sometimes public C. and penance were made for them, and sometimes a public minister was appointed to hear men's C. and direct their repentance; but this was by no means an essential condition for communion, much less were auricular C. and private absolution from a priest; it was all a matter of advice and free choice. But in the fourth Lateran Council (1215) Pope Innocent III. published a decree, requiring it to be held as an article of faith that every one is bound, by a positive divine ordinance, to confess his sins to a priest, and the dogma of auricular C. was fully established in the Roman Catholic Church. In the standards of the Church of England, C. is permitted, and in some cases recommended. The practice fell into almost complete disuse, however, after the Reformation; but in modern times it has had a great revival in the High Church party. Public C. is practised among certain Nonconformist communities. See Bingham's *Antiquities of the Christian Church*.

Confession, in law, means avowal or admission of an allegation. In England, in a criminal case, a jury may convict a prisoner on his C. without further evidence, provided it be made without intimidation or bribe. In Scotland, corroboration is required, the C. being merely held as evidence. In a civil action, refusal to deny an allegation within the knowledge of the party is held as C. of its truth. C. before an ecclesiastical court, even though followed by public Church censure, is not in Scotland held as proof in any civil or criminal matter by a lay court.

Confession and Avoi'dance is, in common law pleading in England, the admission of an allegation of the opposite party, but with the addition of some circumstance which destroys its legal effect. Some pleas of this kind urge justification or excuse, while others endeavour to show discharge or release.

Confession, Judgment by, in England, is judgment against a defendant on his admission of the law and facts alleged against him.

Confes'sional is an enclosed seat or recess in Roman Catholic churches in which a priest sits to hear penitents make confession. The usual place used to be an open seat in the chancel; the modern C., resembling a sentry-box, with a small window for penitents to speak through, being of recent introduction.

Confessions of Faith might be called elaborated Creeds (q.v.). The principal C. of F. extant, which were composed at the time of the Reformation or soon after, are the following:—Confession of the Roman Catholic Church, contained in the decrees of the Council of Trent (q.v.); Confession of the Lutheran Church, contained in the three ancient creeds, the Augsburg Confession (q.v.), and Melancthon's Apology, the Articles of Schmalkald, Luther's Catechisms, the Concordienformel, and the articles of Visitation (1592); Confession of the Reformed or Calvinistic Churches—the Helvetic, Tetrapolitan, Gallic, Palatine or Heidelberg, and Belgic; Confession of the Anglican Church—the Thirty-nine Articles (q.v.); the Confession of the English and Scotch Presbyterian Church, and the Westminster Confession of Faith and Catechisms, drawn up by the Assembly of Divines who sat at Westminster from 1643 to 1649.

Con'fident Person means in law an intimate associate or dependent. The term is especially applied to a partner in business, steward, agent, or servant of any one. Deeds of an insolvent person in favour of those so connected with him, if granted without adequate consideration, are, in Scotland, reducible by statute. See CONJUNCT PERSONS, COLLUSION, CONSIDERATION.

Confidential'ity, in law, denotes the legal privilege which some communications have. Letters between agent and client have the privilege of C., as do in certain cases communications between husband and wife, and secrets of states. No action of damage can be founded on them, nor can anybody be required to produce them in a suit or action. How far the privilege extends has been the subject of much legal discussion. It has been decided that a former agent is bound to secrecy, and in England the tendency of decisions has been towards a wide view of the privilege (see Dickson on *Evidence*). In Scotland it is still doubtful whether confessions made by a criminal to a clergyman are privileged. In England it has been decided that they are not. Physicians are not entitled to withhold communications, however confidential. In Roman Catholic countries the 'Seal of Confession' is held inviolable. Husband and wife are admissible as witnesses for and against each other in civil suits, but neither is a competent witness against the other in a criminal case. See EVIDENCE.

Confirma'tion is a rite supplementary of the sacrament of baptism, and without which no one is admitted to the sacrament of the Lord's supper. It means literally a *strengthening*, and is so called because they who receive it are understood to be strengthened thereby for the fulfilment of their Christian duties. There has been a controversy between Romanists and Protestants as to whether such a rite existed in the time of the apostles, or whether it originated at a later date. Be this as it may, it was, in the early Church, always performed in connection with baptism. The full ceremony of baptism consisted, besides the immersion, of unction, of the sign of the cross (the seal of the Lord), and of the imposition of hands accompanied with prayer; and by the name of one or other of these three actions it was generally known. Baptism thus consisted of a negative and a positive part: the cleansing from sin, signified by the immersion; and the importation of the Holy Spirit, signified by the imposition of hands. Now, as the Holy Ghost was given by the laying on of the apostles' hands (Acts viii. 14-19, and xix. 1-6), this power was reserved exclusively for their successors, the bishops. Accordingly the latter part of the rite of baptism, which afterwards became to be called C., could only be performed at the same time with the immersion (which could be performed by the presbyters, and even the deacons) if the bishop happened to be present. If not, it was performed by him at the first opportunity, for which purpose he went periodically through his diocese. It was not till the 13th c., however, that C. came to be regarded as a separate ordinance from baptism, even in the case of infants, to whom at first the eucharist also was given at the same time. The Council of Trent (1545) pronounced it to be a true and proper sacrament. In the Eastern Churches, baptism, C., and the eucharist are all administered yet in immediate succession. In the Western Churches, for the last three or four centuries, a delay of seven years has been interposed between infant baptism and C. In the Anglican Church, this delay is extended to fifteen or sixteen years. See Blunt's *Dict. of Doct. and Hist. Theology*, Smith's *Dict. of Christ. Ant.*, and Bingham's *Eccl. Ant.*

Confirmation, in English law, means the conveyance of a voidable right in land or of a particular estate to a person in possession, by which the former becomes valid and unavoidable, and the latter greater. In Scotch law, C. means the form in which a title is conferred on the executor of one deceased to administer. The process for C. goes on before the Commissary (q.v.) of the district.

Confirmation, Charter of, in Scotch conveyancing, is the title of a charter granted by the superior to the purchaser of a property. It is so called because it confirms the rights granted to the purchaser under the Disposition (q.v.) in his favour, and the Sasine (q.v.) following upon it.

Confisca'tion was the forfeiture of lands or goods to the crown, being part of the punishment of certain crimes. This has been abolished by statute 32 and 33 Vict. c. 23.

Con'flict of Laws. There is no kind of question more perplexing to the mind of lawyers than that which springs from the confliction of the law of different states. An individual may have two nationalities by parentage, and many nationalities by residence and right of property in various countries; thus it may be very difficult to say under the law of which country this individual or his right of property ought to be. Even in the Roman Empire the C. of L. was very embarrassing, for the inhabitant of one province was not subject to the jurisdiction of the magistrate of another. But it has been since the Roman Empire dissolved into the various kingdoms of modern Europe that the full force of the difficulty has been felt. In the United States of America it has been also very greatly felt, owing to the partially independent character of the states forming the Union. In Great Britain, the chief conflict of law has arisen from the difference in the legal doctrine of England and Scotland respecting the constitution of Marriage (q.v.), and in the determination of other points involving questions of Domicile (q.v.). See Story's *Conflict of Laws*.

Confor'mable Strata, in geology, are strata deposited one above the other in parallel layers. They indicate the absence of any great physical disturbance (save perhaps an interrupted but gradual rise or fall of the whole district) during their deposition, and point to a comparatively short geological time between the formation of any two.

Confron'té, or **Com'battant,** in heraldry, two lions or other beasts of prey, face to face, rampant.

Confu'cius (a Latinised form of *K'ung Fu-tsze*, 'the Master Kung'), the son of Shu-leang Heih, a brave soldier of ducal descent, and Chingtsae Hen, was born in the district of Tsow, now Yenchow, 21st of 10th moon, B.C. 551. His father's death left him poor. After a studious youth, he married at the age of nineteen, and then became keeper of grain stores, and afterwards of the public lands and fields. At the age of twenty-two he began publicly teaching for fees the 'doctrines of antiquity.' In 528 B.C. he lost his mother. After a long study of the history, literature, and institutions of the empire, C. obtained from Prince Ch'aou, through a favourite pupil, Hohe, the means of travelling from his native state of Lu to the state of Chow, where he met Laou Tau, the founder of the Rationalistic sect named Taouists. Civil commotion in Lu next forced C. to retire to the state of Tse, where he enjoyed the friendship of the King, and extended his knowledge of music. From 515 to 501 B.C., he remained in Lu without public office, but with an increasing number of disciples. After the expulsion of the usurper, Yang Hu, C.'s success as chief magistrate of the town of Chung-tu led to his appointment by the Prince Ting (of Lu) as Assistant-Superintendent of Works (in which capacity he carried out a survey, and many agricultural improvements), and latterly as Minister of Crime. His determined opposition to the great private families, and his administrative power, made him many enemies in Lu and Tse; in 496 B.C., he was driven from the court, and spent the next thirteen years in wandering from state to state, chiefly in Wei, Ch'in, and Ts'u. In 483, he returned to Lu, where he spent the last five years of his life, consulted occasionally on public affairs, but chiefly engaged in revising his works on rites and history, and in the reformation of music. After losing his son Le, and his disciples Yeu Hwuy and Zsze-lu by death, C. himself died, on the 11th of the 4th moon, 478. His disappointments in life were compensated by the universal veneration of his memory. His classics have become the text-books of instruction in all schools and colleges, and the subject of competitive examination for civil posts. He not only receives titles of honour, as the Ancient Teacher, the Perfect Sage, &c., but in association with his ancestors and four eminent disciples, he is regularly worshipped in temples built for the purpose, the Emperor performing an act of public worship twice in the year. The immense literary class of the empire transmit the influence of C., which extends to the Taouist and Buddhist population, as well as to the pure Confucians. The Chinese classics consist of the Five *King* (or canonical works), which are the Yih (Book of Changes); the Shu (Book of History); the Shi (Book of Poetry); the Le Ke (Book of Rites); the Ch'un Ts'ew (Spring and Autumn), a chronicle of events from 721 to 480 B.C.; and the Four *Shu* (or writings), which are the Lun Yu (or the Confucian Analects or Digested Conversations of C.); the Ta Hëo (Great Learning), attributed to Tsang Sin; the Chun Yung (Doctrine of the Mean), ascribed to K'ung Keih, the grandson of C., and the works of Mencius. These works (which have been the subject of innumerable commentaries) were first completely collected by the Emperors of the first and second Han dynasty. Since the beginning of the Christian era they have been jealously preserved by the state, but it should be remembered that the original text was put together from scattered bamboo tablets, which the Tsin dynasty (B.C. 255-202) had endeavoured to destroy. The Ch'un T'sew is the only work entirely composed by C. The great feature in the philosophy of C., is that he professes to base everything on the past; to revive the wisdom of early sages, and the purer and more scrupulous rites and ceremonies of former times. Possessed of high and noble conceptions of morality, and of a warm and generous disposition, he nevertheless, in accordance with the genius of his race, put a faith in the minute external regulations of life which is pedantic and incomprehensible to Europeans. This faith has communicated itself to the empire, and has survived through many political revolutions to the present day. It is probable that C., while insisting on the duty of ancestor-worship (a form of human service revived by Comte), had little belief in the objective existence of the Shang-Te, or Supreme Spirit, mentioned in the Book of History, or of departed relatives and friends. Women have always been oppressed in China; 'talkativeness' being one of the seven grounds of divorce laid down by C. The despotic principles thus applied to the five relations of society (including those of friendship and of elder and younger brother), must have been useful in establishing the centralisation of the imperial power, and the suppression of feudalism. C.'s negative expression of the Golden Rule of Christ has often been commented on; his ethical code, however, permits blood-revenge, a thing repugnant to Christian ethics. See Legge's *Chinese Classics.*

Confucius.

Confu′sion, a term of Scotch law, denoting the extinction or suspension of an obligation by the debt and credit devolving on the same person.

Congé-d'Élire is the sovereign's licence to the dean and chapter to *elect* a new bishop when the see is vacant. It is accompanied by letters-missive from the crown, naming the person to be elected. If the election is delayed beyond twelve days, the nomination may be effected by letters-patent from the crown. If the dean and chapter elect any other than him who is named, they incur the penalties of a *Præmunire* (q.v.).

Con′ger Eel, a genus of Teleostei, included in the suborder *Malacopteri,* and differing from the ordinary eels, chiefly in the length of the dorsal fins, which commence above the pectoral fins. The upper jaw is larger than the under jaw. The tail is elongated and pointed. The C. E. may attain a length of from 3 to 6 feet, and a thickness equal to that of a human leg. The colour is a brownish-black above, and a white beneath. It is the only British species, and is fished chiefly on the S. coasts of Britain. The flesh is coarse. The baits used in its capture are small fishes of various kinds.

Conges′tion, in medicine, is a term used to denote that condition in which there is excess of blood in a part of the system. It is of three kinds:—(1) *Active C.,* in which there is an increased flow of blood to a part through the arteries. This occurs in all local inflammations, and was denominated by the older surgeons *determination of blood to the part.* It may result from the application of some irritant, as is seen in the redness produced by a mustard-poultice, which is due to the increased flow of blood to that part. Active C. often ends in hæmorrhage, especially when situated in a mucous membrane, as in the stomach. (2) *Passive C.,* when the excess of blood in the parts is due to want of tone in the small blood-vessels (capillaries). These capillaries are dilated, and the circulation of the blood in the part is sluggish, and as a consequence the serum of the blood is exuded, and dropsy is the result. Passive C. is often the result of Active C. (3) The *Mechanical C.* of some authors is C. due to obstruction in some vein, as a tumour pressing on a vein. Tight garters will produce C. of the lower extremities. Mechanical C. produces a variety of passive C. In active C. the part is generally bright red; in passive C. it is more or less of a dark-purple colour. Treatment of C. will depend on the kind of C. present. In all cases the cause is to be removed if practicable. In passive C., iron tonics internally, and astringents, as alum or zinc, externally, will often do good.

Con'gleton, a market-town and borough, Cheshire, on the Dane, 33 miles E. of Chester, with manufactures of cotton and silk. C. silk fabrics are of superior quality. Many of the houses consist of timber-framing and plaster, which gives the town a picturesque and ancient appearance. Pop. reg. subdist. 18,547; mun. bor. and civ. par. (each) 10,744.

Conglom'erate, or **Pudding-Stone,** is a rock composed of water-worn pebbles (usually quartz or other highly siliceous mineral), cemented together by a matrix of sand, clay, or lime. It indicates the position of a former coast-line, and a subsequent depression below the sea. *Breccia* differs from C. in being made up of angular fragments.

Congo, or **Livingstone,** the greatest if not the longest river of Africa, drains the region lying to the W. of the Great Central Lakes, and enters the Atlantic in lat. 6° S., 200 miles N. of Loando. It issues from the S.W. extremity of Lake Bangweolo or Bemba (q.v.), and flows N. as the Luapula to Lake Moero, then in a N.W. direction, and after passing through the W. side of the Marungu country, it takes a great curve to the W. before reaching Nyangwe, the most westerly point attained by Livingstone (April-June, 1871), and the point from which Stanley began to trace its course. The C. then flows due N., and under the equator rushes over five cataracts, called Stanley Falls, round which Stanley's boats had to be dragged for 13 miles. One of the most remarkable and unexpected of Stanley's revelations was this great northerly sweep of the river, which takes it to 1° 45′ N. lat. On leaving Upoto on the left bank it trends S.W. to the Atlantic, taking the name C. (*Kwango*). It has an estimated drainage area of 1,400,000 sq. miles, and a length of over 3000 miles. Stanley named many affluents, but explored none. One, the Sankuru, is obviously Cameron's Sankorri; another, 2000 yards wide at its junction (about lat. 1° N.), is called Aruwini or Biyerre, and is supposed to be Schweinfurth's Welle. Stanley reports that for 780 miles (16° 50′-25° 50′ E. long.) the C. is continuously navigable, but for 170 miles the lower course is impeded by rapids and cataracts. The country through which it flows is densely wooded; oil-palms, white cotton, india-rubber, ground-nuts, and ivory are superabundant. The basin of the Upper C. is rich in copper and gold mines. Stanley gave the name 'Livingstone' to the whole river. See Burton's *Gorilla Land and the Cataracts of the C.*; Monteiro's *Angola and the River C.* and Stanley's *Through the Dark Continent*, &c.

Congo Snake, a harmless batrachian, occurring in the southern of the United States of America. It breathes through branchiæ at the sides of the neck. It possesses four small limbs; the fore arms have two fingers and the hind two toes. The colour is bluish black and the length about 2 feet 4 inches. The C. S. lives in muddy ditches and is often found in rice-fields, where it feeds on insects and small fish or molluscs.

Congo Snake.

Congrega'tion, means—(1) in its largest sense, the visible Church, or the whole body of Christian people considered as assembled in some act of fellowship; and then popularly (2) the worshippers assembled in a particular place; (3) also it was the ancient name for a Chapter (q.v.); and (4) in the Roman Catholic Church it means a council or court of cardinals and other divines.

Congrega'tionalists, the proper name of the body of Christians best known as Independents (q.v.).

Congress is the term applied to a conference of European sovereigns, or of their plenipotentiaries, to consider matters of international interest, and generally to adjust the Balance of Power (q.v.). Such were the Congresses of Vienna, held in 1815; of Carlsbad, in 1819, for adjusting the position of Germany; and of London, in 1826, for fixing the fate of Greece. At a C. there is no presentation of credentials on the part of the members, although they exchange and examine the warrants under which they act. In the U.S. and some other of the American republics C. is a collective name for the Senate and the House of Representatives, but had originally a similar meaning to what it has in Europe.

Con'greve, William, one of the greatest of our comic dramatists, was born in Stafford in February, 1670, and educated at Dublin. He soon abandoned the law—for which he had studied—in favour of literature. His first comedy, *The Old Bachelor*, written at the age of twenty-three, won him the patronage of Lord Halifax, through whom he obtained a place in the Pipe Office and a post in the customs. After writing two comedies, *The Double Dealer* and *Love for Love*, he produced the *Mourning Bride*, a stilted tragedy, which met with enormous success. His last comedy, the *Way of the World*, being coldly received, he gave up writing plays, and spent the rest of his life in wealthy leisure. He died 19th January, 1729. His career was eminently successful. Ministers competed to offer him sinecures; poets competed to praise his works. Dryden, Pope, Swift, Steele, and Addison, were united in admiration of him. There is little humour, and, excepting in *Love for Love*, little feeling in his plays. The *Way of the World* is a masterpiece of brilliant dialogue; there is in it a perpetual sparkle of piquant conceits, arch raillery, and sprightly repartee and innuendo. The best edition of C. is that by Leigh Hunt. See also Thackeray's *English Humourists*, and Macaulay's Essay on the *Comic Dramatists of the Restoration.*

Con'gruous. In the theory of numbers, two numbers, a and b, are said to be C. to one another with respect to a third, c, when $\frac{a-b}{c}$ is a whole number. The student is referred to the works of Gauss, Poinsot, and Jerret for the curious properties of C. numbers.

Co'ni or **Cuneo,** an episcopal city of N. Italy, and capital of a province of the same name, at the confluence of the Stura and Gesso, 48 miles S.W. of Turin, with which it is connected by railway. The streets, with the exception of the principal one, which has arcades throughout its entire length, are mere lanes. The position of C. gives it a large traffic with Lombardy, Switzerland, and Germany, the merchandise from the port of Nice for these countries passing through it. Pop. 24,924.

Conif'eræ, an order of Dicotyledonous trees and shrubs, chiefly remarkable for the seeds being *naked*, and lying behind scales (generally woody), which make up the compound fruit called a cone (hence the name C., or cone-bearers). They also constitute the subdivision *Gymnospermæ*, or naked seeded plants. There are two sub-orders *Abietinæ* and *Cupressineæ.* Some of the species are rather variable, and have been unnecessarily multiplied on very slight grounds. The number may be given at about 130; they are distributed all over the world, but chiefly in northern and temperate climates. The region of America immediately to the W. of the Rocky Mountains is rich in some very beautiful forms, *e.g.*, *Sequoia sempervirens* and *Sequoia* (*Wellingtonia*) *gigantea*, the latter of which is one of the largest known trees. It grows in two or three clumps in the Sierra Nevada and vicinity, in California, and though the height of these 'big trees,' as they are called in California, has been much exaggerated, the highest reaches 325 feet, and the stump of one which had fallen before the grove was discovered by the white, is 30 feet in diameter. A house is now erected on it, in which dancing-parties are held. Neither this species, nor its close ally *Sequoia sempervirens* (the redwood), has been ever found in the neighbouring states of Oregon, or, indeed, out of California. The order possesses many excellent timber trees, which also yield resin, pitch, tar, turpentine, &c. The wood of all of them is marked with dots or disks, by which it can at once be distinguished under the microscope. The Yews (q.v.) are by some authors considered as a tribe of C. (*Taxineæ*), and by others as a distinct order (*Taxaceæ*).

Coni′ine is an Alkaloid (q.v.) contained in hemlock, and is a volatile liquid, boiling at 168° C. It possesses a powerful, pungent odour, like that of tobacco, and is very poisonous. C. is a strong base, and forms crystalline salts with acids. It has been prepared artificially.

Coniros′tres, a sub-order of Insessorial (q.v.) or Perching birds, distinguished primarily by the conical shape or form of the beak, whilst the upper mandible is not markedly toothed at its apex. Of this group the sparrow (q.v.), hawfinch or bullfinch, crow, starling, hornbill, finch, and lark are good examples. These birds are chiefly granivorous in habits.

Conjoin′ing of Pro′cesses, a term of Scotch law. Where two or more processes in the Court of Session relate to the same matter and affect the same parties, the court may conjoin them. They are then discussed together as one group.

Con′jugal Rights, a Suit for Restitu′tion of, is a suit arising from a husband or wife, without legal cause, insisting on living separately; in which case, the courts will decree them to come together, 'if either,' as Blackstone remarks, 'be weak enough to desire it.' The Divorce Court before which the suit is brought does not attach the party disobeying the decree though it will order the husband, if the wife be the petitioner, to make certain payments to her from time to time. Neither party can forcibly carry out the decree of the court, so that neither can seize and detain the other by force.

Conjuga′tion (Lat. *conjugo*, 'I yoke together') is the grammatical designation of the classes into which verbs have been divided, with the view of exhibiting collectively the various methods of denoting the relation of voice, person, number, mood, and tense. These relations are expressed in some languages (as in Sanskrit, Greek, Latin) by additions to and alterations upon the verb-stem; and in others (as in English, &c.) by distinct words. As the mechanism of inflections practically draws half its facts from Latin and its derivatives, we shall take Latin as an example of the former class. In Latin verbs the inflections in a C. express the voices, active and passive (sometimes called reciprocal, or middle); the numbers, singular and plural; the persons in each number, first, second, third; the moods, indicative, subjunctive, and imperative; the tenses, present, future, and imperfect, denoting incomplete action, and perfect, future perfect, and pluperfect, denoting complete action. There are also comprehended in C. indeclinable substantives, called infinitives, verbal adjectives, called participles, a verbal substantive, Gerund, and a verbal adjective, Gerundin, and the supines, the accusative, and the ablative case of a verbal noun. Every person in the Latin verb is a complete sentence, the simplest form being found in the singular of the present indicative active, where we have only the stem and the person-word, *ama-s*, 'thou lovest.' The word *scrib-er-e-nt-ur* exhibits the inflections attached to the stem to express the various verbal relations; *scrib*, the stem, signifies *write*; *'er*, indicates past time; *e*, the subjunctive mood; *nt*, the person in the plural, 'they;' and *ur*, the passive voice. The ordinary Latin conjugations are four in number, distinguished by the last or characteristic letter of the stem; (1) verbs whose stems end in *ā*; (2) in *ē*; (3) in a consonant, in *u*, or in *ĭ*; and (4) in *ī*. In English, as in all the German dialects, there are two great conjugations, distinguished by the form of the preterite. The first, called the Strong C. forms the preterite from the root without the addition of any foreign element: as ride, rode; fling, flung; hold, held. The second, called Weak C., comprises verbs that form their preterites like kill, kill-ed; move, move-d; dip, dip-t. The verbs of the Strong C. are comparatively few in number, but they are all native English, and give our speech much of its peculiar strength and flavour; the Weak C., on the other hand, is recruited by all the contingents derived from other languages. (See Latham's *English Language*, ch. i. ss. 17-25, and Whitney's *Language and its Study*.)

Con′junct Persons. Under the Bankruptcy Statutes of Scotland, all those who, by their relationship to one who is insolvent, would be legally incapable of being judges in a cause in which he might be concerned, are termed C. P. Deeds in favour of any conjunct person by the insolvent, if granted without adequate consideration, are, under statute, reducible.

Conjunc′tion, in astronomy. Two heavenly bodies are said to be in C. when they occupy the same portion of the heavens, as, for instance, the sun and moon at new moon. When Mercury and Venus are between us and the sun, they are said to be in *inferior C.*, and when the sun is between us and them, they are in *superior C.* The other planets can only be in superior C. Chinese history records a C. of five planets in the reign of the Emperor Thuen-hin, B.C. 2514-2436.

Conjunctions (Lat. *con* and *jungo*) are the parts of speech which join sentences and independent words. They are either (1) *Co-ordinate C.*, joining independent propositions, as *also*, *and* (*Copulative C.*); *or*, *else*, &c. (*Disjunctive C.*); *but*, *yet*, &c. (*Adversative C.*); *for*, *hence*, &c. (*Illative C.*); or (2) *Subordinate C.*, joining a principal sentence to a dependent or modifying clause; *for*, *because*, *since*, *as*, *if*, *unless*, *lest*, *that*, *whether*, &c. *Compound C.* are such expressions as *not*, *only*, *nevertheless*, *howbeit*, *provided that*, &c.; and C. used in pairs, as *either*, *or*; *both*, *and*; *as well as*, &c., are called *Correlatives*. C., which are of comparatively recent growth, language being at first too simple to require them, have been formed by lessening the meanings of other words. Thus, *as* and *also* are contractions from the Old Eng. *eal swa*, ('altogether,' 'thus'); *or* is a contraction from *other*; *and* originally meant *against* (O. H. Ger. *anti*); the conjunction *than* comes from the adverb *then*; the conjunction *therefore* from a demonstrative pronoun and a preposition; the conjunction *because* from a noun and a preposition; and the conjunction *that*, from the pronoun *that*—such a phrase as 'I know *that* he is here,' being altered from 'he is *here*, I know *that*.' (See Morris' *English Accidence*, ch. xvi., and Latham's *Eng. Lan.* ch. xxvi.)

Conjunction of Cells, a term applied to a peculiar phenomenon of reproduction in plants, such as *Desmideæ*, &c., when, as among the *Confervæ*, two cellular filaments approach, each one of them gives forth a protuberance which unites with the opposite cell, after which the two contiguous walls get absorbed, so that an open passage is left between the two cells. Through this opening the endochrome of one Cell (q.v.) passes into the other, and after various changes becomes a *Zoospore*, and the cell-water bursting, liberates the spores.

Conjunct′ly and Sev′erally, a Scotch law-term denoting the form of obligation by which two or more persons become each bound to discharge the whole obligation. A creditor in such circumstances may either exact performance in part from each, or enforce the whole obligation against one, leaving him to seek relief from the rest. The corresponding term in English law is Jointly and Severally (q.v.). There is some difference here shown in the law of the two countries with regard to joint obligations.

Conn, Lough, a lake in the county of Mayo, Ireland, together with Lough Cullin, from which it is separated by a narrow channel, crossed by a bridge called the Pontoon, is 13 miles long and from 1 to 3 broad, and is studded with isles.

Connara′ceæ, a natural order of calycifloral Dicotyledonous trees or shrubs, consisting of about forty-two species, natives of the tropics of America and of the Old World. The best-known of the six or seven genera are *Boswellia*, *Balsamodendron*, and *Amyris*. They are universally characterised by the abundance of fragrant resinous or gum-resinous juice which they possess. A few furnish good timber; some are poisonous; while others are bitter.

Conn′aught, the most western, smallest, and most barren of the four provinces of Ireland, bounded N. and W. by the Atlantic, S. by Munster, and E. by Leinster and Ulster, comprises the five counties of Galway, Leitrim, Mayo, Roscommon, and Sligo. Its greatest length is 105 miles; its greatest breadth, 92 miles; area, 6867 sq. miles. The W. coast, indented with numerous bays and harbours, presents a great variety of the most picturesque scenery. From 1841 to 1881, the population, owing to emigration and other causes, fell from 1,420,705 to 817,197, and since then it has still further decreased to 724,774. C. is the most purely Celtic and wretched part of Ireland. It was long ruled by the O'Connors, but passed under English authority in the reign of Elizabeth, and was then subdivided into counties.

Connecticut (pron. *Connet'icut*), one of the original thirteen states of the Union, lies between Massachusetts on the N., Rhode Island on the E., Long Island Sound on the S., and New York on the W. Area, 4845 sq. miles. Pop. 746,258, of whom 12,820 are described as coloured. It is watered by the C., the Housatonic, the Thames, the Farmington, and the Quinepiack. Much of the soil is poor; in the N.W. it is hilly; in the centre it is sandy and gravelly; but in the valley of the *C. river* there is a large tract of fertile and meadow land, extending from Wethersfield into Massachusetts, and producing large crops of hay, tobacco, maize, onions, and fruit. The chief cereals of C. are Indian corn, oats, rye, and buckwheat. C. has varied mineral resources: iron at Salisbury, cobalt, nickel, and freestone at Portland. It is noted for numerous industries, every stream being utilised for machinery. The staple manufactures are clocks, carriages, arms, cutlery, plated silver, paper, copper, brass, and indiarubber goods. Banking and insurance are extensive. The state capital is Hartford. Other towns are Newhaven, Bridgeport, Norwich, Waterbury, Middletown, New Britain, and New London. C. is celebrated (in America) for its education, literature, and theology. Early in this century it founded a school fund (from the proceeds of public lands in Ohio), now amounting to $2,046,035, and rendering elementary education almost free. There is an attendance of 151,624 under 4307 teachers. Besides the elementary schools, there is a large number of private and secondary schools. There are three universities, Yale College (q.v.), in Newhaven, the Wesleyan University, in Middletown, and Trinity College (Episcopal), Hartford, attended by 2379 students, under 232 professors and teachers. The average daily attendance at the public schools is estimated at 86,255. There are also ladies' schools of a comparatively high order in Farmington, Hartford, and Newhaven.

State Seal of Connecticut.

C. ('the land of steady habits') was colonised by the New England Puritans, who arrived in Windsor and Hartford in 1633, and in Newhaven in 1638, and their churches were established by law till about 1818. Charles II. granted the colony a charter in 1661, which remained in force till 1818. During the time of James II. it was concealed for safety in the 'charter oak' tree.

Connecticut (Ind. *Quonetocut*, 'the long river'), the largest river between the Hudson and the St. John, rises in 45° 15′ N. lat., and flows S. between Vermont and New Hampshire, crosses Massachusetts and the state of C., and enters Long Island Sound at Saybrook, after a course of 400 miles, and a descent of 1600 feet from its source. It is navigable to the city of Hartford (50 miles) for vessels drawing 8 feet of water. It is famous for its *shad*, a large and most delicate fish. The river in spring overflows and enriches large tracts of meadow land, and the valley presents many scenes of varied and cultivated beauty.

Connective Tiss'ue. This name is given by modern histologists to a number of tissues which originate from the same primary structures in the middle layer of the embryo of all animals. Although widely different from each other, both chemically and histologically, in the mature condition, yet on account of this primary relationship they are usually grouped together under the name of C. T. The members of the group are cartilage, mucoid tissue, reticular C. T., ordinary C. T., usually known under the name of white fibrous, or areolar tissue, fatty or adipose tissue, bone, and one of the principal substances entering into the composition of tooth, called dentine. A description of the histological characters of these various tissues will be found under their appropriate headings. The C. T. group form a framework for supporting the other tissues, such as vessels, glandular cells, muscular fibres, and nerves. In disease, as has been shown by Virchow, the great German pathologist, the C. T. group is often the most active tissue of the body, and many luxuriant growths and tumours may be traced to it. According to Frey, an authority in matters relating to minute structure, the histological characters of the group of connective tissues are—The embryonic rudiments consist of aggregations of spheroidal formative cells, having no membrane, and enclosing nuclei. A soft, homogeneous intercellular matter of albuminous character is formed between these cells. In course of time the cells as well as the intercellular substance undergo changes. The intercellular matter divides into fibrous masses or fibrillæ, while the cells become short and stunted, or may unite together by long processes so as to form a delicate network. Sometimes calcification, or a deposition of earthy salts, chiefly those of lime, occurs in the intercellular substance. Coincidently with those histological changes, chemical metamorphoses also occur—the albuminous matter of an early period giving place to mucin, chondrin, or elastic matter.

Connoisseur (Fr. from (old) *connoitre*, 'to know;' Lat. *cognoscere*, 'to become acquainted with') is one whose knowledge and comprehension of art is complete enough to entitle him to pass a critical judgment in music, painting, and sculpture, or in any of these. The word is sometimes mockingly applied to pretenders, or to *conoscitori sensa cognizione*, or judges uninformed. See COGNOSCENTI.

Co'noid, a surface generated by a straight line which moves parallel to a given plane upon two fixed lines or *directors*, one of which is rectilinear. The best-known conoids are the *hyperbolic paraboloid*, both of whose directors are straight lines in different planes, and the *skew helicoid*, a familiar example of which is afforded by the under surface of a spiral staircase.

Con'quest, a term of Scotch law denoting real or heritable rights which any one has acquired by purchase, donation, or Excambion (q.v.); real estate acquired by succession being called *heritage*. When left to the destination of law, heritage descends to the heir of line, and C. ascends to the heir of C. This separation of succession can, however, only take place where the deceased has died without lawful issue, having a brother older and a brother younger than himself, or having an uncle older and an uncle younger than his, the deceased's, father; or, in the event of there being issue of one or other of these brothers or uncles, he being deceased. In such cases, heritage descends to the immediate younger brother of the deceased, or to the next younger brother of his father, or to the representatives of either, but C. ascends to the immediate elder brother, or uncle, or representatives. In all cases the full relationship by blood excludes the half. In contracts of marriage, the C. acquired during marriage, or a proportion of it, is frequently settled on the heir, or on the issue of the marriage; but under a provision of this kind, C. is held to mean only such an accession of estate as makes the husband richer, and does not therefore necessarily include all that he acquires during the marriage by singular title.

Consal'vi, Ercole, Cardinal, an eminent Italian ecclesiastic and statesman, was born at Rome, 8th June, 1757. As secretary of state to Pius VII., he concluded the concordat between Napoleon and the Papal States in 1801, although he subsequently opposed his aggressions upon Rome. During the latter part of his life he distinguished himself as a reformer of abuses, abolishing monopolies and feudal taxes. He died at Rome, 24th January, 1824. C., who was a moderate and sensible politician, also deserves favourable mention as a patron of literature, science, and the fine arts.

Consanguin'ity is the relationship of persons descended from the same ancestor. It is either *lineal* or *collateral.* Lineal C. exists between the generating and the generated; thus a man is lineally related to his children, grandchildren, and to his remotest descendants. Collateral C. exists between those who have had a common ancestor; brothers, cousins, &c., are so related. Connection by marriage is called Affinity (q.v.).

Conscience, Courts of. These were English courts of law in London and other towns for the recovery of small debts. In some C. of C. the limit was forty shillings; in others, as much as £5. They have been abolished, and have given place to county courts. For Scotland, see SHERIFF; DEBTS, SMALL.

Conscience, Hendrick, a brilliant Flemish novelist, and one of the founders of the Flemish or national school of literature, was born at Antwerp, 3rd December, 1812. In 1830, at the outbreak of the Belgian revolution, he entered the army and served six years. In 1837 he published his first work, 'The Year of Miracles,' and at once found himself famous. In the following year appeared his great national romance, 'The Lion of Flanders,' and from this date he continued annually to pour forth novels, romances, sketches of country life, &c. He was appointed Assistant-professor in the University of Ghent in 1845. In 1858 he published an autobiography in the *Revue Contemporaine.* In 1870 he gained the 'prize of literature;' in 1871 he published a romance, in 1874 two stories of contemporary manners, in 1875 a touching tale entitled 'The Fear of Shame,' and in 1876 a story of Charles the Bold. Most of his works have been translated into all the great European tongues. C. was a fine literary artist, clear in thought, pure in sentiment, and charmingly pictorial in his sketches of national life. He died September, 1883.

Conscience-Money. When the Income Tax Commissioners find that a person has understated his or her income, they demand a sum supposed to be equal to the tax evaded. Instead, however, of inflicting the legal penalty, the Commissioners sometimes give the defaulter an opportunity of forwarding the amount to the Chancellor of the Exchequer as C.-M. Other departments of the Government, as, for instance, the Post Office, occasionally obtain payments of C.-M., and many large insurance companies receive similar remittances. The sums received by the Chancellor of the Exchequer for many years averaged about £6000. In 1885 nearly £10,000 was received, the largest amount on record.

Con'sciousness has been defined by Hamilton as the recognition by the 'mind or *ego* of its own acts or affections.' This includes the whole of human knowledge, but it is objectionable as suggesting that intellectual effort or discrimination is a necessary element in C., whereas intense feeling may produce the maximum of C. accompanied by the minimum of intellectual activity. Again, Hamilton includes in C. an immediate knowledge of objects external to the mind, but present in time and space, to the exclusion of the past, the future, and the distant. This, however, is to fix scientific nomenclature with reference to a metaphysical theory. C. is simply a generic name for all human feelings (including therein the spiritual side of ideas, emotions, and volitions) 'which rise above a certain intensity.' It therefore includes the complex operation of belief, whether the belief be false or true, *i.e.*, corresponds with a real object or not. In the formation of the habits which have been called 'secondarily automatic,' we find mental trains sinking out of C., as repetition makes them easier, and therefore less in need of attention. The question is still debated whether, in such cases, the mental product is realised by purely physical changes, or whether slight modifications of C. may not be irrecoverably lost by the memory. This is closely connected with the larger question whether C. is merely the spiritual expression of parallel changes in the brain, or has itself the power of reacting upon the brain and impressing a direction upon the nervous force. C. was also applied by Reid and Stewart to the self-introspection or subjective analysis, which they regarded as the most powerful instrument of mental science. Whatever they find in C. to be 'universal and necessary,' or going beyond what experience justifies, is on this method pronounced to be a simple or ultimate deliverance of C. The 'experience' school, on the other hand, contend that 'necessary beliefs,' of which the opposite is inconceivable, are easily generated by experience and the laws of mental association.

Consciousness.—This is a mental condition for which it is impossible to give a definition physiologically. We can only state some of its conditions. It appears to depend (1) on the integrity of grey matter on the surface of the brain, which must not be torn, cut, lacerated, bruised, or compressed by accident; (2) on the absence of extensive disease of the grey matter; (3) on the absence of compression of the grey matter either by a foreign body, depressed bone, or by an effused fluid, such as serum, blood, or lymph; and (4) on a healthy quality and due supply of blood. The blood must not contain any substances which, by acting on the grey matter of the brain, cause a state of coma.

Conscrip'tion, or compulsory military service, as opposed to the system of voluntary enlistment, was the rule in the ancient republics of Athens, Sparta, and Rome, and in modern times has been adopted by nearly every European nation except the British. At Sparta the period of service was from the age of twenty to sixty; at Rome, from seventeen to forty-six. It was not till 1798 that Jourdan's celebrated law of C. was passed by the French Council of Five Hundred, making five years' service compulsory in the case of every able-bodied citizen, and enrolling the whole male population between the ages of twenty and twenty-five. Later on, for the purpose, it is said, of evading the obligations of the Treaty of Tilsit, Prussia commenced the 'short service and reserve' system. See ARMIES, MODERN.

Consecra'tion, or the devoting or setting apart of persons or things to a deity, is a rite which has been practised more or less by most nations, heathen as well as Christian. Among the Israelites, not only were priests, prophets, and kings consecrated, which in the case of the first was done by washing (symbol of the putting away of the filth of sin), clothing with an official costume (symbol of endowment with the character required for the office), anointing with oil (symbol of divine life), filling their hands with a wave-offering (symbol of offering praise and thanksgiving), and sacrifices, but also the Tabernacle and everything in it, Solomon's Temple, and even private houses (Ps. xxx. title), and the walls of their cities (Neh. xii. 27). In the early Christian Church, not only were the clergy, virgins, and widows consecrated, but also churches, the elements in the Eucharist, the water used in baptism, and the Chrism (q.v.) used in the various sacraments. An inferior kind of C., or what was in some cases a part of the fuller rite, called Benediction (q.v.), was applied to a multitude of persons and things—kings, travellers, persons receiving the sacraments, churches, altars, vestments, vessels, bells, candles, ashes, palms, churchyards, houses, ships (still preserved in the 'christening' of a ship), food at meals, the first-fruits of corn, wine, and fishings, &c. Many of these consecrations and benedictions are preserved in the Roman Catholic Church. In the Episcopal Protestant churches, bishops, churches, cemeteries, and the *instrumenta* of divine service are consecrated. See Blunt's *Dict. of Doct. and Hist. Theology.*

Conseguia'na, a volcano of Nicaragua, Central America, about 10 miles from the Pacific, on the S. side of the Bay of Fonseca. The crater is 3800 feet above the level of the country; its walls descend sheer to the depth of 200 feet, and it is half a mile in diameter. The eruption of January, 1835, desolated a fertile grazing district, studded with majestic cedars, which, where not uprooted, stand out scorched and barkless.

Consent′. A person can consent only when he has the physical and mental power to do so and the free and serious use of such power. In all contracts, in themselves good by law, it is understood that there has been the free C. of the parties to it. Thus, if, as frequently happens, it should appear that there has been a misunderstanding instead of an understanding in a nominal agreement, or that one of the parties to it is legally incapable of giving C., the nominal agreement is legally null or reducible. But if acts have been done or left undone on either side under an apparent agreement, neither can draw back. Questions involving proof of C. must ever continue to give rise to litigation, from the infinite variety of circumstances by which it may be proved or disproved, or by which it may be shown to have resulted from aberration of mind. Where C. is the result of essential misconception, it is of course only nominal, and therefore invalid. Even where no ground of nullity exists, C. may, under certain circumstances, be withdrawn.

Conservation of the Peace. Several high officers of the crown have, as regards preservation of the peace, jurisdiction throughout the kingdom. Minor officers are only empowered to act within their own jurisdiction. See CONSTABLE, JUSTICE OF THE PEACE.

Conser′vatoire (*Conservatorium*), the name by which the Continental music-schools are known. These were originally benevolent institutions, in which musical education and board were given gratuitously to poor children. They have now to a great extent lost this character, except in so far that state endowments in many cases enable them to give musical education for very low fees.

Conser′vatory (Lat. *conservo*, 'I preserve') is a glazed structure, artificially warmed in winter, in which exotic plants are grown. It is kept cooler than a hothouse, and is distinguished from a greenhouse by the plants in it growing in beds on the floor, and not in pots or tubs or on shelves. It also differs from an orangery in not having an opaque roof. The largest and finest C. in the kingdom is at Chatsworth (q.v.), in Derbyshire, the seat of the Duke of Devonshire. It is 277 feet long, 123 feet wide, and 67 feet high in the centre. It is composed wholly of iron and glass, and furnished the idea on which exhibition buildings, from that of 1851 onward, have been constructed. Among the other principal conservatories in this country are those at Alton Towers, Staffordshire, which are 300 feet long, and those at Mount Edgcumbe, near Plymouth, Wilton House, near Salisbury, and Kew Gardens and the Crystal Palace, near London. Among those to be found on the Continent, may be mentioned the conservatories at the palaces of Schönbrunn, near Vienna, and Sans Souci, near Berlin.

Con′serves, a name given to different kinds of confections, consisting chiefly of fruits preserved in sugar, also by druggists to palatable compounds enclosing nauseous medicines.

Con′siderant, Victor Prosper, a French Socialist, born at Salins, Jura, 12th October, 1808. He entered the *École Polytechnique* in 1826, but withdrew in 1831 to propagate Fourierism. On the death of Fourier (1837) he undertook the direction of *La Phalange*, the organ of the party, and, supplied with funds by an Englishman named Young, he made a trial of the system of the Social colony or *Phalanstère* in the department of Eure-et-Loir. But his attempts to revolutionise society signally failed. For his share in the democratic movement of 13th June, 1849, he had to flee into Belgium, whence he embarked for Texas to make a new trial of his system. Here he founded a Societarian community, *La Réunion*, which, after a season of fitful prosperity, finally collapsed. C. returned to France with his family in August, 1869. He was a prolific writer, but his works are no longer notable.

Considera′tion, in law, is the name given to the price, matter, or motive of inducement to grant a deed or other obligation, or to enter into a contract. Where the obligation is incurred without C., it is called *voluntary* in England, in Scotland *gratuitous ;* when incurred *for C.* it is so termed in England, and in Scotland *onerous.* In England the rule of law is that a contract without valuable or sufficient C. is invalid, except under a formal deed. But even deeds may, under certain circumstances, be set aside if granted without C. In England they are ineffectual, by statute, against creditors when the grantor is insolvent at the time of granting the deed. In Scotland the law is similar, no proof of insolvency being required when the deed is in favour of Confident Persons (q.v.) or of Conjunct Persons (q.v.).

Consign′ment. In mercantile law, this term is generally applied to goods delivered or transmitted by one merchant to another, or by a merchant to an agent or factor for sale, or for other specific purpose. The bankruptcy of consignor or of consignee often gives rise to questions of great legal nicety with respect to reputed ownership, and on other points connected with the rights of the parties or their creditors.

Consis′tory (Lat. 'a standing or waiting place,' specially used in ancient times of the place where the emperor's council met), denotes an ecclesiastical court held in some place belonging to a cathedral. It is held by the bishop's chancellor or his commissary for determining matters under spiritual cognisance, arising within the bishop's jurisdiction. An appeal lies to the archbishop of the province. Before the establishment of the Court of Probate, the C. courts granted probates of wills for Chattels (q.v.).

Consola′to del Maré (Ital. 'the consulship of the sea'), a code of maritime law, constructed on the laws and trading customs of the great commercial cities of the Mediterranean —Venice, Genoa, Barcelona, Marseille, &c. See MERCANTILE LAW.

Con′sole (Fr. *console*, a 'pier-table'), a bracket or corbel of any kind in classical architecture. It is used as a support for the cornice, or to place figures or busts upon. Frequently in the form of the letter S, it is sometimes richly ornamented. It is called also an *ancone.* See CORBEL, MODILLION, BRACKET.

Console—reversed.

Consol′idated Fund. The aggregate produce of the branches of the public revenue of the United Kingdom is paid into the Bank of England to the credit of what is called the C. F. It is chargeable with the interest of the national debt, and the salaries of judges, ambassadors, and other important officers of the state, and it is mortgaged for payment of a yearly sum to maintain the Civil List (q.v.). On all these being satisfied, then the residue may be applied to the uses approved of by Parliament.

Consolida′tion. When applied to Acts of Parliament, C. means the throwing of various Acts regarding the same subject into one Act; this tends to secure congruity in their provisions. In the feudal law of Scotland, C. means the reunion of the property with the superiority after they have been feudally disjoined.

Con′sols. A portion of the British National Debt is so called. The word has its origin in the Consolidated Annuities Act of 1757. By that statute a variety of Government stocks were thrown into one fund, for which one account is kept in the Bank of England. See DEBT, NATIONAL.

Con′sonance, the pleasing effect to our ears of the combination of certain musical sounds. The physical phenomena, which give rise to C., are only now beginning to be understood. If two simple tones, not of the same pitch, be sounded together, they cause a series of compound waves in the surrounding air, which go through a continual series of changes in amplitude, and of which, therefore, the sound undergoes regular changes in intensity. The number of times in a second which the maximum loudness occurs is equal to the difference between the number of the vibrations of the notes in the same interval of time. Each recurrence of maximum loudness is called a beat. C. and dissonance differ only in degree—not in kind—and both are caused by these beats, which when moderately rapid are harsh and rough (making a dissonant interval), but when very rapid are pleasant (causing C.). The effect of the beats depends upon their *absolute number* per second; but for any given interval this will be much less in a low than in a high octave, so that in the latter the rapidity necessary to convert dissonance into C. is reached within a shorter interval than in the former. For notes in middle compass the maximum roughness occurs at about a semitone, and C. commences before a minor third is reached. The interval, in which the beats are disagreeable, is called the *beating distance*.

Con'sort (Lat. *consors*, 'a sharer or partner of the same lot') is the title of the husband or wife of the reigning sovereign of a kingdom. A Queen-C. does not, as other women do, according to legal theory, fully merge her personality in that of her husband, who, according to Coke, is held to be so engrossed with state affairs that he has no time for such supervision of domestic matters as ought to be exercised by a private individual. The Queen-C. must, therefore, discharge the domestic functions which usually belong to the husband. Her privileges are almost exclusively those of precedence and of etiquette. The husband of a Queen-regnant of England does not by marriage acquire the title of C., or any English title. The title of Prince-C. was, in 1857, conferred on the late husband of Queen Victoria by letters patent. The title of King-C. has never been given to any one in England.

Conspir'acy. The Lat. *conspiratio* denotes a harmony, lit. a 'breathing together' either in good or evil; in modern usage the latter sense predominates, but does not exclusively prevail. As a rule, 'conspirators' mean mischief, but men may honourably conspire to rid themselves of a tyranny. In law, the term C. has an extensive and undefined application. It infers confederacy, and for a criminal object. There are many acts which are not criminal when done by an individual, but which become so when effected by several with a common design. Thus, any one attending a theatre may express his approval or disapproval of the piece or of the acting, but if several agree to condemn a play or hiss an actor, they will be guilty of C. (2 Camp. 358). Any combination whose *object* is to injure public trade or to defeat the law is C. C. is—unless the offence be felonious and actually committed, when it is a felony—a misdemeanour and punishable with imprisonment and hard labour. See COMBINATION.

Con'stable, from the Old Fr. *conestable* (mod. Fr. *connétable*), Lat. *comes stabuli*, 'overseer of the (imperial) stable,' a dignitary of the Roman empire, transferred to the Frankish courts, whose name was corrupted into *connestabulus* and *comestabulus* at least as early as the 9th c. Originally the commander of the royal Frankish cavalry, the C. became in the 13th c. the commander of all the military force of the kingdom; and in France particularly the name recalls some famous historical personages, both good and bad. Suppressed by Louis XIII. in 1626, the office was revived by Napoleon, who created his brother Louis Grand C., Marshal Berthier being made Vice-C. At the restoration of the Bourbons, the office was again abolished, and it has not since been restored. In England a Lord High C. was appointed shortly after the Conquest. He and the Earl Mareschal (a word of similar meaning) were joint judges of the Court of Chivalry (q.v.). The office was abolished by Henry VIII., on the attainder of the Duke of Buckingham. At coronations, and on some other great state occasions, a Lord High C. is appointed for the time. In Scotland, the Lord High C. had anciently the command of the king's armies while in the field in absence of the king. He was likewise judge of all crimes and offences committed within four miles of the king's person, or within the same distance of the Parliament, or of the Privy Council, or of any general convention of the states of the kingdom. The office is hereditary in the family of the Earl of Errol, and is reserved by the Treaty of Union, and by statute 20 Geo. II. c. 43. It confers the dignity of first subject in Scotland next to those of royal blood.

Constable of a Castle was in ancient times the keeper of a castle. In England, constables were of three kinds—high C., petty C., and special C. The office of high C. was not confined to any particular town or parish, but extended to the Hundred (q.v.) to which he was appointed. The office was abolished by Statute 32 and 33 Vict. c. 47 in England and Wales and the Justices' clerk was appointed to perform all duties of High C. in connection with notice of special sessions, &c. The jurisdiction of the petty C. extends to the parish or borough for which he is chosen. He is appointed by the Watch Committee in boroughs under 10,000 in population and by the County Council in all boroughs above that amount of inhabitants whereever the Municipal Corporation Act of 1882 applies. The county constables are, under the Local Government Act, 1888, appointed by a joint committee of the Justices and the County Council. The special C. is an auxiliary appointed on emergencies. The general legal duties of a C. are to prevent violation of the law, and to apprehend offenders. In discharge of their duty, they may require the assistance of bystanders, who are bound to give it under pain of fine and imprisonment. A C. may break open doors to preserve peace, and he may arrest and imprison on reasonable grounds and suspicions.

Constable, John, an English landscape-painter, was born in the village of East Bergholt, in Suffolk, in 1776. The son of a proprietor of several mills, he was engaged about his sixteenth year in learning the miller's business, but his father's scheme that he should inherit the mills was frustrated by his desire to become a painter. After receiving lessons from Reinagle, he was admitted a student at the Royal Academy, 4th February, 1799. Many years elapsed before the charming simplicity, freshness, and fidelity of his art met with appreciation, but eventually the tide of fame set in, and he was elected an Academician in 1829. He resided latterly at Hampstead Heath, and died suddenly in London 30th March, 1837. Three of his finest works are 'The Corn-Field' (National Gallery), 'The Glebe Farm,' and 'Dedham Vale.' His art, says Ruskin, is 'original, honest, free from affectation, and manly in manner.'

Con'stance, or **Kostnitz,** a fortified city on the S. or Swiss shore of the lake of the same name, but belonging to the Grand Duchy of Baden, lies at the point where the Rhine connects the main sheet of water with the Untersee, about 65 miles E. of Basel by railway. It communicates by bridge with Petershausen, a suburb on the N. side of the Rhine. The most notable buildings are the fine Gothic cathedral, begun in 1052; the bishop's palace; St. Stephen's Church, built in 831; the Franciscan convent, now a ruin; the Dominican monastery, now a cotton factory; and the Kauf-haus, or merchants' hall, built in 1388. C. was formerly a free imperial town. Having fallen under the ban of the empire in 1518, it was ceded to Austria, which handed it over to Baden in 1810. C. has manufactures of cotton, silk, watches, and musical instruments. It has also sawmills, and many of the inhabitants are engaged in fisheries, and in cultivating vineyards and gardens. Pop. 16,235.

Constance (Lat. *Lacus Brigantinus*, Ger. *Bodensee*), a lake of Central Europe, whose N. shore is German (Baden, Würtemberg, Bavaria), and its S. shore Swiss (Thurgau and St. Gall); while its eastern end reaches Austrian territory (Tyrol). It lies from 1280 to 1380 feet above the level of the sea, is 44 miles long, and 9 broad (at its greatest), and attains in some parts a depth of 960 feet. The Rhine traverses it from E. to W. The lake is divided into two arms—the more northerly called Uberlingen Lake, and the other Zellersee or Untersee. In the course of time it has contracted itself considerably, having once extended some miles further from the beach. A singular phenomenon is its sudden rising, after a thaw, from the melting of the snow. Since 1824 there have been steamers on the lake. Its navigation, for sailing vessels especially, is dangerous when the wind blows strongly from E., S., or N.W. Numerous species of aquatic fowl, as many as sixty, it is said, and twenty-five species of fish, belong to the lake.

Constance, Council of, was held at the town of C. during the years 1414-18. Its professed purpose was to bring to an end the 'great schism' in the Church, and to make a clean sweep of all ecclesiastical abuses. The council, reluctantly summoned by Pope John XXIII., who foresaw the fate that awaited him, was attended by an immense number of dignitaries. Besides the Pope himself and the Emperor Sigismund, there were present 26 princes, 140 counts, more than 20 cardinals, 7 patriarchs, 20 archbishops, 91 bishops, 600 other prelates and doctors, and about 4000 priests. The three rival Popes of the time—John XXIII., Gregory XII., and Benedict XIII.—were deposed, and a new Pope, Martin V., was elected. Before this election, however, took place, the council formally declared itself the supreme judicial and legislative authority in the Church, but its projected 'reforms' were indefinitely postponed; for Martin V., a few months after his election, dissolved the council in alarm, lest his power should be lessened by its pretensions. The discussion of ecclesiastical reforms was first resumed at the Council of Basel (see BASEL, COUNCIL OF). How little this splendid—or perhaps one had better say *showy*—assembly really cared for the advancement of learning or the cause of truth, is seen in the iniquitous trial of John Huss and Jerome of Prague on charges of heresy. Among their bitterest enemies were some of the leaders of this *quasi*-reforming council, which is more likely to be remembered with abhorrence for the burning of the Bohemian Reformers, than with respect for its insincere and impotent schemes for the purification of the Church.

Con'stant, in mathematics, is a quantity which, entering into an analytical expression, does not vary under the conditions of the problem—*e.g.*, *radius* and *co-ordinates* of the centre of a sphere given in position and magnitude, *mass* in the equations of motion of a particle, *force of gravity* in those of a projectile, *energy* of a conservative system uninfluenced by external forces, &c.

Con'stant de Rebecque', Henri Benjamin, a French politician and journalist, was born at Lausanne, 25th October, 1767. The son of a Swiss officer in the Dutch service, he received much of his education at Oxford and Edinburgh (where he met Mackintosh and Erskine), and after a good deal of European travel (in the course of which he made the acquaintance of Marmontel, Kant, and Gibbon), married and settled for some years in Brunswick. In 1795 he began at Paris his career as publicist. He supported Talleyrand and the other moderate republicans who formed the 'Constitutional Circle,' or 'Club of Safety,' opposed to the 'Clichy,' or royalist club. In 1799 he published his work on the consequences of the counter-revolution of 1660 in England, and entered the *Tribunat*, from which he was expelled by Napoleon in 1802, and even driven out of France. In company with Madame de Stael he went to Weimar, where he saw the great stars of German literature. He translated Schiller's *Wallenstein* into French. After a long stay at Göttingen, C. returned with the Bourbons in 1814, and relying on the promises of liberty in the *Charte*, supported the Government in the *Journal des Débats*. During the Hundred Days C. astonished his friends by accepting a place in the Emperor's Conseil d'État. Under the second Restoration he was more decidedly in opposition, attacking the election and press laws in the *Mercure* and the *Minerve*, and insisting in his *Cours de Politique Constitutionelle* (1817-20) on the observance of representative principles as the only security of social order. The biting sarcasm with which he had attacked the oppressive Government proceedings in the Lainé and Regnault affairs was displayed to great advantage in the discussions in the Chamber of Deputies, to which he was elected in 1819. Under Charles X. he opposed the Spanish war, the laws of sacrilege, succession, &c., and in the Revolution of 1830, along with his friends Laffite and Lafayette, took a leading part. He died 8th December, 1830. In the midst of politics C. found time to elaborate his well-known *Religion Considérée dans sa Source, ses Formes, et ses Développements* (Par. 1824-31), in which he traces the sentiment of religion through the various positive institutions which have been confounded with it, and explains the causes which have led to the growth of these institutions, and on which religion itself does not depend. His remarks on savages are especially valuable. In politics his cardinal dogma was Individualism, a term of dangerous vagueness, but the value of which he could hardly exaggerate during the Bourbon rule.

Constan'tia, a district of Cape Colony, S. Africa, 12 miles distant from Cape Town, on the E. and N.E. slopes of the Table Mountain range, famous for the excellence of its wine. This is due mainly to the alkalies present in the soil, but also partly to the shelter afforded to the vineyards by the encircling hills. The export (known to have reached 1,000,000 gallons about 1860) has greatly declined. The vines of C. were brought from Shiraz in Persia.

Constanti'na, a town of southern Spain, province of Sevilla, 40 miles N.N.E. of Seville, in a mountainous district. It has manufactures of soap and leather, and a trade in corn, wood, and wine. Pop. 11,953.

Constantine', the capital of the department of C. (pop. 1,714,539), in the French colony of Algeria, 195 miles E. by S. of Algiers, stands on a rocky height, washed on three sides by the Rummel, which rushes through a deep ravine, 60 feet broad. The town is 830 feet above the river. A wall, built of stones sculptured by the Romans, and having four handsome gateways, surrounds the city. The streets are narrow and filthy, and none of the public buildings deserve especial notice. C. has manufactures of woollen stuffs, saddlery, boots and shoes, and a trade in corn and wax. Pop. 46,581, of whom only 12,006 are French-born, or naturalised citizens. C. is the *Cartha* ('city') of the Carthaginians and the *Cirta* of the Romans. It derived its present name from Constantine the Great, who rebuilt it after it had been destroyed in the wars of Maxentius.

Con'stantine I., Caius Flavius Valerius Aurelius, surnamed the 'Great,' was the son of Constantius Chlorus, one of the joint rulers of the Roman empire, and of Helena, a woman of obscure origin. He was born at Naissus, in Dacia, A.D. 272 or 274. Instead of going with his father, whose province was Gaul, Spain, and Britain, C. remained in the service of Diocletian (q.v.), till his popularity with the soldiers roused the jealousy of Galerius (q.v.). His exploits in the distant East are recorded in an exaggerating spirit by the historians of later times, but there is no doubt that in an atmosphere of danger and distrust he acquired a wariness and strength of character, a penetration of understanding, and a courage of soul that marked him out for future greatness. When C. found that his life was really in peril, he secretly fled to his father, arrived just in time to accompany him on his expedition to Britain (305), and took part in some campaigns against the Picts or Caledonians. On his father's death at York, he was proclaimed *Augustus* by the troops, but prudently contented himself with the inferior title of *Cæsar*, thereby frustrating the malice, though he could not escape the hatred, of Galerius. For six years he remained a stranger to the rest of the empire, but full of activity within his province, which embraced Britain, Gaul, and Spain, encouraging agriculture, enfranchising the towns, improving political administration, and inspiring the turbulent Franks of the Rhineland with the wholesome fear of his power. Like

Coin of Constantine.

his father, he ignored the edicts issued against the Christians, and thus the new religion rapidly spread in the W. of Europe. Meanwhile Galerius was ruling so tyrannically that the Romans called in Maxentius (a son of Maximianus, formerly a colleague of Diocletian) to help them. He assumed the purple along with his father, defeated Severus, an obscure creature whom Galerius had invested with supreme power, and forced Galerius himself to retreat to Pannonia. But father and son now quarrelled. The former took refuge with C., then conspired against his benefactor, and in 310 was strangled at Marseille. Maxentius next made himself so hateful to the people of Rome that the senate sent a message to C. to come and save them from their Emperor. C. thereupon crossed the Alps (311), defeated the armies of Maxentius at Turin, Verona, and finally at Rome; his rival being drowned while attempting to escape (312). In the East, affairs now stood thus:—Galerius had long had a colleague, Maximinus, with the title of Cæsar, but in the place of Severus he put another called Licinius. This drove Maximinus into rebellion, and Galerius was compelled to grant the purple. His death, in 312, led to a fierce struggle between Licinius and Maximinus, in which the latter was vanquished, and soon after poisoned. The Roman empire was now (314) divided between C. and Licinius, who were brothers-in-law, the latter having married Constantia, sister of C. At first they were on good terms, but a difference of policy soon showed itself. There may have been jealousy and plotting on the part of the lesser man, but the great fact is, that in the final struggle between the old Paganism and the new religion of Christ, Licinius made himself the champion of the former, and fell with the worship of Zeus and Apollo. After two conflicts (314-315 and 323), C. remained sole master of the Roman world. Almost the first solemn act of his monarchy was to make the Christian religion the religion of the state. Everywhere churches arose and temples fell; the statues of the old divinities were gradually removed from public view; the offices of state were mainly conferred on the followers of the new faith; bishops were invested with civil authority, and money was liberally given from the imperial treasury to relieve the wants of the Christian poor. In 325 C. presided at the first Œcumenical Council ever held by the Christian Church, the Council of Nicæa (q.v.). In 330 he laid the foundations of his new capital, named after himself, Constantinople (q.v.), and after a career of enormous activity and turmoil, died at Nicomedeia, 22nd May, 337. The chief blot on his fame is the execution of his son Crispus, a gallant and popular youth. That many other persons perished at the same time (326) may perhaps suggest the notion of a political conspiracy being the real cause of the odious act. The story of C.'s conversion, as recorded by Eusebius, is a point on which superfluous attention has been bestowed. His character is not difficult to read. It was massive, practical, just. He weighed the influences that were moving men, and long before he proclaimed himself a Christian had realised the fact that the new religion was the strongest and purest agency in the state. It was natural he should acknowledge its claim to a divine origin. All this is consistent with an adherence to certain Pagan forms, and an indifference to theological orthodoxy. The greatness of Christianity lay in its broad life-giving power, not in distracting dogmas, and C. loved best moderate men like Eusebius, who tried to steer a middle course between the fanatics on either side. See Gibbon's *Decline and Fall* and Stanley's *History of the Eastern Church*.

Constantine, Paulovich, a Russian grand-duke, second son of the Emperor Paul I., was born 8th May, 1779. He served in Italy in 1799, and distinguished himself at Austerlitz, but held no important command till 1815, when his brother, the Emperor Alexander, appointed him generalissimo of the Polish armies. Having, in 1822, renounced his claims to the throne, his younger brother Nicholas succeeded on the death of Alexander in 1825. C. failed to conciliate the Poles, who broke out into insurrection in 1830. He retired to Bialystok, which he was ordered to quit. He then withdrew to Vitebsk, where he suddenly died, 27th June, 1831.—**Constantine Nicolaëvich**, Grand-Duke of Russia, and second son of the Emperor Nicholas, was born 21st September, 1827. As Grand-Admiral of Russia, he commanded the fleet in the Baltic during the Crimean War, and at its close, as leader of the old Russian party, he strenuously opposed the concessions made to the Allies. He was for some time President of the Council of the Empire, and chief of a regiment of hussars.

Constantino'ple (the Turkish *Stambul* or *Istambul* is a corruption of the Greek *Es tan polin*, 'into the city'), so named because built by Constantine the Great, occupies the site of the ancient Byzantium (q.v.). Its splendid position on the promontory which serves as a connecting link between the Eastern and Western worlds recommended it to Constantine as the site of his capital, when he had resolved on removing the seat of empire from Rome. The 11th of May, A.D. 330, is marked as the birthday of the new city, but the rites of inauguration lasted forty days. Thenceforth it became the seat of the Roman emperors till the reign of Valens and Valentinian, when the empire was divided; after which it continued to be the capital of the Eastern or Byzantine empire till its capture by the Turks in 1453. Since that time it has been the residence of the Turkish sultans. The city proper is situated on a triangular promontory on the European side of the Thracian Bosporus, or Channel of C., an arm of which, the Golden Horn, penetrating above 5 miles into the land, forms at once the northern boundary of the city and a magnificent harbour. On the opposite side, on the peninsula of Pera, are the suburbs of Galata, Pera, and Tophana, while Scutari lies on the Asiatic side of the Bosporus. There are in all eighteen suburbs. C. was formerly completely walled in, but its ancient defences have either disappeared or are in a dilapidated condition, with the exception of the inland or W. wall, a fine specimen of mural architecture. From the Golden Horn the city, built on a series of gentle hills, with its mosques, minarets, and cypresses, presents an imposing appearance; but the interior, with its narrow, crooked, filthy, ill-paved streets, swarming with hungry masterless dogs, and its ill-built houses of wood and earth, is sadly disappointing. Considerable improvement has, however, taken place in the architecture of C. of late years, from extensive quarters of the city having been destroyed by several great fires, and the spaces thus cleared having been rebuilt with substantial structures of stone. Of its 379 mosques (with each of which is connected at least one elementary school—for boys only, of course), the most interesting is that which was formerly the Church of St. Sophia, built in the reign of Justinian, though the largest and most splendid is that of Suleiman. The Seraglio, or palace of the Sultan, is of vast extent. Its principal entrance, a large and lofty gate, has given origin to the phrase 'the Sublime Porte,' all political and diplomatic business being supposed to be transacted under it. The other objects of interest are the two obelisks of the Atmeidan (the ancient *Hippodrome*), the Citadel of the Seven Towers, and

St. Sophia, Constantinople.

numerous bazaars and caravanserais. Galata is the centre of trade, Pera is the residence of Europeans and of the foreign ambassadors, the naval arsenal is at Hassim-Pacha, and Fanar is the Greek quarter. There are public libraries, and numerous charitable institutions. The manufactures of C. are chiefly in steel, arms, leather, saddlery, paper, and fez caps. In 1893 (latest returns), 17,876 vessels entered and cleared the port, representing 11,638,735 tons. Corn, wool, and goat's hair are the principal exports, while cotton goods are the chief imports. The Turks have allowed the carrying trade in their own waters to fall in great part into the hands of foreigners. An underground railway, to connect the lower part of Galata with Pera, was opened in 1875. Three lines of tramways have been established in C., and one on the Galata side of the Golden Horn. Omnibuses and cabs are in use. Railway communication connects C. with Adrianople (210 miles) and Saremby (152 miles) in E. Rumelia, and thence passes N.W. to Servia and Austria. Pop. estimated at 874,926, of whom 386,000 are Mohammedans; 153,000 are Greeks; and 150,000 are Armenians. It is impossible to hope that C. will recover its former grandeur under the enervating rule of the Mohammedans, but it is possible to look forward to the day when the powers of Europe will allow their jealousies to remain at rest for a time and so permit the Greek, the Slav, and the Bulgarian to sweep the Turk across the Bosporus back to his native Asia.

Constella'tion (Lat. *con.* 'together,' and *stella*, 'a star'), a grouping together of stars under one denomination. The ancient astronomers gave to each C. the name of some person or thing to which they fancied the arrangement of the stars bore some resemblance; and this method of nomenclature, convenient in many ways, was recognised and even extended by later and modern astronomers. The work of Eudoxus (B.C. 370), giving the constellations recognised in his day, is lost; but Aratus' paraphrase of it names forty-five constellations. Ptolemy in his *Almagest* enumerates forty-eight, being the catalogue constructed by Hipparchus. Hevelius added twelve; Halley, eight; Beyer, twelve; La Caille, fifteen; which, together with other minor additions, make up the number to about 107. Notwithstanding the attempts of certain pious astronomers of the Middle Ages to overthrow the mythical nomenclature of the Greeks and Romans (Bede, for instance, substituting the twelve apostles for the signs of the zodiac), the ancient names have continued intact to this day.

Constitu'tion, in politics, signifies the system of a state on which its executive Government rests, and by which its laws are made. The term may also be held to embrace these laws whether statutory or consuetudinary; the latter being the result of tacit constitutional sanction. The basis of the C. of a state may be broadly stated to be the will of its people having material power; individual influence being generally regulated in its power over the will of others by the extent of the individual's control over material resources, and by the force of his convictions. To a certain extent this constitutional basis is always inharmonious; hence it divides into political parties, each of which strives by getting a majority to direct the affairs of the state, the minority being bound to yield; without which rule in the political game government would be impossible. And the stability of the C. of a country, and the benefits which flow from that stability, depend on the good faith with which this rule is observed. In England, fierce as have been the political contests of the last hundred years—over Catholic Emancipation and Free Trade, for example—the defeated minority have happily never appealed to the last tribunal—that of physical force.

In England the supreme power is divided into the legislative and executive. By constitutional fiction the former is vested in the sovereign and Parliament jointly, the latter in the sovereign alone. Really, the legislative function is exercised by Parliament (q.v.) alone; the executive by that portion of the Privy Council (q.v.) called the Cabinet, though it does not form a recognised part of the C. of England. See RIGHTS OF THE PEOPLE.

Constitution, Decree of, a term of Scotch law usually applied to those decrees which are requisite to found a title in the person of the creditor in the event of the death of the debtor. But every decree, by which the extent of a debt or obligation is ascertained, is a D. of C.

Constitutions, Provincial, were decrees made in the provincial synods held under various Archbishops of Canterbury, from Stephen Langton under Henry III. to Henry Chichele under Henry V. The last were adopted by the province of York in the reign of Henry VI.

Con'sul (*consules*—'those who go together,' 'colleagues') was the highest office in the government of republican Rome, embracing both the entire civil authority and the supreme command of the army. On the expulsion of Tarquin this magistracy was immediately instituted—the two first consuls being Lucius Junius Brutus and Lucius Tarquinius Collatinus. The consuls were two in number, were invested with equal rights, and held office for one year. In earlier times, the chief magistrates were called *prætors*, the title C. having been introduced in 305 B.C. The C. was elected in the *comitia centuriata*, presided over by a C., except when the appointment of a dictator had put the consular power for a time in abeyance. Under the Licinian law, in 366 B.C., L. Sextius was the first plebeian C.; and, after a protracted struggle between the two great classes in the state, both consuls were plebeians, B.C. 172. At first the consuls enjoyed all the privileges of the kings, except the priestly power, but they lost in succession the censorship and the judicial power. They were held in check by each C. having the power of vetoing the other, by the possibility of their being called to account at the close of their term of office, and by the power of the senate. When emergencies demanded it, the senate passed a decree *viderent consules ne quid respublica detrimenti caperet*, which invested them with unlimited power. Their outward badges of distinction were the procession of twelve lictors with fasces before them in a line, whenever they appeared in public; the *toga prætexta*, a cloak with a scarlet border; and the seat, ornamented with ivory, called the *curule chair*. At the close of the republic, the office of C. declined in power, and under the empire the C. was merely honorary, elected by the senate, and sanctioned by the emperor. Sometimes the emperors themselves assumed the consulship.

Consul, Mercantile, is an officer appointed by one state to reside in another to attend to the interests of his countrymen, but he may be a foreigner to the country which he represents. Consuls are generally divided into consuls-general, consuls, vice-consuls, and consular agents. A C. should be able to speak fluently the language of the country in which he resides. He ought also to have a fair knowledge of its laws, in so far as they affect the interests of the merchants or travellers of his country. It is the duty of a C. to endeavour to obtain redress for any citizen of the country he represents, who may appear to him to have been illegally treated within his jurisdiction; but a C. is not called on to interfere in a mere dispute between any such citizen and a foreigner. If an Englishman abroad be robbed or cheated, he may go for advice to his C., who ought in courtesy to give it, but for redress he must look solely to the authorities of the place. A C. can in no case come between any such citizen and the law of the country to which he is accredited; to which law the C. is himself subject. He has, however, the privileges of an Ambassador (q.v.). He can perform the acts of a notary public; deeds executed by him being valid, and held as done in England. The marriage of British subjects abroad is made valid by recording it in the books of the local British C., or of his legally-appointed representative during his absence, &c., whenever he or his representative is satisfied that a marriage between the parties, of whom one, at least, is a British subject, has been duly solemnised in the place, in accordance with the local law of the country. The consul, &c., can solemnise marriages himself, provided he do so in accordance with the regulations set forth in the different statutes, and provided he has the Secretary of State's authority. The salary of agents and consuls-general ranges from £900 to £4000 a year; that of consuls-general from

£600 to £2000; that of consuls from £150 to £1200; and that of vice-consuls from £40 to £720. The most onerous duties of a C. are usually those connected with trade. He must, if requested, attend any arbitration concerning property between masters of British ships and freighters who are inhabitants of the country to which he is accredited.

Con'sulate (Lat. *consulatus*, 'consulship') the name given to the chief magistracy of the French republic after the revolution of the 18th Brumaire (q.v.). It was first conferred upon Bonaparte, Sièyes, and Ducos, by the rump of the Council of the Ancients and the Five Hundred. On 13th December, 1799, Bonaparte was made First Consul, with absolute power, an income of 500,000 francs, and all the pomp and circumstance of monarchy, and held the office till 1804, when he made himself Emperor.

Consumption, in political economy. In considering certain questions in political economy, it is necessary to distinguish between C. which is temporary and reproductive, and C. which is unproductive. Money spent in improving land, or in educating the *workman* or *workwoman* for the occupation to be followed, whether in the highest arts and professions, or in the humblest and least advanced employments, is an instance of the former: the human labour and material so consumed will bear fruit. Money spent in war is held by some to be an example of the latter, yet such cannot be said of all wars, as the beneficial result to humanity at large may be far greater than the loss to the individual bodies of men or states. Unproductive consumers are they who live upon the charity of living or dead persons, or do not themselves contribute their full share to the amount of *labour* required from the entire mass of mankind by the laws of Nature (or rules drawn from past experience). This *labour* is of every imaginable sort and condition, and ranges from the careful attention of the mother herself to her child's wants and necessities, the song of the musician, and the output of the miner, to the analytical appeal of the savant, the unceasing solicitude of the master mariner, and the ambitious toil of the cabinet minister.

Con'tact. In geometry, two curves are said to be in C. when they have *two*, *three*, or more consecutive points in common, constituting contacts of the *first*, *second*, &c., orders respectively. Two straight lines cannot be in C. without completely coinciding; and a straight line or plane can only have a C. of the *first* order with any curve or surface, being, in this case, a tangent or tangent plane.

Conta'gion (Lat. 'touching together') means a communication of disease by one individual to another. Contagious diseases are only propagated by the poison being conveyed in some form or other; consequently some countries are exempt from particular kinds of these—*e.g.*, Australia, from smallpox. How such diseases first arose we cannot tell; but now they are only spread by a mode which does not account for their origin. As a rule, they attack the same individual only once.

Contari'ni, a noble and illustrious family of Venice, rose to eminence in the 11th c., furnished many doges, warriors, &c., to the state, and only waned with the republic itself. In 1380 the representative C. led the Venetian fleet against the Genoese, defeated them, and saved Venice. **Ambrogio C.,** ambassador to Persia (1473-77), wrote an account of his travels in Persia, India, and Constantinople.

Contempt', in law, is an offence of various kinds. The embezzlement of public money by a public officer is a C. punishable under parliamentary impeachment by fine and imprisonment. To accept a pension from a foreign prince without consent of the crown is a C. of the Queen's government. So it is to drink to the 'pious memory' of a traitor, or for a clergyman to absolve at the gallows a criminal persisting in the treason for which he is about to suffer.

Contempt of Court.—In the first place, an inferior judge or magistrate is guilty of C. of C. when he administers justice oppressively, unjustly, and not in accordance with the regulations prescribed for his court; an attorney or solicitor is guilty of C. of C. when he acts unjustly, dishonestly, fraudulently, &c., by his client; a sheriff or other executive officer of a court is guilty of C. of C. when he abuses the process of the court and acts oppressively, corruptly, &c., in reference to persons with whom he has to deal in the performance of his duties connected with the court; a juryman is guilty of C. of C. when he eats or drinks without permission of the court, or when he does not attend court, being properly summoned, or does not perform his duty when there; a witness is guilty of C. of C. when, duly summoned, he does not appear, or does not give his evidence at all, or properly, &c.; any person is guilty of C. of C., when he, being a party to any matter before a court, disobeys its order, &c., or when he misbehaves himself in court, or attempts to intimidate, corrupt, obstruct, &c., any suitor, witness, or officer of the court, or when he speaks or writes disrespectfully of the judge, &c., of the court.

When a person is charged with C. of C. out of court, a rule *nisi* is moved for, and the person may file affidavits to show cause why he should not be committed. On the other hand, any judge of a superior court may summarily commit a person for C. of C. within the court or in his presence. Punishment is fine or imprisonment; to the latter there is no statutory limit.

Contempt of Parliament is an infringement of a privilege of Parliament. These privileges are large, and are purposely kept indefinite to suit the times. In the famous contest between the House of Commons and the newspaper reporters in 1771, J. Miller, of the *London Evening Post*, was arrested in the City of London by the Speaker's warrant. Miller being brought before the Lord Mayor, his lordship declared the arrest illegal, discharged Miller, and committed the messenger for assault. The House of Commons sent the Lord Mayor and Alderman Oliver, similarly implicated, to the Tower of London, while the Speaker's messenger was tried at Guildhall for the assault, found guilty, and sentenced to fine and imprisonment. The power of Parliament to imprison ceasing at the end of the session, on the day of prorogation the Lord Mayor and Alderman left the Tower in triumph, and at night the City was illuminated. The contest ended in practically establishing the right of reporting the debates of Parliament, but the resolution affirming that to do so 'is a notorious breach of the privileges of the House,' remains unrevoked on the journals; and every now and then this opposition between the legal theory and that which has become established usage gives rise to perplexity. See PARLIAMENT.

Con'ti, House of, a branch of the House of Condé (q.v.), which took its title from the small town of C., not far from Amiens.—**Armand de Bourbon,** first prince of C., the brother of the great Condé, was born in 1629. Although of a feeble constitution, and originally intended for the Church, he took to a military career, first as the opponent, and next as the ally of his brother, and distinguished himself in Calabria. He retired from the world in 1657, gave himself up to works of piety, and died at Pezenas in 1666.—His eldest son, **Louis Armand,** who was born in 1661, died of smallpox in 1685. Having no children, he was succeeded by his brother, **François Louis,** born at Paris in 1664, and by far the ablest of this family. He was possessed of the highest military talents, which would have been displayed to more advantage had he not, during the greater part of his life, been under a cloud of royal displeasure. As it was, he distinguished himself in Hungary, and, under his friend Luxemburg, at the battles of Steenkirk and Neerwinden. In 1709 Louis XIV., who had been persuaded by the great Condé before his death to pardon C., appointed him to the command of the army in Flanders, but he died in the same year. His scientific attainments were considerable, and as he had many popular qualities, he was much regretted by the French nation. Saint-Simon, in his *Mémoires*, has given a fine sketch of his character and appearance.—His son, **Louis Armand** (1695-1727), had the cultivated tastes, if not the brilliant genius, of his father, but unfortunately he succumbed to the gross dissipations of the Regency.—**Louis François** (1717-76), son of the preceding, revived the military fame of the family, signalising himself in the war with Austria and Sardinia; but he had the misfortune to incur the aversion of Madame de Pompadour, and during the Seven Years' War languished in retreat, while the French troops were being led by a Soubise. The H. of C. became extinct in the person of his son, **Louis François Joseph** (1734-1807), who died in Spain.

Con'tinent (Lat. 'holding together') a term usually applied to the great land masses as distinguished from islands. Ordinary speech recognises five continents—Europe, Asia, and Africa constituting the Old World, and America and Australia the New World. Strictly speaking, the Old World constitutes but a single C., the separation of Africa from the mass by the Suez Canal being merely artificial. The New World is also a single C., though sometimes the two Americas rank each as one. In the midst of seeming irregularity certain uniformities have been long observed. Bacon remarked that the continents ran out in points towards the S. and broadened towards the N. Johann Reinhold Forster made these southern promontories the extremities of mountain ranges, while archipelagos lay over against their eastern sides, their western being hollowed out by large bays. Steffens recognised only three continents, consisting each of two land divisions united by an isthmus, having an archipelago on one side and a peninsula on the other. These are (1) America; (2) Europe, with Western Asia and Africa; and (3) the remaining part of Asia and Australia, formerly connected by an isthmus, which was disrupted in later times. Ritter notices that the greatest expansion of the land of the eastern hemisphere is from E. to W.; of the western, from N. to S. Humboldt calculated the height of the centre of gravity of the land masses, with the exception of Africa, at 1007·267 feet. A special meaning of *the* C. is the mainland of Europe as opposed to England.

Continen'tal Sys'tem is a name given to the method devised by the first Napoleon for cutting off connection between England and the Continent. It began with the 'Berlin Decrees,' issued 21st November, 1806, declaring the British Islands blockaded, and prohibiting correspondence, commercial or otherwise, with them; declaring all merchandise belonging to Englishmen a lawful prize, and even Englishmen themselves, found in a country occupied by French troops or by their allies, prisoners of war. England retorted with an Order in Council, 7th January, 1807, prohibiting all neutral vessels from entering any port belonging to France or her allies, and confiscating, with its cargo, every ship that violated this order; and this was followed in the end of the same year by another order, placing under the same restrictions, as if they had been blockaded, all harbours and places of France and her allies, in Europe and the colonies, as well as every country with which England was at war, and from which the English flag was excluded. After this, numerous opposing orders were issued on both sides, but, on the fall of Napoleon, the C. S., which had helped to increase the hostility to him, was given up.

Contin'gent, a word of ambiguous signification, but applied usually to the quota of troops furnished by tributary or allied states to the common army. The Indian army, during the Mutiny, had several contingents, whose disloyalty seriously injured the general efficiency.

Contingent, a term of English law, having a variety of applications.

Contingent Legacy.—If a legacy be left to any one on the condition of his attaining the age of twenty-one, it is C.; and if he die before that age, the legacy lapses.

Contingent Remainder is when an estate in remainder (see ESTATE and REMAINDER) is limited to take effect either to an uncertain person or upon an uncertain event.

Contingent Use is a use limited in a conveyance of land, which may or may not happen to vest according to the contingency expressed in the limitation of the use. A C. U. requires a particular estate to support it.

Contingent Debts are debts due in a certain event. Creditors in such debts are in Scotland allowed to rank on the estate of a bankrupt. A discharge under the sequestration statute in Scotland is effective against C. D., but in England the rule is the other way.

Contingent Processes.—In Scotland, when processes are likely to throw light on each other, the first enrolled is held to be the *leading process*, and those subsequently brought into court may be remitted to the same judge or division (see SESSION, COURT OF) *ob contingentiam.*

Contor'niate (Ital. *contorno*, 'the outline of a design'), an ancient bronze medallion, having a curved furrow on each side, and supposed to have been struck in the time of Constantine and his successors.

Contort'ed Strata, a name applied in geology to the appearance presented by some beds of rocks, in which they exhibit a twisted aspect, their edges presenting crooked and curved lines. This appearance is said to be due to lateral pressure, or to subsidence and pressure of *curved* surfaces.

Con'tra (Ital. 'opposite to'), a term often applied in music, in the sense of lowness or depth, as in Contra-Bass (q.v.).

Contraband Goods are goods imported or exported without paying legal duties—against the 'ban' or proclamation of law. When the buyer of C. G. knows them to be contraband, he has no claim for delivery, nor action of damages for breach of contract. Nor is an action competent on a bill of exchange granted for C. G. in the hands of a drawer, or of his trustee. See SMUGGLING.

Contraband of War is a term applied to certain commodities relative to war, and to trading in them with the belligerent states. A neutral state may carry on ordinary trade with a country at war, except with a port under Blockade (q.v.), but the trading-vessel must carry no C. goods. These are, generally, horses, timber for ships, and implements or stores pertaining to war by land or sea. Whether an article of peaceful commerce, but which is also of importance in war, is C., is a question which has given rise to much discussion, especially relative to coal—a superior supply of which would now often give one power so great an advantage over another. Lord Chelmsford said in the House of Lords (16th May, 1861) that any Englishman fitting a privateer to assist the Southern States of America in the war then going on would be guilty of piracy; but it is not held that this would apply to the crews of vessels carrying goods C. of W.; but were they captured by the belligerent state within its jurisdiction, they might be treated as that state would treat its own subjects in the same circumstances. Every nation at war with another has the right of search consequent upon its right to intercept merchandise, &c., which is C. of W.

Contra-Bass, or **Double Bass,** the lowest stringed instrument. The C.-B. used in this country has three strings tuned in fourths, the lowest of them being tuned to the A on the third ledger-line below the bass staff. The German C.-B. has a fourth string tuned to the E below this A, which gives it some most valuable additional notes.

Con'tract. A C. is defined by Erskine to be 'the voluntary agreement of two or more persons by which something is to be given or performed on one part, for a valuable consideration, either present or future, on the other part.' A C. by which the parties, or any of them, bind themselves to do what is impossible, illegal, or immoral, is null in law; but all facts in themselves legally possible may be made the subject of obligation, and though performance be beyond the power of the contracting party, the fact will not free him from liability in damage for non-performance. In England, contracts put into writing under hand and seal are technically called *deeds* or *specialities*; and those which are merely parole, or in writing not under seal, are called *simple* contracts. In support of an action on simple C., the creditor must prove that it was founded on a *sufficient consideration.* See DEED, COVENANT, CONSIDERATION.

Contract of Marriage.—Under the usual form of C. of M., property settled upon a wife is protected against the creditors of the husband. She has also power to dispose of the principal by will. A man about to be married may secure a provision for his wife 'in consideration' of the marriage; but he cannot defeat the rights of creditors by post-nuptial C. See MARRIED WOMEN, PROPERTY OF.

Contractil'ity is a vital property manifested by certain living substances both in the vegetable and animal kingdoms. By virtue of this property, these substances change their form, push out and retract processes, and they may also move from place to place. It is manifested by all living protoplasm, whether obtained from vegetable or animal living forms. It is seen in many of the humbler forms of life among the protozoa, in the colourless blood corpuscle, in the spermatozoon, in the cilium, in muscular fibre, and in minute capillary vessels. At one time it was supposed that the C. of muscular fibre depended on the nervous system. The old view of Haller, however, is that generally adopted by physiologists—namely, that C. is a property inherent in the ultimate elements of muscular tissue.

Contrac'tions. The great labour of writing out complete copies of ancient works by hand caused the adoption of numerous C. in the manuscripts. These are naturally made in the most frequently-recurring words and combinations of letters, and though for the most part quite evident, they have caused considerable difficulty in the correct interpretation of many passages. These C. were introduced into the earliest printed books, and continued in use for several centuries after the invention of printing, and they appear in those reprints of the books of the Middle Ages that have been so extensively issued. C. have been arranged in various classes, of each of which we give a few examples. A straight line marked above a letter indicates the omission of *m* or *n* following it: thus quā = *quam*, and nō = *non*. A crooked or circumflex line above or through a letter indicates the omission of one or more letters at that part of the word: thus dñs or dŝ = *dominus*, grâ = *gratia*, Đ = *David;* and sometimes a straight line is used in the same way, as in the Latin terminations *unt*, *int*, *erunt*, &c., where regt̄ = *regunt*, and fuer̃t = *fuerunt*. The sign ꝰ above a letter shows that *er* or *re* has been omitted: thus ıñcator = *mercator*. Furthermore, the absence of the final letters of a word is indicated by the marks ꝯ, or ', or . : thus M' = *Manius*, and mag. = *magister*. A vowel written small above a contracted word indicates the omission of a consonant, and a consonant so written the omission of a vowel; thus g^{a}tia = *gratia*, and fig^{r}a = *figura*. One or more letters are frequently run into another, as in the case of the diphthongs. Numerous symbols of an almost arbitrary character are employed to represent various syllables or words: thus quiqꝫ = *quibus*, and ∻ = *est*. A table of the C. in old Greek typography is contained in the Greek Grammar of Professor Geddes.

Contraven'tion, in Scotch law, denotes any act in violation of a legal condition or obligation. The term is specially applied to an act by an heir of entail in opposition to the provisions of the deed, and to acts in violation of Lawburrows (q.v.).

Contrayer'va, a medicine derived from the root-stock of the Dorstenian species of plants, belonging to the Mulberry order (*Moraceæ*). They are natives of S. America, Mexico, and the W. Indies, are dwarf, perennial, and herbaceous, and are generally found growing in high, rocky places. Dorstenias are distinguished by a peculiar inflorescence, having a broad concave receptacle, containing both male and female flowers. The root-stock, which is the part used, is of a reddish-brown colour, with numerous long, yellow fibres. It has an aromatic odour, a warm, pungent taste, and is used chiefly in America as a tonic, stimulant, and diaphoretic.

Contribu'tion, in its legal sense, is applied to contributions made by co-sureties, or for equalising loss incurred by sacrifice made for the common safety in a sea-voyage. C. is, speaking generally, the performance of his share or obligation by each one of two or more parties bound by contract or otherwise. See AVERAGE.

Con'tumacy, a term of Scotch law denoting disobedience to any lawful summons or judicial order. In a civil case the only consequence is that decree will be given against the defender. In a criminal process, C. is punished by sentence of Fugitation (q.v.). The equivalent term in English law is Default (q.v.). See DECREE IN ABSENCE.

Conular'ia, an extinct genus of Pteropodous mollusca, remarkable for its large size as compared with living Pteropods. Specimens of the fossil shells of C., of which eighty-three species are enumerated by Barrande, chiefly from Palæozoic rocks (beginning with Silurian formations), may attain a length of a foot, and a breadth of over an inch. The genus also extends into the Mesozoic rocks, and seems to die out in the Lias. The shell is straight, tapering at the end, of four-sided form, with its surfaces striated. Occasionally its cavity may be divided internally. *C. ornata*, from the Devonian rocks, is a familiar species.

Con'vent. See MONASTERY.

Conven'ticle (Lat. *conventiculum*, dim. of *conventus*) originally meant a secret assembly of the monks of a convent, generally to secure the election of an abbot. In its modern sense, it was originally applied to the meetings of the followers of Wickliffe, but came latterly to mean any assembly for worship of those who departed from the Established Church, and in this sense is associated both in England and Scotland with the tyranny of the Stuarts.

Conven'tion of Estates. In Scotland, before the Union, a C. of E. of the kingdom used to be summoned to impose taxes in any emergency. These conventions were formed by any members of the three Estates of the Kingdom (q.v.) who could be quickly assembled, and without the formal citation required in summoning a regular Parliament. The power of the Convention was limited to the disposal of the special business for which it was convened. Regularly, the Estates could be convened only by royal authority; but, when necessary, they met without it, as in the Convention for settling the government at the Revolution of 1688. See CONVENTION PARLIAMENT.

Convention Parliament. An English Parliament convened without the royal authority is so called. Its acts are, according to the theory of the constitution, invalid without ratification by a Parliament convened by writ of the sovereign. The Parliament which restored Charles II. was a C. P., so also was that which disposed of the crown at the Revolution of 1688. The acts of these Parliaments were subsequently ratified by a Parliament legally convened. See CONVENTION OF ESTATES.

Conven'tional Obliga'tion is, in Scotch law, an obligation resulting from agreement. The term is generally used in contradistinction to *natural* or *legal* obligation, which arises from the operation of law independently of contract.

Conver'gent and Diver'gent Series are infinite series, which, in the former case, however far taken, never reach a certain finite value, though they may be made to differ from it by a quantity less than any given quantity, and which, in the latter case, may be made of greater value than any given quantity by taking a sufficient number of terms. $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \ldots$ is a case of a converging series, the limiting value of which is 2; $1 + 2 + 4 + 8 + \ldots$ is an example of a diverging series, which has no limiting value, however great.

Conversa'no, a town in the province of Bari, S. Italy, 19 miles S.E. of the town of Bari, has a trade in the wine, oil, flax, and cotton which the district produces. Pop. 12,370.

Conversion (Lat. *conversio*) is, in logic, the transposition of the subject and predicate of a preposition. Universal negatives and particular affirmatives are converted by *simple C.*—*e.g.*, 'No A is B,' the *converse* of which is 'No B is A,' and 'Some A is B'—*converse*, 'Some B is A.' Universal affirmatives are converted by *C. per accidens*, by changing their quantity—*e.g.*, the *converse* of 'All A's are B's' is 'Some B's are A's,' not 'All B's are A's,' which would not be *necessarily* true. Particular negatives are converted by transferring the negative from the Copula (q.v.) to the predicate—*e.g.*, the *converse* of 'Some A's are not B's' is 'Some not B's are A's.' C., by contraposition, may be applied to universal affirmatives—*e.g.*, 'All A's are B's,' *converse*—'All not B's are not A's.'

Con'vex. See CONCAVE.

Convey'ance is, in law, an instrument by which property is transferred from one party to another; the instrument may be lease, assignment, settlement, appointment, and other assurance, and covenant to surrender, made by deed on a sale, mortgage, demise, or settlement of any property, or on any other dealing with or for any property.

Conveyancer, one whose business it is to prepare deeds of Conveyance (q.v.). In England the C. is generally a barrister. In Scotland it is generally the law-agent who prepares deeds of conveyance; but there the term C. is often used to denote one whose special business it is to prepare deeds, while *agent* denotes one who specially devotes himself to the conduct of lawsuits. Any one may act as a C. who chooses, but so to do he is required by Stamp Act, 1891, to purchase a certificate every year—in London, Edinburgh, and Dublin, £4 10s. for first three years, and £9 afterwards; in other places, £3 for first three years, and £6 afterwards.

Conveyancing is the preparation of deeds for the transference of property. Great legal skill is required for this, there being certain parts in deeds, any error in which is fatal to their validity. No clearness of ordinary language will avail in C.; the terms used, to be effectual, must be legal; but, by Statute 44 and 45 Vict. c. 41, the *common forms* are now taken to be implied, unless the instrument states the contrary. The object of this statute was to shorten the length of conveyances, &c., a material consideration to suitors, seeing that solicitors (conveyancers) were paid by length. The Solicitors Remuneration Order, 1882, however, dealt with the amount of money to be paid to a solicitor, and the skill, responsibility, and labour required from him. Usually the term C. is in England and in Scotland limited to the transference of real (Scotch *heritable*) property.

Con'vict. Any one found guilty on a criminal charge may be so called; but with us the term has come to be restricted in its application to those whose crime is punishable with *penal servitude*; a sentence which was some years ago substituted for that of Transportation (q.v.). There are C. establishments in various parts of England. In these, the C. is generally employed on public works, such as the breakwater, quarries, and fortress at Portland, and the works at Chatham and at Portsmouth. The treatment of the C. has ever been a subject of legislative difficulty; the difficulty being how to make the punishment sufficiently severe for the protection of the community without injuring the mind or body of the C. Without disputing that these are the ends to be sought for in so far as they are consistent with each other, it may seem a little inconsistent that the law should be so careful of the mind and body of the C. sentenced to 'penal servitude for life,' when we consider that that sentence is the most severe but one which the law can give, that one being *Death*. It has been found that the negative object of doing no injury to mind or body was inconsistent with the prison discipline of prolonged solitary confinement. Males, as a general rule, broke down under it at the end of about nine months; females did not succumb usually till the lapse of a few months more. After about nine months of seclusion the convicts are now associated, under careful inspection, in some profitable mechanical work. The Crown appoints persons to administer the property of convicts, as, by Statute 33 and 34 Vict. c. 23, forfeiture has become altogether abolished.

Convoca'tion was at one time applied to any assembly of clergy, as a diocesan synod or a provincial council. It is now confined to the assembly of bishops and clergy of the Anglican Church summoned by the mandate of the archbishop. From the Magna Charta to the Statute 37 Hen. VIII., this body assessed itself and the clergy whom it represented for public aids without parliamentary sanction. By the celebrated *Præmunientes* clause, Edward I. and his successors had endeavoured to convene the proctors of the clergy in Parliament. This failed, but by the Act of Submission (25 Hen. VIII. c. 19) the C. was forbidden to meet, confer, promulgate, or carry into execution (as regards canons) without the royal licence, or to do anything contrary to the prerogative, the common law, statute, or custom. In 1665 the taxation of the clergy was finally transferred by Clarendon to the Commons; hence the right claimed by the clergy to vote in parliamentary elections, although it has been settled since 1553 that no member of C. can sit in Parliament. After preparing the Act of Uniformity the C. gradually fell into disgrace and impotence; and its criticisms on Toland, Burnet, Clarke, Whiston, and chiefly Hoadley (in the Bangorian controversy), led to its being practically suspended from 1717 to 1840. Burke said its function was to pay 'polite ecclesiastical compliments' to the king and then to dissolve. Lately it has shown signs of life and has taken into its consideration all the great questions of the day which seemed to affect the Church directly or indirectly. There are two convocations, one of the province of Canterbury, the other of that of York. Each C. consists of two houses—the Upper, in which the Archbishop and Bishops sits; the Lower, to which are summoned the Deans, Archdeacons, and Proctors (representatives by election of the chapters and beneficed clergy). Only two proctors are allowed for the parochial clergy of each diocese; and only parsons, vicars, and perpetual curates can vote, stipendiary curates, deacons, and the laity being incapable of election. Colonial bishops do not appear in C. The Lower House proceeds to the election of a prolocutor, *organum cleri* or *Referendarius*. Business is brought forward under the name of *Gravamina* or *Reformanda*. Important constitutional demands may be in the form of a petition to the Crown or Parliament, and are called *Articuli cleri*. The deliberations of the Lower House are chiefly conducted through committees, but the Synodical Act requires the presence of the lower clergy in the Upper House. The Lower House has no right of initiative, but it has a final *veto*. Proxies may be used by members who are not proctors. C. generally sits during the same time as Parliament; it is prorogued by a schedule of continuation signed by the archbishop, who presides in the Upper House, and intimated by the prolocutor to the Lower House. The dignity of C. is secured by various penalties of excommunication contained in the canons of 1603. A canon of C., even when approved of by the sovereign, does not bind the laity, who can be bound only by an Act of Parliament; it, however, binds the clergy *in re ecclesiastica*. Formerly an appeal lay to the Upper House from the ecclesiastical courts in matrimonial, testamentary, and tithe causes. In 1864 C. declared *Essays and Reviews* heretical; it has no power to proceed against heretics.

Convolvula'ceæ, the Bindweed order, a natural order of Dicotyledonous plants belonging to the division *Corollifloræ*. Altogether about 700 species, and forty-six genera are known. Jalap is produced from the root of *Exogonium* (*Ipmœa*) *Purga*; *Batatas edulis* is the sweet potato, and the various species of *Convolvulus* (q.v.) yield important medicinal substances. The species of this order are abundant in tropical countries, but rarer in cold ones. Most of them twine around other plants, and are frequently seen among weeds not far from the sea-shore.

Convol'vulus, a large genus of twining or trailing annual and perennial plants, widely distributed, typical of the order *Convolvulaceæ*. Most of them have showy flowers, expanding during the early part of the day, and owing to the presence of a peculiar resin are purgative. *C. Scammonia* furnishes Scammony (q.v.). *C. dissectus* abounds in hydrocyanic acid, and it is believed that it forms one of the species from which the 'liqueur noyau' is prepared. There are many others which possess in a more or less degree the same qualities, and which are cultivated in our gardens for the beauty of their flowers. *C. Scoparius*, a shrubby species of the Canary Islands, is one of those which yield rosewood.

Con'voy (Fr. *convoyer*, 'to conduct'), a naval and military term, meaning, in the former sense, a vessel or fleet appointed to escort merchant ships in the time of war, or, during peace, to protect them on seas infested by pirates. In the military sense, a C. is a detachment of troops appointed to guard provisions, ammunition, or money in the course of transit. The term is also applied to the train of waggons laden with these stores.

Convul'sionaries, an extreme sect of the Jansenists, originating in France about 1730. They met in the outskirts of Paris, at the tomb of one Francis, whose violent asceticism they imitated. The C. pushed fanaticism to frenzy, and finally ruined Jansenism by the absurdity of their excesses. In 1733 their suppression was decreed by law; but it was many years before this could be effected.

Convul'sions, a form of disease common among children. It consists in violent, sudden contortions of certain muscles, occurs in spasms, is quite independent of the will, and is accompanied by insensibility on the part of the sufferer. It may last from a few minutes to some hours. C. may be caused by inflammation of the brain or of its membranes, by a depraved condition of the blood, by disease of the kidneys, or it may be due to irritability of the nervous system, produced by teething, &c. The treatment varies with the cause. In severe cases inhalation of chloroform, administered by a physician, is an excellent application.

Con'way, or **Aberconway,** a picturesque town in the N.E. of Caernarvonshire, N. Wales, at the mouth of the Conway, 12 miles E.N.E. of Bangor. The principal objects of interest are the old wall with its battlements, the splendid old castle, reared in 1283 by Edward I. as a defence against the Welsh; the chain-bridge, constructed by Telford, and the tubular bridge, in 1848, by R. Stevenson for the proprietors of the Chester and Holyhead Railway. C. has some coasting trade, chiefly in slates, and a little shipbuilding; but it owes its recent prosperity mainly to the beauty of its scenery, which makes it a favourite summer resort It unites with Caernarvon, Bangor, Criccieth, Nevin, and Pwellheli in returning one member to Parliament. Pop. reg. sub-dist. 7246; mun. bor. 3442; civ. and ecc. par. 2350.

The river *Conway* (Cymr. *Cyn-wy*, 'chief water,' the *Toisobius* of Ptolemy) rises in a small lake, *Llyn C.*, on the borders of Merioneth, amidst rocky moors, flows in a northerly direction, receiving lesser tributaries from the E. and from the Snowdon range on the W. Its scenery is perhaps the most romantic in Wales. After a course of 30 miles, it falls into Beaumaris Bay, in the Irish Sea. The C. is navigable for ships of 100 tons 10 miles above its mouth.

Co'ny, the scriptural name of a mammal, the *Hyrax Syriacus* of Syria and Palestine, usually included in a distinct order of mammalia—*Hyracoidea*—but sometimes classified with the rhinoceros, on account of similarity in the molar teeth. No canine teeth exist; the lower incisors are sharp, curved, and grow from permanent pulps. The front feet are four-toed, the hinder three-toed, and the toes have hoof-like nails. No clavicles exist. The nose and ears are short, the tail is rudimentary, and the placenta is deciduate and zonary. These animals live in holes in rocks, and are about the same size as rabbits. The *Hyrax Capensis* of South Africa is another species.

Cony'za, a genus of plants of the natural order *Compositæ*, the most familiar of which is well known in England as Fleabane and Ploughman's spikenard. The first name refers to the property, which it is widely believed to possess, of driving away fleas and other insect pests. The second popular name is probably derived from its somewhat aromatic odour. It is a common hedge plant in England and most parts of Europe.

Co-ob'ligants, though each bound to a creditor for the whole of a debt, are liable proportionately among themselves; and any one paying more than his share is entitled to relief from the rest.

Cook, Captain James, the son of an agricultural labourer, was born at Marton, Yorkshire, 27th October, 1728, and apprenticed to a haberdasher at the fishing-town of Straiths. His employment was uncongenial, but the sea was before him. After being employed some time in coasting vessels, he entered the royal navy, in which his progress was rapid. He was employed to survey the coasts of Labrador and Newfoundland, and was afterwards commissioned by the Royal Society to command an expedition to the Pacific. C.'s ship was the *Endeavour*, and setting sail in her on the 26th August, 1768, he successively visited Tahiti or Otaheite, and New Zealand, discovered and took possession of New S. Wales, sailed W. between New Guinea and Australia, and past Java, &c., to the Cape of Good Hope, arriving in British waters 12th June, 1771. This voyage round the world was productive of great scientific results. In July, 1772, he commanded the *Resolution* and *Adventure* on an expedition to the Pacific and Southern Oceans, from which he returned 30th July, 1774. Of this long, successful, and most interesting voyage, C. has himself given an account in his *Voyage towards the S. Pole and Round the World in H.M. Ships 'Resolution' and 'Adventure'* (Dub. 1784). On the 12th July, 1776, C., in the *Resolution*, accompanied by Captain Clerke in the *Discovery*, sailed on a voyage in search of the N.W. Passage. He proposed to discover this passage by making for Behring's Strait, and sailing from the Pacific to the Atlantic. Beaten back by ice, only, however, after making many valuable discoveries, C. was stabbed in the back by the savages on the shores of Hawaii, 14th February, 1779. See Kippis's *Life of C.* (Lond. 1788).

Cook'ery, the art of preparing for use the various articles used as food by the human family. The first object aimed at in cooking operations is to render food more easy of assimilation to the human system, next it is sought to make food more palatable, and C. also is concerned with the presentation of food in an agreeable form. There is an almost endless diversity in the sources from which the food of mankind is drawn, and at first appearance it might be supposed that alimentary substances are so varied as to defy any classification or definition. The art of the cook to appearance further complicates food by combining various substances, and so treating them as to present made dishes under an endless variety of guises. Notwithstanding all this, the number of alimentary principles is very limited, and some knowledge of them tends very much to simplify the essentials of C., and to reduce to order the chaos presented by an ordinary C.-book.

Under the head of FOOD will be found a classification of the alimentary principles which must enter into every perfect human diet. Of these, the cook is concerned with, first, the nitrogenous or albuminoid substances, such as the fibrin of flesh, the albumen of eggs, the casein of cheese, and the gluten of flour and meal, and, secondly, with the non-nitrogenous or carbonaceous elements, as the fat of oils and butter, the starch of flour and other vegetable substances, and sugar derived from various sources. The proportions in which these substances should enter into a proper diet we learn from experience and physiological investigation, and it is the function of the cook to prepare them in view of such knowledge in the manner least wasteful and most nutritious. Food is chiefly prepared by submitting it to high heat, as by boiling, roasting, baking, broiling, stewing, &c. (See these headings, and also BREAD.) The object attained in all cases is much the same, but differences of flavour result from the various methods of preparation, which have considerable influence on the sapidity and relish of food. By the action of heat albuminous substances are coagulated, as in boiling an egg, but if this action is carried too far, the albumen becomes hard, dry, and indigestible. The natural juices within a piece of meat are retained in it by the rapid coagulation by high heat of the albuminates on the surface sealing it up. The action of heat on starchy substances, such as flour, causes the expansion and rupture of the starch granules, and partly changes them into a soluble condition, thereby rendering them fit for assimilation and digestion. Generally tissues, both animal and vegetable, are rendered softer or more easily masticated by the action of heat in cooking, and, being presented to the digestive organs in a state of minute subdivision, are readily dissolved and digested. In the preparation of food, it is necessary to attend to the compatibility of certain substances as to flavour and character. Cleanliness is the first essential of good C.

There is no art on which human health, happiness, and comfort are more dependent than on C., and in no direction can greater economy and saving be exercised than in dealing with food. Public attention has now been prominently drawn to the importance of elementary knowledge of the principles of food and C., and attempts are being made in various directions to supply the want. A National School of C. has been established in London to teach the cooking of meals suitable for all classes of society, and throughout the chief towns affiliated schools have been instituted. The subject of C. is also receiving encouragement in elementary schools, under the code of regulations in operation in connection with the Education Department. With advancing civilisation, and increasingly artificial habits of life, a knowledge of the best methods of treating food becomes daily more indispensable to all classes.

In his primitive state the range of man's food was limited, and his cooking operations necessarily simple. Probably the earliest inhabitants of the world lived on roots, fruits, and the products of the chase, without submitting their food to any cooking process, but at a very early date we find our ancestors cultivated cereals and prepared them for food by roughly bruising the grain and parching it on hot stones. Actual baking of bread was also practised in very early prehistoric times, as is testified by the remains of baked bread found among the relics of ancient Swiss lake-dwellings. The art of C. was carried to considerable perfection among the ancient Egyptians, and generally as nations progressed in civilisation, especially if accompanied by wealth and luxury, C. was studied and carefully regarded in proportion. A great variety of dishes and elaborate banquets of the Athenians are described in *The Deipnosophists* of Athenæus, and costly and extravagant luxuries were also a feature of Roman life under the Empire. Skill and resource in C. has been a strong point in the domestic life of the French ever since the Middle Ages; and it is not only in high, elaborate, and expensive dishes that their *chefs* excel, but also in the carefulness, economy, and resource of their *cuisine bourgeoise*, in which they are especially deserving of praise and imitation. C. is an art that cannot be learned from any C.-book, however practical, and the recipes such books contain are seldom suited to the means of any but the comparatively wealthy. Every housekeeper should learn by experience as much as possible, and at least it is essential that she should be able to cook all plain everyday articles of food exquisitely, after which in a tentative manner she may essay more elaborate dishes.

Cook'ia, a genus of plants of the natural order *Aurantiaceæ*, named in honour of Captain Cook. The fruit of *C. punctata*, the *wampee* of China and the Indian Archipelago, is greatly esteemed.

Cook, Mount, the highest mountain in New Zealand, is situated in the province of Canterbury, and forms the culminating point of the Southern Alps. Its height above the sea-level is 13,200 feet.

Cook's Inlet, a gulf on the N.W. coast of N. America, territory of Alaska, about 60 miles wide at its entrance, and penetrating 200 miles into the interior. It is named after Captain Cook, who explored it in 1778.

Cook's Islands, Cook's Archipelago, Mangaia Archipelago, and later **Hervey Islands**, a group of islands of coral formation in the S. Pacific Ocean, visited by Cook in his first voyage. The parallel 20° S. passes nearly through the centre of the group. The principal islands are Rarotonga (area 53 sq. miles, pop. 3000), Mangaia (pop. 2000), Atui (pop. 1200), the three small Hervey isles, Aitutaki (pop. 2000), Takutea, Mauki, Mitiero, and the Palmerston group. Water is scarce (except in Rarotonga), and the inhabitants are obliged to rely in part on the milk of the coco-palm. Yet the soil is tolerably productive. The bread-fruit-tree and Pisang are particularly abundant. The inhabitants are Polynesian Malays, like those of the Society and Friendly Isles, and are skilled in various manufactures. The islands belong to Great Britain and are useful as coaling stations. Many of the inhabitants have accepted Christianity.

Cooks'town, a town in the county of Tyrone, Ireland, on the left bank of the Ballinderry, 14 miles N. of Dungannon. It consists of a single long broad street, crossed by a shorter one at right angles, and has a small trade in linen. Pop. of township 3841.

Cook Strait divided the N. and South Islands of New Zealand, and is 21 miles wide at its narrowest part. It is named after Captain Cook, who discovered it in 1770.

Coo'lies, or **Coulies**, from being originally the name of one of the hill-tribes of India, passed into use in that country as a generic term for porters, many of the tribe being employed in that capacity in the principal towns, in much the same way as the Gallegos in Spain. Subsequently the word has come to be generally employed to designate labourers sent from India and China to various tropical countries, the chief of which are the Straits Settlements, Mauritius, the W. Indies, and portions of S. and Central America. A warm and prolonged controversy has prevailed on the subject of the exportation of C. On the one hand, it was alleged that the C. were subjected to much cruel treatment or neglect, and were slaves in fact though not in name. On the other hand, it was contended that they were much better off in the countries to which they emigrated than in their native lands—that they were treated with a reasonable amount of consideration, and were on the whole contented and prosperous. The truth probably is, that while grievous wrongs were at one time inflicted upon the coolie, he now improves his circumstances by emigration, at all events to British settlements. The number of C. introduced into British Guiana from India in the season 1873-74 was 8299, besides 388 from China. The number of East Indians in the colony at the last census was 105,463, and that of Chinese, 3714; the majority of these were C. In Dutch and French Guiana C. are imported in considerable numbers, though the importation of C. was suspended for several years. The British Vice-consul at Cayenne reported that the C. there 'are very fairly treated by their French masters.' Most of them embrace the Roman Catholic religion, and many remain in the colony 'as free men, and become French citizens.' C. brought from Jamaica have been introduced into Colombia, and in Costa Rica the importation of Chinese C. commenced in 1873. E. Indian C. are employed in most of the British W. Indian Islands, as well as to a small extent in the islands belonging to France and Denmark. In the census returns for 1891 it appears that there were in Trinidad 45,594 East Indians and 1006 Chinese, most of whom were C.

Sir W. Grey, Governor of Jamaica, in his report for the year 1872-73, states the E. Indian population of the island at 12,455, of whom 5880 were serving under indenture, 1418 had served five years under indenture, but had not completed ten years' residence, and 5157, having completed ten years' residence, had voluntarily become colonists. Regarding the last class, the agent-general for immigration stated that 'everywhere throughout the country the time-expired C. may be found in comparatively affluent circumstances.' The importation of Chinese C. into the W. Indies received a severe check in 1867, through the Chinese Government insisting on a return passage being granted at the end of five years, which was found to render the employment of Chinese C. unremunerative. A Chinese official visited Cuba in 1874 to arrange for the better treatment of Chinese C. employed in that island. In 1891 there were in Jamaica 10,116 East Indians and 481 Chinese, and most of these were C.

It is in Mauritius, however, that C. are most numerous. In August, 1846, out of a total population of 158,462 there were 56,245 East Indians; in 1891, out of a total population of 370,588, there were 255,920 East Indians. Now most of these East Indians were C. It should be stated that the expression C. means the labourers, their wives, and children. Coolie immigration to Mauritius began in 1834, but was suspended in 1838. In January, 1842, it was resumed, inquiry having shown that the immigrants were not grossly ill-treated, as had been alleged. In 1856 the outbreak of cholera caused another suspension of the immigration, which was resumed in April, 1857. Due regard being had to maintaining a balance of the sexes, the coolie population of Mauritius much increased. In 1873, of the engaged labourers on estates, 5501, or about 8·40 per cent., were Indian creoles. The condition of the Indian population was spoken of by the officer administering the government as being 'fairly prosperous,' and as showing a marked improvement on some preceding years.

Steps were taken to introduce Chinese C. into Cape Colony. In January, 1876, an agent was despatched to China to make the necessary arrangements, the Colonial Government engaging to contribute £7 per head towards the expense, but the venture came to nought and the number of Chinese in the colony is very limited.

A system of exportation of Chinese C., which was really nothing but kidnapping, was carried on for a number of years from Macao, until it was finally extinguished by the action of the British, Chinese, and Portuguese Governments in 1872-73. As showing what atrocities were perpetrated in carrying on this traffic, it may be mentioned that in twenty-three out of thirty-eight ships, the C. mutinied, and in thirteen they murdered every European on board. The C. themselves suffered still more heavily, as out of 3552 shipped on board seven vessels, 2449 perished from disease, fire, and shipwreck.

The importation of Polynesian natives into Queensland, to work on the sugar-estates there, has been carried on for some years, and the same practice has more recently been adopted in the Fiji group. In 1891 there were 9428 Polynesians and 8574 Chinese, of whom nearly all were C. The condition of these labourers is identical with that of C., but they are not known by that name. Stringent laws have been enacted to prevent the trade in 'labour,' as it is called, from being abused. The importation of C. into the Straits Settlements and Malay Peninsula has now been carried on for many years; the C. are sent from China and from India. The Chinese immigrants numbered 193,232 in 1891 and those from India 53,691, and the great majority of all these were C. Without Chinese labour the colony could never have reached its present position of importance and wealth. The life of the Chinese coolie in our colony is a hard one, yet it is a long way preferable to the life in China where the labourer can never be certain of his wage and must always be in fear of losing the greater part of his earnings, whatever they may be, through the rapacity of his rulers. Many of the Chinese settle permanently in the colony, and there is now a rapidly increasing portion of the community consisting entirely of Chinese who have been born and bred in the Settlements, have never seen China, and have no intention of visiting their mother-country. These Straits-born Chinese number over thirty thousand; most of them talk and write English, and the youths and boys are showing a keen appreciation of athletic games, such as cricket, football, and bicycling. The girls are permitted to attend the public schools, where they also learn English and mix with the children of other races. In this way the great barrier of Chinese exclusiveness is gradually being worn away. It is but natural that the Chinese C. should be much impressed by these changes in their fellow-countrymen and their families, and that they should on their return to China draw a comparison between their life in our colony and that in China, which must be favourable to the former. A grave responsibility rests on our shoulders in respect of this large importation of Indian, Chinese, and Polynesian labour; nevertheless, it would appear that we do not shirk our duty, and that we deal fairly by these C. who so materially help in promoting the prosperity of our colonies.

There is also a large coolie traffic between China and Sumatra, and between Java and Sumatra, whereby the Dutch colonists are enabled to carry on the cultivation of their various sorts of plantations in the island by means of Chinese and Javanese labour.

Coomass'ie, the capital of the kingdom of Ashanti, W. Africa, 130 miles N.N.W. of Cape Coast Castle. It was formerly walled, had wide streets, an extensive royal palace, furnished with a curiously miscellaneous collection of objects of value and interest, and a strong and vast fortress, named the Bantima. It was taken and burned by British troops under Sir Garnet Wolseley, February, 1874, in the war against King Coffee Calcalli; but since then it has been rebuilt.

Coo'per, Sir Astley Paston, one of the greatest of British surgeons, was the son of the Rev. Samuel C., rector of Brooke, Norfolkshire, and was born at the rectory, 23rd August, 1768. He received his practical training under Cline, and attended the anatomical lectures of John Hunter. He soon became a great authority in anatomy and surgery, and filled in succession the posts of Professor of Anatomy in Surgeons' Hall (1792), and surgeon to Guy's Hospital (1800). In 1804-7, C. published his celebrated work on *Hernia*. His private practice rapidly increased, and in 1813, in which year he received the Professorship of Comparative Anatomy in the College of Surgeons, his income reached the sum of £21,000. A skilful and daring experimenter, he attempted (1817), although unsuccessfully, the tying of the carotid artery and of the aorta. In 1820 C., who had removed a steatomatous tumour from the head of George IV., was made a baronet, and till his death, which took place 12th February, 1841, honours poured in upon him. He filled, besides other posts, those of President of the College of Surgeons (1827), and Vice-President of the Royal Society (1830), while he was made a D.C.L. of Oxford, an LL.D. of Edinburgh, and a member of the French Institute. His writings, in spite of his busy life, were numerous, and many of them, especially his treatise on the *Anatomy and Diseases of the Breast* (1829-40), may be said to have revolutionised the theories on the subjects of which they treat. The school of Hunter was fertile in great surgeons, but none has surpassed, if any has equalled, the brilliant and original C. See *The Life of Sir Astley C.* (Lond. 1842) by B. Cooper.

Cooper, James Fenimore, one of the most popular of American novelists, was born at Burlington, New Jersey, U.S., 15th September, 1789. Educated first privately, and afterwards at Yale College, he entered the navy at the age of thirteen as a midshipman, and served in it for six years. Retiring into private life, he married, and after some years of solitude he took the reading public of the United States by storm with his novel of *The Spy* (1822). This was followed by a large number of other fictions, all like it marked by strong nationality and great powers both of narration and description. The chief are *The Pioneers* (1822), *The Pilot* (1823), *Lionel Lincoln* (1824), *The Prairie* (1825), *The Last of the Mohicans* (1826), *The Red Rover*, and the *Waterwitch* (1828). Some of these, such as *The Pilot* and *The Last of the Mohicans*, were at least as much admired in Europe as in America; but while C. is still much read, especially by boys, he does not stand on the pedestal on which he was placed by his earlier admirers. C. visited England in 1827, and published some sketches of European society. He died at Cooperstown, New York, 14th September, 1851. C.'s daughter, **Susan Fenimore C.,** born 1815, became an authoress of some mark. Her books are chiefly descriptive of country life. The chief are *Rural Hours* (1850), *Country Rambles, &c.* (1852), and *Rhyme and Reason of Country Life* (1854).

Cooper, Peter, an American philanthropist, was born in New York, 12th February, 1791. About 1828 he engaged in the business of glue and isinglass, and in 1845 he erected large mills in Trenton for iron-rolling. The fortune which C. acquired in business he liberally used for the public good. Feeling a deep interest in the welfare of the working classes, he erected the *C. Institute* in a central part of New York city. It cost £100,000, and this building, with all its profits and rents, was devoted to the education of the people. It included a free reading-room, school of design, galleries of art, and evening classes. C. died 4th April, 1883.

Coo'perage, the art of making barrels, casks, and other vessels of wooden staves and headings, banded with hoops. The art early reached a state of perfection, for Pliny states that such vessels were used for storing wine. Although of late years a large number of ingenious machines have been contrived for the production of casks, &c., and are employed in a few establishments, yet the C. industry is practically carried on manually. The manufacture of *tight* or *wet* casks for holding liquids is the most important branch of C. The operations of the cooper consist in shaving and planing the Danzig oak staves to the proper curve, both in the direction of the length and breadth, in shaping them so as to be broadest and bulging at the middle, and gradually tapering to the ends, in bevelling the edges and ends, and in 'chining' the grooves to receive the heads. The staves are then brought together and bound with slightly coned iron hoops, the heads, bevel-edged and slightly ovalled, are driven into the grooves, and the bung-hole bored.

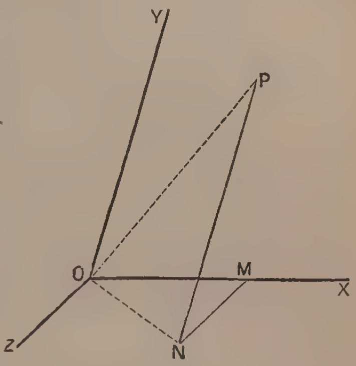
Co-opera′tion. This term has come to be specially applied to an extension of the principles of joint-stock enterprise which has taken place within comparatively recent years. Societies are formed, whose members subscribe a capital with which to work some commercial concern, of a kind formerly left to individual enterprise; the object being to share the profit among the members, without any expenditure of time and thought by the general body of them. There are, of course, co-operative societies whose object does not come within the above definition. (See BENEFIT OR FRIENDLY SOCIETIES, BUILDING SOCIETIES.) Besides supporting about five hundred officials, the profits of the *Civil Service Supply Association* of London have been enormous. In Edinburgh, on a humbler scale, the similar institution—the *Professional and Civil Service Supply Association*—continues to be very prosperous. Such institutions clearly ought to succeed—competent managers and sub-officials being easily obtained. By the ready-money system on which they are conducted, the honest are not taxed on account of the dishonest. Providing their own customers, they are not obliged to increase the price of articles to pay advertising. Some endeavours have been made by members of Trades Unions (q.v.), as opposed to capitalists, to carry on co-operative productive trading. These have not been successful, nor does it seem as if they ever could be, owing to the antagonism of the positions. The aim of trades-unionism is to force up the rate of wages; the success of C., as applied to production, depends on keeping the rate of wages low. As co-operators the workmen are their own employers, and experience has shown that workmen prefer immediate to postponed enjoyment—high wages to profits.

Co-or′dinates, the name of the directed quantities which determine the position of a point, and which constitute the great peculiarity of Descartes' method of analytical geometry. The position of a point in space requires for its determination three numbers, one of which, at least, must be a rectilinear measure. Thus, the summit of a mountain is fixed, if we know the number of points of the compass which it is E. or W. of N., the angle of elevation, and its direct distance from us; or if we know how far it is N., E. (or W.), and its vertical height. This latter is a case of the method in question, these distances being the C. of the summit. It is obvious, however, that it is requisite beforehand to fix three arbitrary directions, which need not be at right angles to each other, but which are usually so taken for convenience. Take then in the plane of the paper the two lines OX, OY, to represent two of these directions, and suppose OZ not in the plane of the paper to be the third. These lines are called the *axes*. Take now *any* point P, whose position is to be determined with respect to these three directions. Through P draw PN parallel to OY, and meeting the plane containing OX and OZ in N. Through N draw NM parallel to OZ, and meeting OX in M. MO, PN, NM, are the C. of the point P with respect to the three axes of X, Y, and Z; and are expressed respectively as x, y, and z. If the axes be mutually rectangular, the C. are so also, and therefore

$$x^2 + y^2 + z^2 = \mathrm{ON}^2 + \mathrm{PN}^2 = \mathrm{OP}^2.$$

If P lie on the surface of a sphere, whose centre is at O, OP is constant $= a$ suppose. Hence $x^2 + y^2 + z^2 = a^2$ represents any point on the sphere, and is, therefore, called the *equation* of the sphere. If $z = 0$, the equation becomes $x^2 + y^2 = a^2$, representing a circle of radius a, centre O, in the plane xy. For any value of y, x has two equal values, one positive, the other negative; and thus the signs $+$ and $-$ undergo an important extension of meaning, representing not merely addition and subtraction, but *direction*. In *plane* analytical geometry only two axes are required, and y and x are known respectively as the *ordinate* and *abscissa* (Lat. 'cut off'). See GEOMETRY, ANALYTICAL.

The method of *Polar C.* has been already hinted at. By it a point is fixed by the length and the *Direction-Cosines* (q.v.) of its radius vector. Its most practical use is in the planetary theory.



Lagrange's *Generalised C.* deserve a word of notice. The C. represent the degrees of freedom possessed by the system whose motion is under consideration, and are wholly determined in each special case by the conditions of the problem. For each co-ordinate there is an equation of motion, and hence there are as many equations as there are C. The combination and integration of these, when possible, give the complete motion of the system. See De Morgan's *Calculus*, and Thomson and Tait's *Natural Philosophy*, vol. i.

Coorg (*Kodagu*, 'steep mountains'), a small inland state in S. India, under permanent British administration, occupying the mountains of the Western Ghâts between Mysore and Malabar district. Area 1583 sq. miles; pop. 173,055. Of these 156,845 are Hindus, 12,665 are Mohammedans, and 3392 are Christians. The whole area is mountainous, and covered with primeval forest or grassy glades. Wild animals abound, including elephants, tigers, bison, and ibex. The chief product is timber—teak, blackwood, *poon*, sandalwood, and bamboo. Rice is industriously cultivated in terraces, along the river valleys. The capital is Mercara or Merkára (q.v.). The climate is very rainy and damp, but cool and healthy for Europeans. The Coorgs are famous throughout India for their physical and moral virtues, and have shown extreme loyalty to the British from the very first. They utterly declined to submit to Hyder Ali and his son Tippoo, and when all the southern part of the peninsula fell beneath the yoke of these conquerors, the Coorgs, in spite of disaster after disaster, valorously resisted the Mohammedans; and when they were on the point of being absolutely exterminated, they again revolted and induced the British to intervene and save them. The native Rajah, with his family, returned from captivity, but gave way to such fiendish cruelty towards his subjects, that the British were forced to take the country from him, promising civil and religious liberty to the masses. The Rajah retired on a pension, and died in England in 1862. His daughter became a Christian, the Queen of England acting as her godmother; she married an English officer, and died two years after her father. The rest of the family are pensioned off by the Government, and live at Benares. Cholera never appears in C., but there are terrible epidemics of small-pox. The Coorgs are possessed of a lively intelligence, and, under the British, have made great advancement in education.

Coo′sy, Koosee, or **Kusi,** a river of Hindustan, which has its source on the southern slope of the Himalayas, and after a course of 325 miles nearly due S., through Nepal and Purneah, falls into the Ganges, about midway between Patna and Murshidabad. The stream is extremely rapid and is liable to floods, which are gradually destroying the country around, and changing the course for navigation, so that the passage up and down is always dangerous.

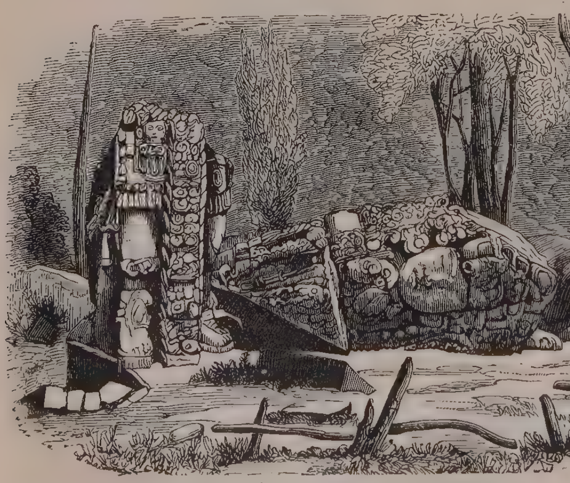
Coot, a genus of Grallatorial birds, included in the Rail family. The toes in the C. are fringed with broad membranous lobes, somewhat similar to those of the Grebes (q.v.). The C. is sometimes placed more intimately in the family of the waterhens. The common C. occurs in Europe, N. Africa, and Asia. It is coloured black; the wings have a white bar, and the forehead is also white. It averages from 13 to 16 inches in length, and has a strong, conical, straight bill. The C. flies southwards in winter. The American C. occurs in N. America.

Coote'hill, a town in Cavan county, Ulster, Ireland, on the river Coragh, 12 miles E.N.E. of Cavan, has a considerable trade in linen. Pop. of township 1789.

Copai'va, or **Copai'ba,** often improperly called *balsam of C.*, is obtained from incisions made in the trunk of *Copaifera multijuga* and other species of Copaifera, trees belonging to the *Leguminosæ*, sub-order *Cæsalpiniæ*, and found chiefly in the valley of the Amazon. It consists of a resin and oil; the latter is used in medicine. C. somewhat resembles olive oil, has a peculiar odour, and an acrid taste. It exudes so abundantly after an incision has been made in the tree, that as much as 12 lbs. is sometimes collected in a few hours.

Co'pal, a resinous substance extensively employed in the arts. It is the general Mexican name for resins and gums. Mexican C. is, however, now derived from a species of *Hymenæa*, a leguminous tree. *Copaifera Guibourtiana* or *Guibourtia copallifera* is the source of most of the recent W. African C., though a great portion of the C. sent from that part of the world is fossil-resin, produced, according to Welwitsch, by trees which are now extinct or only exist in a dwarfed condition. *Trachylobium mossambicense* has been shown by Kirk to be the source of Zanzibar C. The valuable *Animé C.* of the same island is, however, semi-fossil, and was probably derived from the same species of tree, then existing in forests now extinct. The exact source of Brazilian and Angola C. is not known. The so-called Indian C. is the produce of *Vateria Indica*. C. is also obtained from Madagascar, where it is believed to be the produce of *Hymenæa verrucosa*. All are extensively used in making varnishes, lacquer, &c.

Copal'chi Bark, the bark of *Croton pseudo-china* or *niveum*, a Euphorbiaceous plant, a native of the W. Indies and Mexico. It is used as a tonic.

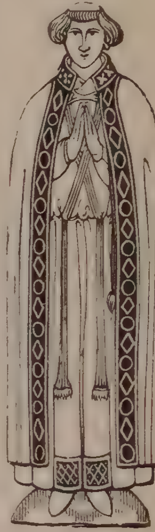


A Fallen Idol at Copan.

Copan', a ruined city of Honduras, on the borders of Guatemala, Central America, on a river of the same name, an affluent of the Motagua. The ruins, which extend for two miles along the banks of the C., and are about 1500 in number, include the remains of a temple 624 feet long, pyramidal structures, and monoliths, with sculptures and hieroglyphs identical with those of Palengue.

Copar'cenery. In England, when an estate of inheritance descends from the ancestor to two or more females, it is said to be an estate in C., and those to whom it descends are coparceners. Each is entitled to her distinct share, though the property remains undivided, and no benefit accrues on survivorship, the right of each descending to heirs. C. does also sometimes occur among males. (See GAVELKIND.) The estate may be dissolved in several ways, such as by deed of partition, by one of the coparceners alienating her or his share, and thus destroying the unity of title; by all but one of the coparceners dying and the survivor inheriting the rest of the estate.

Cope (from the same root as *cap* and *cape*), a semicircular vestment worn during divine service by Roman Catholic priests, reaching from the shoulders nearly to the feet, and open in front, except at the top, where it is fastened by a band, clasp, or morse. This choir, or canonical C., was, prior to the 14th c., distinguished from the *cappa fluvialis*, a large mantle with a pointed hood to it, which was worn out of doors, but which was subsequently disused. In the 12th c. a custom arose of putting sleeves to the C., but Pope Innocent III., in the fourth Lateran Council, forbade these *cappæ manicatæ*.



Cope.

Cope, Sir John, an English commander, who has obtained an unenviable immortality through his surprise and defeat at Prestonpans by Prince Charles Stuart, 21st September, 1745. A clever song in which the defeat is celebrated survives to this day. C.'s 'raw dragoons' were wretched material to oppose to half-savage Highlanders in the first flush of their triumphant march from the N., and C. has perhaps been too severely judged. He died Knight of the Bath and a lieutenant-general, 28th July, 1760.

Co'pec, a Russian copper coin, the hundredth part of a rouble, or of 3s. 2d. in English money. The C. was at first coined of silver. The name is connected with the Russian word for a lance, the C. having anciently borne the effigy of St. George.

Copenha'gen (Dan. *Kjöbenhavn*, *i.e.*, 'merchant's haven'), the capital of Denmark, partly on the island of Zealand (Dan. *Sjaelland*) and partly on the island of Amak or Amager, in the Sound, and situated so low that it has to be defended by embankments against inundation. It is divided into three parts—the Old Town, or W. part; the New Town, or E. part; and Christianshavn on Amak, connected with C. proper by the bridges Langebro and Knippelsbro. The channel between the islands forms a splendid harbour. Pop. 312,859. C. has suffered frequently from fire, the old houses having been for the most part constructed of wood. These have, however, been replaced by structures of brick or Norwegian granite. The city contains numerous squares, of which the finest is Kongens Nyton (the new King's Market). It is central, and is adorned with a colossal leaden statue of Christian V., as the octagonal Frederik's Place is with an equestrian statue of Frederik V. The fortifications, once strong, have, with the exception of the citadel, *Frederikshavn*, been dismantled. The most notable structures are the Frue Kirke (Church of our Lady), the metropolitan church of the kingdom, which suffered during the bombardment of 1807, but has been restored, and contains some of the masterpieces of Thorwaldsen; the Trinitatis Kirke, founded by Christian IV., with a curious round tower; Holmens Kirke, with monuments to the naval heroes Juel and Tordenjold; the palace of Christiansborg, of vast extent, with decorations by Thorwaldsen; and the castle of Rosenborg, designed by Inigo Jones, and in which the regalia are kept. C. is rich in museums of antiquities, natural history, numismatics, &c. That of northern antiquities is peculiarly interesting. It occupies a wing of the palace of Christiansborg, and contains a collection of stone and bronze implements, ranging from the rudest prehistoric times to A.D. 500, also of articles in gold and silver to A.D. 1000, and specimens of Scandinavian art and manufacture to the present time. The Royal Museum of Natural History is rich in zoological and mineralogical specimens. Thorwaldsen's museum, opened in 1846, contains the bequest made by him to the nation of his own works and numerous collections. The university, founded in 1478 by Christian I., but whose constitution was remodelled in 1788, has had among its professors men of European reputation in their several departments. It is well endowed, has forty professors and 1300 students (male and female on equal terms), a library of 200,000 volumes and 4000 MSS., among which are rich collections in Old Persian, Old Indian, and Old Norse. There are besides 28 elementary schools, a veterinary and agricultural college, a college of pharmacy, and several high, technical, and commercial schools. The royal library, founded by Christian III., contains 500,000 volumes and 20,000 MSS., among which are Rask's Sanskrit collection. The manufactures, which are trifling, and chiefly for home consumption, consist of woollens, linens, sailcloth, leather, and porcelain; but C. is still the centre of the foreign commerce of Denmark, which possesses a merchant navy of some 3400 vessels. It has railway communication with Korsör and Helsingör; regular steam communication with Kiel, Lübeck, Stettin, Norway, Sweden, Russia, France, England, and America. About the middle of the 12th c., C. was a small fishing village, in whose neighbourhood Bishop Axel (q.v.) or Absalon built a fortress called Axelhuus, to repress the piracy of the Baltic. In 1254 the village, which Saxo Grammaticus (q.v.) calls *Urbs Absalonica*, then *Portus Mercatorum* and *Castrum de Hafnia*, received municipal privileges, and in 1443 it became the capital of the kingdom. It has suffered much from sieges and bombardments, but its most grievous disaster was its bombardment by the British fleet, 2nd-5th September, 1807. The environs of C. are extremely beautiful. See E. J. Jonas, *K. und Umgebungen.*

Coper′nican System, The, is that system which represents the sun as being in the centre of the solar system, and the planets, of which the earth is one, as revolving round it. It is so called after Copernicus (q.v.), who advocated it in his work *De Revolutionibus Orbium*, but who, it must be observed, was not the first founder of it, that merit being due to Pythagoras (q.v.). The Newtonian system must be carefully distinguished from this, however, which Copernicus merely brought forward as a hypothesis, and tried to establish by much false logic and erroneous conceptions. He imagined the universe to be a sphere, in the centre of which the sun was immovably fixed. Round this central fire the planets revolved in circles, the proof of this being the famous Aristotelian dogma that circular motion was perfect. But this failed to agree with observation, and accordingly Copernicus was compelled to follow the same course as Ptolemy by introducing into his system complex epicycles. Many of the arguments which he used for establishing his hypothesis could have been easily turned against him by an intelligent advocate of the Ptolemaic system. Notwithstanding such defects, the *De Revolutionibus* produced a powerful effect, and prepared the way for the discoveries of Galileo, Kepler, and Newton. It is especially valuable for the generally correct explanation of some astronomical phenomena, mysterious and inexplicable before his time, *e.g.*, the variations of the seasons, the precession of the equinoxes, and the stationary and retrogressive motions of the planets.

Coper′nicus (the Latinised form of *Koppernigk*), **Nikolaus,** a famous astronomer, was born 19th February, 1473, at Thorn, in Prussia. After studying medicine, philosophy, and mathematics, especially the last, in the University of Cracow, he proceeded to Rome in 1496, where he met with the celebrated Regiomontanus, and where, in 1499, he became Professor of Mathematics. On his return to Prussia, he entered holy orders, became a canon at Frauenburg in 1502, and occupied the remainder of his life in his ecclesiastical duties, in giving gratuitous medical advice, and in prosecuting his favourite sciences of astronomy and mathematics. The results of his observations led him to reject the Ptolemaic system of the universe, and to propose the one which goes by his name. (See COPERNICAN SYSTEM.) It was with this end in view that he prepared his great work, *De Orbium Cælestium Revolutionibus*, Libri vi., which was published at Nürnberg in 1543, a few days, it is said, before his death (24th May). C. also wrote a work *De Lateribus et Angulis Triangulorum* (1522), several letters on general subjects, and a treatise on money. The first biography of C., that of Gassendi (1654), of which an English translation is given in Martin's *Biographia Philosophia*, formed for 200 years the groundwork of all other biographies. It is only in quite recent times that researches in archives have enabled us to obtain a clearer conception of C. and his work.

Copiapo′, a name applied in Chili, S. America, to a river, a village, a city and a district. 1. The *river* rises in the Andes, flows in a N. and W. direction, and after a course of 120 miles falls into the Pacific. 2. The *village*, Porto de C., at the mouth of the river, has parted with much of its trade to the flourishing seaport of Caldera. 3. The *city*, capital of the province of Atacama, lies about 30 miles up the river from the sea, and on the railway between Caldera and the mining centre of Juan Godoy. It exports the mineral wealth of the district. Pop. 10,360. 4. The *district* is rich in silver, copper, and cobalt.

Co′ping, in building, the capping or covering course of a wall, which may be flat, or it may be sloping or round, to throw water off. The term *cops* is sometimes applied to the Merlons (q.v.), or rising parts of battlements.

Cop′land, James, an English physician and author, was born at Deerness, in the Orkneys, in 1792, studied at Edinburgh, and, after travelling in Africa to study epidemic diseases, settled in London in 1820. He died 12th July, 1870. C.'s works, including his *Outlines of Pathology*, his *Elements of Physiology*, his essay on *Pestilential Cholera*, and above all his *Dictionary of Practical Medicine*, enjoy a very high reputation both at home and abroad.

Cop′ley, John Singleton, a historical painter, of Irish extraction, was born at Boston, America, 1737, came to England in 1774, was elected R.A. in 1783, and died 1815. His best works are the *Death of Lord Chatham*, in the national collection, and the *Death of Major Pierson*, which was the property of his son, the late Lord Lyndhurst (q.v.).

Copp′er, is an important and widely distributed metal, and has been known from early ages. At one period it was employed in the manufacture of articles and implements now made of iron (see BRONZE AGE)—a fact which is accounted for by the occurrence of C. in the native or uncombined condition, or in ores which yield the metal by very simple processes. C. was called by the ancients *æs* or *chalchos*, its modern title of C. (Lat. *Cuprum*) being derived from Cyprus, an island in which formerly C. was smelted by the Greeks and Romans. C. is found in various minerals, the most important of which are *C. pyrites*, *C. glance* (native sulphide of C.), *malachite*, a basic carbonate of C.; also *Red C. ore* (the red oxide of C.), and black oxide of C. Native C. occurs crystallised or in veins. There is a vein of C. in the neighbourhood of Lake Superior in N. America, which in some places is almost two feet thick. More than one-half of the total C. annually extracted is smelted in Great Britain, and of this about one-third comes from the Cornish mines. The ores raised in Cornwall consist for the greater part of C. pyrites. Owing to the absence of coal from the neighbourhood, they are transported to S. Wales, where that mineral is abundant. The operations of C.-smelting, as practised at Swansea and in the neighbourhood (the seat of C. industry), are complex, though their principle is simple. The ores, after being sorted, are roasted on the bed of a reverberatory furnace. Here much of the sulphur is burnt off as sulphurous acid, and arsenic (also frequently present in the ore) volatilises. The iron by this treatment is converted into ferric oxide, which subsequently becomes changed to ferrous oxide by the reducing gases of the furnace. The ferrous oxide then unites with silica, originally present in the ore, or which has been added to it in the form of sand for the purpose, and forms a fusible slag, whilst a tolerably pure sulphide of C. remains (*coarse metal*). The fused sulphide of C. is drawn off from the slag and again roasted, when it loses the whole of its sulphur as sulphurous acid, and metallic C. remains. C. possesses a peculiar red colour and a bright lustre. It is malleable, ductile, and remarkably soft—a property which enables it to be hammered into various forms at ordinary temperatures. It fuses at a white heat, and at a very high temperature volatilises as a green vapour. In dry air C. remains unchanged, but in presence of moisture and carbonic acid, it becomes covered with a coat of basic carbonate. Heated in the air, its surface becomes covered with a film of black oxide of C. C. is soluble with effervescence in nitric acid, nitrate of C. remaining in solution, and nitric oxide escaping as a gas. Other acids do not act upon it at ordinary temperatures. C. forms two series of compounds called *cupric* and *cuprious ;* these contain respectively one and two atoms of C. united to the same amount of acid or electro-negative radical. The cupric salts are the most important. Cupric sulphate is used by the calico printer, and is called *blue vitriol ;* it has also been employed as a cure for *smut* in wheat, and in medicine as a caustic. Cupric oxychloric, known in the arts as *Brunswick green*, is employed as a pigment. *Scheele's green* is a cupric arsenite; *verdigris*, a basic cupric acetate. C. is largely employed in the arts, both in the pure state and alloyed with other metals. (See ALLOYS.) Its salts are sometimes employed in medicine, and are poisonous. Small quantities of C. appear to be normal constituents of certain organs—the kidneys being one of them. The atomic weight of C. is 63·4.

Copp′eras is the sulphate of iron or ferrous sulphate. See IRON.

Copperhead, a most venomous snake, occurring in N. America. It is of a nut-brown colour, with dark brown bars; the belly is pinkish; and the sides have dark patches at intervals, corresponding to the bars across the back. The head is like a triangle in shape and is thick. Although slow in its movements, it is more feared than the rattlesnake, as it causes no noise as a warning of its approach. It feeds on frogs, lizards, and small birds.

Copperhead.

Copp′ering, in shipbuilding, a term applied to the process of sheathing the bottoms and sides of wooden vessels with copper or an alloy, to protect them from the ravages of sea-worms, and to prevent, by the slow oxidation of the metal, the accumulation of vegetable and animal growths, which, from their abundance, materially impede the progress of ships.

Copp′ermine River, in the N. of the old Hudson's Bay territory, Dominion of Canada, rises in a small lake to the S. of Great Bear Lake, flows N.E. for about 110 miles to Point Lake, after leaving which it takes a northerly direction, entering Coronation Bay at Bloody Fall, after an entire course of some 300 miles. It has only one tributary of any size, and is rendered impassable by its numerous falls and rapids. The C., along with the Indians on its banks and a mountain range to the W., receives its name from the presence of *copper* in the district, and was discovered by Lieutenant Hearne in 1771.

Cop′rolites, the name given to certain fossilised substances, which are presumed to represent certain petrifactions, and occur in Mesozoic and Tertiary deposits. These C. frequently present the remains of scales, teeth, shells, &c., which have resisted the digestive processes. C. are chiefly composed of phosphate of lime, and are therefore valuable as affording a capital manure for the agriculturist. In the chalk system, for example, beds of phosphatic concretions are met with of coprolitic origin. The names 'fossil cones,' 'bezoar stones,' &c., were applied to C. in ignorance of their true nature.

Copros′ma, a genus of shrubs belonging to the natural order *Cinchonaceæ*, deriving their name from their very fetid odours. The leaves of *C. fœtidissima* are used in divining the will of the gods by the New Zealand (Maori) priests. See Bennett's *Gatherings of a Naturalist in Australasia.*

Cop′tis, or **Gold Thread,** a genus of plants of the natural order *Ranunculaceæ*, consisting of a few species found in America, N.E. Asia, and one in Russia. In America the long thread-like underground stems of *C. trifoliata* are used as a tonic and material from which a yellow dye is extracted.

Copts (from *Coptos* in Upper Egypt) are a sect in Egypt professing a corrupt form of Christianity, who are the direct descendants of the Monophysites (q.v.) in Egypt, who seceded from the Catholic Church when their tenets were condemned by the Council of Chalcedon (451). The Arabian conquest rendered the schism irrevocable, and thus the Coptic Church was constituted. The C., however, are much more than the relic of a Christian sect; they are the only living representatives of the ancient Egyptians. In numbers they do not exceed 600,000; they have twelve bishops, a patriarch (of Egypt and Abyssinia, who resides at Cairo), arch-priests, priests, deacons, and monks—the priests must be married before ordination; the monks, arch-priests, and bishops are not permitted to marry at all. They have two versions of the Holy Scriptures—the Memphitic, in the Coptic dialect of Lower Egypt, and the Thebaic, in that of Upper Egypt. The Scriptures are still read from these in their public worship, but as the language is not now understood either by people or priests, they are afterwards explained in the Arabic, which is their vernacular. See Stanley's *Eastern Church*, and Carl Abel's valuable *Koptische Untersuchungen.*

Cop′ula (Lat. 'band'), the logical term for the word which joins the subject and predicate of a proposition—*e.g.*, 'Cæsar is dead.' Here Cæsar is the subject, dead the predicate, and *is* the C. The sign of predication may also be made by an alteration, called an *inflection*, on the predicate—*e.g.*, 'water flows'—*i.e.*, *is* flowing. For the confusion to which a dim conception of the nature of the C. has given rise, see Mill's *Logic*, book i. ch. 4.

Cop′y (Fr. *copie*, Lat. *copia*, 'plenty,' Low Lat. 'a pattern or transcript,' because it could be 'frequently' repeated), in art, a work in painting, sculpture, or engraving, reproduced by one artist from the original design of another. A reproduction of a work of art, executed by the artist himself, is called a *duplicate* or *replica ;* a reproduction in plaster of a work of sculpture is called a Cast (q.v.).

Cop′yhold, in England, is that right of tenure of land constituted by copy of the court-roll of the tenants of the lord of the manor. Copyholders were anciently nothing more than villeins, who by gradual encroachment at last established a customary right to their estates, previously held absolutely at the will of the lord of the manor. No right of C. can now be created, for it is requisite to the tenure that it have been held from immemorial time in virtue of copy of court-roll. In Ireland there are no lands of C. tenure, but in England it is by it that much of the land continues to be held, under relaxation of its more onerous ties and conditions. Services anciently due from them having mostly fallen into desuetude, a C. estate has become nearly equal in value to a freehold. Subsisting manorial rights may be commuted, and copyholds enfranchised under provisions of 4 and 5 Vict. c. 35, amended by 6 and 7 Vict. c. 23, and 7 and 8 Vict. c. 55, and these extended by 15 and 16 Vict. c. 51, which in its turn was amended by 21 and 22 Vict. c. 94, and by 50 and 51 Vict. c. 73, by which the tenant or lord of the C. land may compel its enfranchisement, and the extinction of a claim of Heriots (q.v.). When either lord or tenant requires an enfranchisement, notice is to be given, and unless the sum be agreed upon, the amount is to be ascertained under direction of the C. Commissioners, whose award is to have equal force with a deed of enfranchisement under the C. Acts. The valuation is to be made by a scale obtainable at the office of the Land Commissioners, 3, St. James's Square, London, which scale is, however, to be taken only as a guide.

By becoming enfranchised the C. thenceforth is a freehold, subject, nevertheless, to commonable rights and limitations. An ordinary conveyance is ineffectual with regard to C. land. The mode of transference is symbolical, like that called Resignation (q.v.) in Scotland. The land is symbolically surrendered to the lord of the manor or his steward, who again, in the same way, transfers it to the person to whom the transfer is to be made, and on the desired conditions. See CONVEYANCING.

Copying Machines, a term applied in a restricted sense to machines for producing facsimiles of various writings. In general, the copying machine consists of a heavy metal frame fixed to, or standing upon, a table, and having above it a flat plate of the same size, which can be raised up and pressed down by means of a screw. In connection with the machine, a book full of blank tissue paper is used. A page of this is damped, the letter to be copied inserted underneath it, and the whole placed between the plates of the press. The movable plate is forcibly screwed down upon the fixed one, and by the pressure an exact copy of the letter is impressed upon the damped page. This copy is, of course, reversed, but the paper is so thin that it can be read through the right way without difficulty. Specially thickened ink, called 'copying ink,' must be used in writing the letter in the first instance.

Copying, in photography, is the name given to that branch of the art which deals with the reproduction of pictures, engravings, maps, manuscripts, &c. In employing the camera for C. it is necessary, in order to avoid having a distorted image, to place the instrument in a perfectly horizontal position with the front parallel to the picture. A good diffused light should surround the picture, which should be unglazed and reversed. To secure an image with well-defined edges, a lens provided with a small diaphragm should be used. Engravings with half-tints are not adapted for successful reproduction. To produce a negative with perfect transparency in the shadows, an old collodion, mixed, if necessary, with a little dilute tincture of iodine, that adheres well to the glass, should be selected, and the nitrate bath should be of full strength. A good negative is distinguished by clear delineation of the lights and shades, with great density in the opaque parts. In printing the positives a highly-salted paper will yield good results, free from the gloss which accompanies the use of albumen, and increased intensity and brilliancy will follow the employment of an extra strong 'silver' bath. For rich purple toning, a bath of 30 grains acetate of soda, 5 grains carbonate of soda, and 10 oz. water should be prepared twelve hours beforehand, and just before using add 3 grains chloride of gold in 2 oz. water. The bath works quickly when hot, and slowly when cold.

Copyright, Law of. The intangibility of literary property makes the framing and administration of the laws for its protection peculiarly difficult. Admitting that no one is entitled to sell the book or copy the picture of another without his consent, there still remains the difficulty of determining whether or not one book is essentially the same as another, or whether or not one picture is essentially copied from another. Then questions arise as to the reasonable duration of C. of an author or his heirs, and respecting the rights of others to translate or abridge works.

The L. of C. over the United Kingdom rests partly on common law and partly on statute (the first Act being 8 Anne c. 19, by which the author was protected for 14 years). Under the former it has been decided in England that a *bona fide* abridgment of a book is a new work, and however it may injure the sale of the original, that it does not violate C.; and in the case of Kearsley *v.* Carey, Lord Ellenborough held that a variance in form and manner was a variance in substance. But in all abridgments, histories, chronologies, dictionaries, and the like, it must be left to a jury to determine whether a publication complained of is a *servile* copy and *imitation*, meant to surpersede another, or an original work on the same subject. No one but the author or his assignee has the right to print or publish *original* notes or additions to an old work, though there be no C. in the main work (Carey *v.* Longman, 1 E. R. 358). All translations are C.

An alien author may obtain a British C. by *first* publishing his work in England. This was so decided by Lord Chief Justice Campbell (Boosey *v.* Jeffrey), who thereby reversed the previous L. of C. as declared by the superior courts in the case of Boosey *v.* Purday. It has been decided by the House of Lords (Jeffrey *v.* Boosey) that a foreigner has C. in a work composed and published in England, though he has only been resident in England for a day. C. has been considered by the common law as a right vested in an author or artist. But the duration, modification, and mode of assignment of the right became regulated by the statute 5 and 6 Vict. c. 45. After the passing of the Act, 1st July, 1842, it was provided that in every book published in the lifetime of the author, he and his assignee shall have C. for the term of the author's life, and for seven years after his death; or, if these seven years expire before the end of forty-two years from the date of publication, then for forty-two years. Thus, for any book published since the Act took effect, the C. subsists either for forty-two years certain, or during the author's life, and seven years after his death.

Regarding books published before the Act came into force, and of which the C. then existed, provisions are made by which the benefits of the Act may be secured by the author or his personal representative, or by the proprietor of the C. The C. of a book published after the death of the author is to last for forty-two years from the time of publication, and to belong to the proprietor of the manuscript from which it is first published and his assignee. To prevent the suppression of any book of importance, the Judicial Committee of the Privy Council may, on complaint, license a work to be republished, on such conditions as it may think proper.

The C. in articles in encyclopædias, reviews, magazines, and in periodicals and serial works, is vested in the proprietors who shall have *employed* and *paid* persons to write them; but the right to republish articles published first in periodical works reverts to the author after twenty-eight years, to continue for the remainder of the term given by the Act. During the twenty-eight years the publisher of the periodical has not the right to publish the article separately, without the consent of the author or of his assignee.

A perfect copy of the whole of every book, and of every subsequent edition, with additions or alterations, is to be delivered within one calendar month after publication to the British Museum, and within a month of demand (if made in writing within twelve months of publication) to the officer of the Stationers' Company for the following libraries: the Bodleian, the public Library of Cambridge, the Advocates' Library of Edinburgh, and that of Trinity College, Dublin, or the publishers may send the copies direct to these libraries. Non-compliance with this provision renders the party liable to a penalty of £5. The copy sent to the British Museum must be of the best set issued; those for the other libraries may be of any set. The Commissioners in 1878 recommended the abolition of the gift of books to the libraries save the British Museum.

A book of registry is to be kept at Stationers' Hall; the book to be open to the inspection of all, on payment of one shilling for every entry which shall be searched for or inspected, and a certificate of the same to be given by the clerk, when required, on payment of five shillings; this certificate to be received in all courts as *prima facie* proof of the proprietorship or C. of the work. No one except the proprietor of the C. is allowed to import into the British dominions any copy of the work reprinted abroad, under the penalty of £10, and double the value of every copy imported. C. is declared to be personal property and capable of bequest, and is assignable by a written instrument not under seal. The Act extends to every part of the British dominions.

International Copyright.—The International Copyright Act, 1886, the Berne Convention of 5th September, 1887, and the Order in Council of 28th November, 1887, provide for the protection of foreign authors of the Union in the British dominions, and of British authors in foreign countries which formed the Union, consisting of France, Germany, Belgium, Italy, Spain, Switzerland, Luxembourg, Tunis, Hayti, and Monaco. An Act (51st Congress, Sess. II. c. 345, 1891) came into operation on 1st July, 1891, in the United States of America, which enables foreigners to acquire copyright on certain conditions as to printing. Degeneration of publishing business in America and loss to American authors, both arising from the flooding of the Continent with the best literature of the United Kingdom obtained for nothing, induced the Americans to grant the power of copyright, which had been for so many years sought for by the British author and publisher. The Act is only reciprocal, and this point is left to the President to determine. He has proclaimed that the United Kingdom, France, Belgium, Switzerland, and Germany, fall within the purview of the Act.

Copyright in Lectures, Letters, and the Drama.—The author or assignee of any lecture has the sole right of delivery, printing, or publishing it. Printers or publishers of newspapers publishing lectures without leave are subject to penalties; but the Act does not protect lectures delivered in any university, public school, college, or on any foundation, or by any individual, in virtue of, or according to, any gift, endowment, or foundation. The copyright of a private letter is in the composer and not in the receiver, though possibly the property of the paper, as paper, passes to the latter. The author of any play or opera has the sole right over the acting of it within the British dominions.

Engravings, Prints, Lithographs, Paintings, Drawings, and Photographs are all C. It is an infringement of C. to copy an engraving by photograph (Gambart *v.* Ball in Court of Common Pleas, 1863), and a photograph taken of the original matter may be protected by copyright, yet, if it be, another photograph taken of the original matter does not infringe the copyright, so far as the owner of the former photograph is concerned (Graves's case, L. R. 4 Q. B. 723). The property of designs, prints, and engravings is for twenty-eight years from the date of publication.

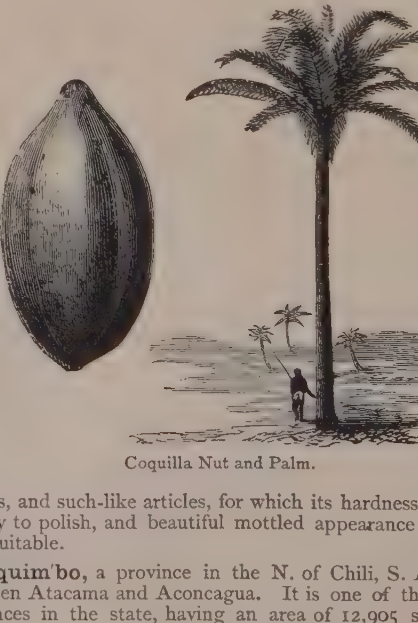
Designs in the Manufacturing Arts are protected by the Patents, Designs, and Trade Marks Act, 1883, by which C. is given to any original design for the ornamenting of any article of manufacture. The term of protection, which formerly varied, is now fixed at five years, though the registration is of no effect unless the design be used in this country within six months of its registration.

Prerogative Copyright.—The C. of certain works is said to be exclusively vested in the crown. The most important of these are the Bible, the Book of Common Prayer, the statutes, the almanacs and the Latin grammar. This right of the crown is also said to be founded on grounds of public policy. The committee of the House of Commons has recommended that the exclusive privilege of publishing the Bible held under letters patent by the Universities of Oxford and Cambridge and the Queen's printer should not be renewed when it expired, so far as the last named was concerned, a short time since. The House, however, *did* nothing, and the crown renewed the patent.

The principle on which the court interferes, by issuing an injunction to restrain the sale of copies of literary or other property under copyright, and by making an order to take an account of all such copies made and sold, being the protection of property, there must be a clear title in the party complaining, and the work must be of such a nature that damages might be recovered in a court of common law for pirating it; that is, the work must not be *immoral*, *blasphemous*, *libellous*, nor *seditious*; that is, it must not be so in its general tenor.

Coq'uerel, the name of two French Protestant pastors, who are likely to have considerable influence upon the destiny and doctrine of their Church. The elder, **Athanase Laurent Charles,** born at Paris, 27th August, 1795, became, after a course of education at Montauban, first, minister of the Reformed Church at Amsterdam, and subsequently (1830) at Paris. He was a singularly eloquent pulpit orator, but the expression of Rationalistic or Unitarian opinions led to the division in the Reformed Church which has not yet been healed, although what is known as the 'Orthodox party' is in the meantime in the ascendant. C., who had been a member of the Corps Législatif, but had not succeeded as a politician, died 10th January, 1868. A collection of his sermons was published in 8 vols. (1819-59). His son, **Athanase Josué,** known till his father's death as *C. fils*, was born at Amsterdam in 1820, and both as a theologian and as editor of various periodicals, particularly the *Nouvelle Revue de Théologie*, expressed opinions similar to those of his father. For his views on Renan's *Vie de Jésus*, he was suspended by the Paris Consistory in 1864. He was, however, enabled to resume preaching, and became the recognised head of the 'Liberal' section of the Reformed Church. He was equally well known as a lecturer, and as an active writer of sermons, theological treatises, and ecclesiastical pamphlets. C. died at Paris, 26th July, 1875.

Coquill'a Nuts, the seeds of *Attalea funifera*, a palm, the wood of which is now exported from S. America for the sake of being cut and polished into buttons, knobs of umbrellas, and such-like articles, for which its hardness, susceptibility to polish, and beautiful mottled appearance make it very suitable.



Coquilla Nut and Palm.

Coquim'bo, a province in the N. of Chili, S. America, between Atacama and Aconcagua. It is one of the largest provinces in the state, having an area of 12,905 sq. miles, and a pop. of 198,432. C. is richly metalliferous, especially in copper, but the soil is barren, and water is scarce, and little grain is produced, though fruit abounds—in particular, grapes and figs. The only rivers of note are the *Rio C.*, which forms at its mouth one of the best harbours in Chili, and the Choapa which divides C. from Aconcagua. The capital is Serena (q.v.). C. is also the name of a small town at the mouth of the Rio C., on a fine bay with secure anchorage and a good depth of water. It is the port of Serena, with which it is connected by railway, and has a pop. of 2116. In the neighbourhood are large copper-smelting works, and about 17,000 tons are exported annually, most of which goes to England. The chief imports are coal, coke, bricks and grain. The value of the imports is estimated at £508,475, that of the exports at £665,245.

Coqui'to, the Chilian name for a palm found in Chili, and the sole representative of its genus. It is one of the most southern American palms, existing in great abundance between latitudes 33° and 35°. The sweet syrup known in Chili as *Miel de Palma* (palm-honey), is made by boiling the sap of this palm to the consistence of treacle. One tree, if carefully drained by cutting off the crown of leaves, will yield, in the course of several months, before it is exhausted, ninety gallons. The nuts are used in the preparation of sweetmeats, and by boys as marbles, while the leaves, trunks, &c., are used for many of the purposes to which all palms are applied.

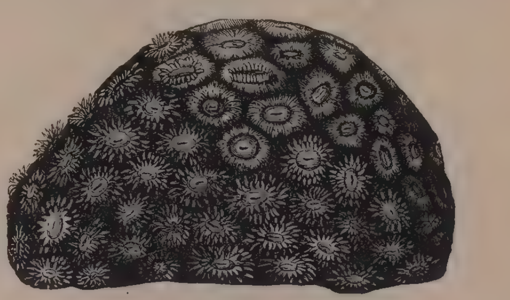
Co'ra, Co're, or **Co'ri,** a town of Central Italy, province of Roma, 30 miles S.E. of Rome, in a region producing wine and oil. It was an ancient possession of the Volscians, and one of the most important cities of Latium. On the hill on which it is built are still the interesting ruins of two temples, the one dedicated to Hercules, and the other to Castor and Pollux. Pop. 6379.

Cor'acle, or **Currach** (Wel. *cwrwgl*, Gael. *curach*, Swed. *karf*, 'a yawl,' claiming affinity to Lat. *carabus*), a small oval row-boat, easily carried by one man, formed of a wicker-work or slender wooden frame covered with leather, hide, or other flexible waterproof material, used in S. Wales and elsewhere. The origin of the C. is unknown, but it is certain that this form of boat has come down to us from primeval times. Herodotus saw skin-clad boats on the Euphrates, and in Chesney's *Expedition to the Euphrates* mention is made that to this day the basket-work is sometimes, though rarely, covered with leather. The ancient Scandinavians are known to have made voyages of discovery in similar boats, and evidence of their use in Scotland is found in Bellenden's *Hystory and Chroniklis of Scotland*, which speaks of a fishing-boat called a 'currok' as 'ane bait of a bull hyd bound with na thing bot wandis.' Less than a century ago the C. was to be seen on the Spey. On the W. coast of Ireland, fishing is carried on in curraghs of a much larger size than usual. They consist of a light skeleton wooden frame, covered over with tarred canvas, measuring 20 feet long by 4 feet broad, and are capable of carrying four men, each of whom plies two short oars.

Cor'acoid Bones, so called from their supposed resemblance to a crow's beak (Gr. *korax*, 'a crow'), in reptiles and birds form the chief support of the shoulder-girdle and arm or fore-limb. In the monotremata or lowest mammals they also exist as distinct structures, but in all other mammalia as mere processes of the *Scapulæ* (q.v.) or shoulder-blades, under the name of *C. processes*. In most vertebrates below mammals, and in monotremata, the C. B. extend to and articulate with the *sternum* or breastbone directly. In birds they are the great support of the wing, and form, with the scapulæ, the cavity (*glenoid cavity*), or the head of the *humerus* or bone of the upper arm.

Cor'aïs, Adaman'tios, or **Diamant Coray,** as he wrote his name in French, the first Hellenist of his day, was born at Smyrna, 27th April, 1748. Having studied medicine, he settled in Paris in 1788. The French Revolution fired him with the idea of emancipating Greece from the Turkish yoke, and he set himself to inspire his countrymen with an emulation of the glory of their ancestors. He published annotated editions of many ancient Greek writers, and translated into modern Greek Beccaria's *Dei Delitti e delle Pene* (1802). C. died at Paris, 6th April, 1833. Two volumes of his correspondence were published at Athens in 1839.

Cor'al and **Coral Islands.** C., or *corallum*, is the name given to the hard structures developed in the tissues of *Actinozoa*, the highest class of Cœlenterate animals, and of which the Sea-Anemone (q.v.) or *Actinia* may be taken as the type. C. may be of two kinds, *sclerobasic* and *sclerodermic*. The latter is the more typical kind, and exists as an external covering, containing the polypes or animals that secrete it. This variety of C. structure is truly secreted within the tissues of the polypes, being formed by the *enderon* or inner layer of the ectoderm (the outer tissue of the body). Each polype thus manufactures a little cup of C., the wall of which is known as the *theca*, whilst internally the cavity bounded by the *theca* is divided into chambers or *loculi* by vertical partitions or *septa*. Sometimes horizontal partitions or *tabulæ* are developed, and others known as *dissepiments* may also exist. A sclerodermic C. may readily be known on looking at it, by noticing the separate little cups of C. structure, which the individuals of the C. colony fabricate. Of the sclerodermic corals, which are the chief *reef-building* forms, the madrepore, star-C., brain-C., organ-pipe C., &c., are familiar examples. The *sclerobasic* or second variety of C. structure exists *within* the organisms, and appears as a more or less *solid* central rod or axis, coated by the living polypes as by a bark. Of this kind the red C., mare's-tail C., sea-shrubs, &c., are good examples. The sclerobasic C. is secreted by the *outer* surface of the polypes and not *within* their bodies. It is thus named by Dana *foot-secretion*. The *outer* surface of the polypes that form the *sclerobasic* C. is in fact inverted and turned *inwards*, and hence the C. formed by the inverted outer surface comes to exist in the *centre* or *interior* of the living tissues. This C. forms branching, tree-like organisms, and from its nature bears little or no share in reef-building. No cups or separate C. structures for each of the polypes can be seen on inspecting a sclerobasic C. C. is not always, however, represented by such definite structures as denoted by the preceding remarks. Sometimes, as in *Alcyonaria*—of which *Alcyonium* is a good example—a sclerodermic corallum exists in the form of detached, tusiform, calcareous spicula or needle-like bodies, and the same may be said of the C. secretion of forms allied to our Sea-Anemones (q.v.). C. may also be of horny consistence, as in sea-shrubs, or partly horny and partly limy, as in mare's-tail C.


Coral Animals.

Corals require for their life two great conditions—a temperature of sea not less than 66° Fahr., and a depth not greater than from 15 to 30 fathoms. A belt of about 1800 miles on each side of the equator marks the zone of distribution of corals. The red C. is found in the Mediterranean Sea, in depths of from 25 to 50 feet and lower. It appears as a branching sclerobasic organism, each of the little polypes which comprise it having eight fringed tentacles. It is fished for by means of nets, and fetches high prices for its finer qualities. Its susceptibility of a high polish, its hardness, and red colour, are the chief characters which give red C. its high value.

No C. reefs exist on the W. African or American (N. of 30° N. lat.) coast, but on the Australian and E. African coasts, Red Sea, Persian Gulf, Indian Ocean, all Polynesia, W. Indies, and Florida, they occur in immense numbers. The theory of C. reefs put forward in 1845 by Darwin is that now universally accepted as explanatory of the erection of C. islands. A *fringing reef* is the first stage of erection, this reef fringing the shores of the land at a depth (15 to 30 fathoms) suitable for the polypes. If the land begins to sink or subside, the lower corals are carried out of their depth and die, whilst those at the top build upwards at a rate corresponding to the subsidence. Thus a *barrier reef* is formed, which encloses a sheet or belt of water between it and the original land. If the barrier reef sinks in its turn, an *atoll* or *lagoon reef* (the perfect form of C. island) is produced—this latter appearing as a circular ring of C., enclosing a lake or lagoon which communicates with the outer sea by a break in the C. ring. Darwin's theory is thus wholly dependent on the phenomena of the subsidence of land; and his views have gradually and surely supplanted the old ideas that the C. polypes began at the bottom of the ocean and built upwards, since it has been shown that they can live in *limited* depths of sea only. A depth of 200 feet is about the maximum depth at which reef-building corals can live. Some C. reefs are of large size. The great barrier reef on the N.E. coast of Australia runs uninterruptedly for a length of more than 1000 miles, and other reefs and atolls are proportionately large. Different corals inhabit different parts of a reef. The foundation appears to be formed by star-C., which lives at about 6 fathoms depth. To this succeed brain-C. and pipe-C.; the upper parts and summit of the reef being formed by *Madrepore*, *Millepore*, and sea-shrub. The reader may with advantage consult Darwin's work on *C. Reefs*, and also James D. Dana's *Corals and Coral Islands*.

Branching Coral.

Cor'allin, a red colouring matter, first obtained in 1861 by the German chemists Kolbe and Schmitt, by heating phenol with sulphuric and oxalic acids, and now extensively prepared as a commercial product, under the names of *Aurin* or yellow C., and *Peonin* or red C. The constitution of these dyes is complex and slightly different. Aurin yields peonin on being heated with alcoholic ammonia. Yellow C. forms a stable lime-lake with excess of lime, and is employed largely by paperstainers. Red C. is much used for printing fabrics and dyeing wool, but the colour fades into yellow in contact with acids, unless an alkaline body be mixed with the dye. By the use of calcined magnesia in an alcoholic or aqueous solution of red C., a rich and durable Turkey red is obtained.

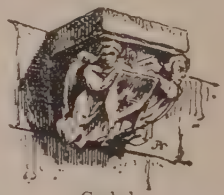
Cor'alline and **Coralline Crag.** The name *C.*, often erroneously supposed to denote *Coral* (q.v.), is now restricted, and applied in zoology to indicate various kinds of *Polyzoa*, or lower molluscan animals. Of these forms, the bull's-horn C., the snake-head C., the coat-of-mail C., the shepherd's-purse C., and the bird's-head C., are familiar examples. The C. C. is a deposit belonging to the Pliocene period, averaging from 20 to 50 feet in thickness, and deriving its name from the abundance of its fossil 'corallines' or Polyzoa (q.v.). This deposit is well developed in Suffolk, and of its polyzoa the genera *Cellepora*, *Theonoa*, and *Fascicularia* are familiar examples. Many marine molluscs (about 350 species) and echinoderms also occur in the C. C.

Coral Rag, a formation belonging to the middle Oolite or Juras series (*Mesozoic*) of rocks, and consisting of from 150 to 250 feet of limestone, lying above the Oxford clay. It derives its name from the number of fossil corals found in it, these fossils belonging to such genera as *Isastræa*, *Thamnastræa*, *Stylina*, and *Thecosmilia*. In Oxfordshire and Wiltshire this deposit may be typically seen. Abundant mollusca, echinoderms, and a few fish remains occur in the C. R.

Coral Sea is that portion of the S. Pacific included between Australia, New Guinea, the New Hebrides, and the 29th parallel of S. latitude. It derives its name from the coral reefs with which it abounds, and which, in the opinion of Dana (*Corals and Coral Islands*), indicate a subsidence of the land of more than 2000 feet.

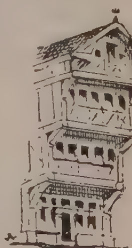
Cor Anglais, a species of bass oboe, not now used in the orchestra.

Cora'to, a town in the S. of Italy, province of Bari, 25 miles W. of Bari. It has some fine churches and convents, and a trade in wine, oil, and southern fruits. Pop. 33,258.


Corbel.

Cor'bel (Fr. *corbeille*, 'a basket'), in Gothic architecture, a projecting bracket, sometimes in the form of a basket, but often variously sculptured, which supports a superincumbent weight or receives the spring of an arch. A row of corbels supporting a battlement, parapet, or cornice is called a *C.-table*.

Corbelling, any construction which projects beyond the wall of a house and is supported by corbels or beams that rest upon the wall. The frontage of many Gothic houses affords examples of C. where each story projects beyond the one immediately below it; in this way the top stories almost reach across the street when it happens to be narrow.


Corbelling.

Cor'bie, Corby, or **Corbeau** (Lat. *corvus*, 'a raven'), in heraldry, bears its etymological meaning.

Corbie-Steps, or **Crow-Steps** (Fr. *corbeau*, Lat. *corvus*), in architecture, steps up the sides of a gable. This picturesque finish to the end wall, as it narrows along with the slope of the roof, is frequently to be met with in old houses, especially in Flanders, Holland, Germany, and Scotland. The popular notion is that the steps are meant for the crows. The top step is called the crow-stone.

Cor'chorus, a genus of plants of the lime-tree order (*Tiliaceæ*), containing between forty and fifty species, inhabitants of both hemispheres, but generally not found far from the tropics. *C. capsularis*, an annual Asiatic plant, and *C. olitorius*, a closely allied species, both much cultivated in India, yield the fibre so well known as Jute (q.v.), and the fibre used in making Gunny Bags (q.v.). *C. olitorius*—the *Corette potagère* of the French gardens, now naturalised in all parts of the tropics, and as far N. as the Mediterranean—is sometimes called the *Jew's mallow*, from being much cultivated for the sake of its tender shoots as a potherb by the Jews of Syria and the East generally. *C. capsularis* (sometimes also called *Chinese hemp*, owing to its being extensively cultivated in China) is used also for the same purpose. The leaves of *C. siliquosus* of the W. Indies and tropical America are used by the negroes in the former islands and by the inhabitants of the Isthmus of Panama for making an infused beverage called *te*, and, as the name would indicate, used as a substitute for tea.

Cor'dage, a nautical term applied to the running rigging of a ship, as distinguished from the standing rigging, and also to the store of ropes kept in reserve.

Cor'day d'Armans, Marie Anne Charlotte, born at St. Saturnin in 1768, the second daughter of a poor nobleman, passed much of her youth in a monastery at Caen. She studied Rousseau and Plutarch incessantly. Caen became a retreat for the Girondists when they were expelled from the Convention. Excited by their tales of blood, and by the murder of Colonel de Belzunce, C. took the resolution of striking a blow for the peace of her country, and, with an introduction from Barbaroux, went to Paris alone. After several days' watching, she was admitted to an audience with Marat, whom she killed by a stroke of her knife as he sat in his bath. She confessed, and justified her crime on grounds of patriotism, and died on the scaffold, with great courage and serenity, on 17th July, 1793.

Corde'liers ('wearers of the knotted cord') was the French name for the strictest branch of the Franciscans. The name received a new significance during the Revolution in 1790, when it was given to the club of Danton, Camille Desmoulins, Marat, and Hébert, which met in a Franciscan monastery.

Cord-Grass, a genus of grasses; of which one species, a native of the muddy salt marshes of the E. and S.E. coasts of England, is used for making ropes. Elsewhere it is rare.

Cor'dia, a genus of plants comprising nearly all of the *Cordiaceæ* (q.v.), and containing upwards of 180 species, mostly trees or shrubs. The fruits of *C. latifolia* and *C. Myxa* of India are succulent, mucilaginous, and emollient, and are accordingly eaten. Under the name of *Sebestens* or *Sebesten-plum* they have been employed in chest complaints as pectoral medicines, a use to which those of *C. Abyssinica* (Wanzey) are also applied in Abyssinia. Those of *C.* (*Varronia*) *rotundifolia* are used to fatten cattle. The bark of *C. Myxa* is used in India as a tonic, and for making astringent gargles. Its wood is said to have been that employed by the Egyptians to make their mummy-cases. That of *C. Rumphii* is brown veined with black, and smells of musk. From *C. Gerascanthus* is obtained the dark brown-veined and fine-grained timber known in commerce as Spanish elm, Prince wood, or *Bois de Chypre* of the W. Indies. Anacuhuite wood, imported a few years ago as a tonic, &c., is obtained from *C. Boissieri.*

Cordia'ceæ, a tribe or sub-order of *Boraginaceæ*, though sometimes described as a separate order of plants. There are about 200 species known, natives chiefly of the tropics of the Old and New Worlds, and distributed over about twelve genera, but most of these have been delegated to the genus *Cordia* (q.v.).

Cor'diceps, a genus of Fungi (q.v.) which grows on dead leaves, decaying branches, ergoted seeds, and upon the pupæ and larvæ of insects. *C. Robertsii* grows upon the caterpillars of a species of New Zealand *Hepialus*. One species attacks wasps in the W. Indies, and attains a considerable size before the insect dies. The Chinese sell *C. Sinensis* in little bundles, under the belief that it is a drug possessing medicinal properties. See ERGOT.

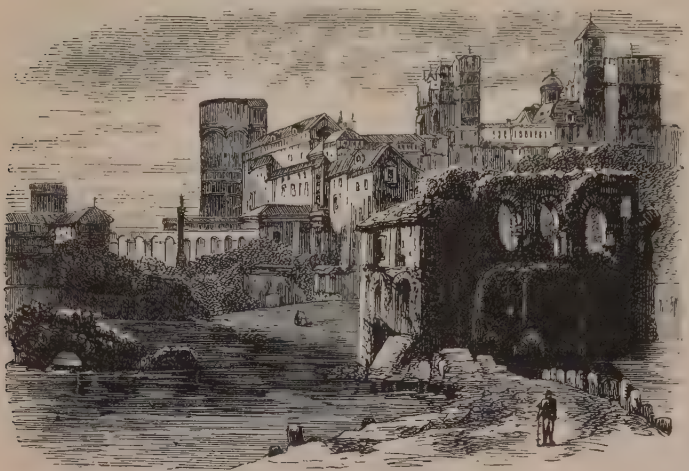
Cordille'ras, a word applied by the Spaniards of America to mountain chains, and formed from a root meaning a string or rope. The C. of S. America form part of the Andes (q.v.), and those of Central America extend from the Isthmus of Panama northward through Mexico to the borders of the United States.

Cordite, an explosive substance composed principally of gun-cotton and nitro-glycerine. It is, in fact, the explosive called 'Abel-Dewar,' granulated in a special way. C. is manufactured in the following manner:—Take equal weights of nitro-glycerine and dry gun-cotton; either add to the nitro-glycerine $\frac{1}{6}$th of its weight of acetic ether or acetone; mix, then add the gun-cotton, and, if there be room in the mixing vessel, some pulverulent substance; mix up well until the whole mass attains the consistency of a thick jelly; or reduce the gun-cotton to a jelly first and then add the nitro-glycerine and mix up as before stated. After this, the mass is thrust into a compressing machine, forced through a mould, and cut into the desired lengths. These pieces are converted into pliant threads by means of a machine consisting of a strong cylinder, fixed to a frame, in which a piston works and pushes the C. through a small orifice, of the size required, made for the purpose at the bottom of the cylinder. The threads so obtained are wound upon a bobbin and dried by placing the bobbin in a cylinder, surrounded by circulating warm water or vapour, where a continual current of air is kept up around it. When perfectly dry the C. is ready for the cartridge. In appearance and consistency C. resembles hoof-horn. Its density is 1·60, and it becomes inflammable before its temperature reaches 180°. C. may be smashed up by a hammer; but, after many blows, the part hit becomes alight. Neither a moist atmosphere, nor even water for a time, affects C. injuriously, and C. remains uninfluenced by a temperature ranging from 0° to 93° Centigrade.

Captain Sir A. Noble thus gives some of his experiences in reference to C.:—'With both C. and gun-cotton I have developed enormous pressure, close upon 100 tons per sq. inch (about 15,000 atmospheres), but the former explosive I have not succeeded in detonating, while gun-cotton can be detonated with the utmost ease. The erosive effect of C., if considered in the relation to the energy generated by the two explosives, is very slightly greater than that of brown prismatic; but very much higher effects can, if it be so desired, be obtained with C., and if the highest energy be demanded, the erosion will be proportionately greater. Erosion produced by ordinary gunpowder has the most singular effect on the metal of the gun, eating out large holes, and forming long rough grooves resembling a ploughed field in miniature; and these grooves have, moreover, the unpleasant habit of being very apt to develop into cracks; but with C. the erosion is of a very different character. The eddy holes and long grooves are absent, and the erosion appears to consist of a simple washing away of the surface of the steel barrel.'—See *Nature*, 26th July, 1894.

Cor'doba, or **Cor'dova,** the capital of the province of C. (pop. 420,728; area 5190 sq. miles), Spain, on the right bank of the Guadalquivir, which is here crossed by a Moorish bridge of fifteen arches, 65 miles N.E. of Seville. Its wall, also Moorish, is pierced by thirteen gates, of which that named *Puente* consists of a fine arch supported by four Doric pillars. There are numerous large squares, and many of the houses possess marble porches, and have sparkling fountains in their courts. The streets, however, are narrow and filthy. The cathedral, originally a mosque, and occupying the site of a Roman temple of Janus, is the finest in Spain, and is famous for its 'forest' of marble, jasper, and porphyry pillars, of which there are still 850. The bishop's palace, now degraded into stables, the churches of San Hipolito, of Santa Marina, of San Salvador, with some monastic buildings, are the other most remarkable structures. The manufactures, once important, have much fallen off. They consist of paper, silk-stuffs, hats, silver-work, and the leather known from C. as *Cordovan*. Since the opening of the railway, however, to Seville and Cadiz, the commerce of the city has begun to increase. Pop. 55,614. C. was founded by the Consul Marcellus (B.C. 152). Under the Romans it was the greatest and most flourishing city in Spain, and the seat of the supreme tribunal for Bætica. In the 6th c. it became the see of a Visigothic bishop, and from 716 was the capital of the

Moslem power in the Peninsula. It reached the height of its prosperity in the time of the Caliphs Abd-ur-Rahman III. and IV., when it is said (doubtless with exaggeration) to have been upwards of 20 miles in circumference, to have had 200,000 houses, and 1,000,000 inhabitants. At that time it possessed a famous Moslem university, 80 public schools, a library of 600,000 vols., 600 mosques, 900 public baths, and many splendid palaces. Its greatness gradually declined after its conquest by Ferdinand III. of Castile in 1236. The Senecas, father and son, Lucan the poet, and Averroes were all natives of C.


Prison of the Inquisition, Cordoba.

Cor'doba, or **Cor'dova**, the capital of the province of C., Argentine Republic, lies in a beautiful valley on the Primero, an affluent of the Paraña. It has a cathedral, a trade in hides and wool, and was long the residence of a bishop. Pop. 67,200. The *province* of C., in the heart of the republic, has an area of 54,000 sq. miles; pop. 377,200. It abounds in excellent pasturage, and cattle and sheep are reared in great numbers.

Cor'don (Fr. *cordon*, 'a line, a girdle'), in military language is a line of troops drawn round a town or district, sufficient to prevent ingress or egress, if requisite. If the sentries so placed are intended as a precaution against some contagious disease, they are called a *C. sanitaire*. In fortification, the term means the coping of the escarp or inner wall of a ditch, which is usually rounded in front, and projects about a foot over the masonry.

Cor'dovan, or **Cordoban**, Spanish leather, or cordwain, made of goatskins tanned and dressed, and used in the finer kinds of boot and shoe making, as well as in bookbinding. It was originally manufactured by the Moors at Cordoba, hence the name. The same fact explains why shoemakers are called *cordwainers*.

Core'a (called by the natives *Ch'ao Hsien*, by the Chinese *Kaoli*, whence the Japanese *Korai*, the origin of our form, *Corea*), a kingdom of Eastern Asia, under the suzerainty of China, bounded N. by Manchuria, E. by the Sea of Japan, S. by the Strait of Corea, and W. by the Yellow Sea, and a neutral uninhabited mountainous district, separating it on the N.W. from the Chinese districts of Shing-king and Liaotong. It is peninsular in form, and has numerous groups of islands belonging to it in the Yellow Sea and the Strait of Corea, of which the largest is Quelpaert. Area estimated at 81,901 sq. miles; and population at 8,758,937. C. is divided into eight provinces; its capital is Seoul (pop. 248,000). A mountain chain traverses the peninsula through its entire length, covered in part with dense forests, and fairly fertile, especially on its western slope, which is well watered. The rivers, from the conformation of the land, are small, the chief of them being the P'ing Jang and the Han. The climate is excessively hot in summer and cold in winter, and the rainfall is excessive. Agriculture is not in an advanced condition; but the S. produces in abundance wheat, cotton, rice, millet, and hemp, and barley is grown in the N. The rice, which forms the principal food of the inhabitants, is inferior to that of Japan. Paper and ginseng are exchanged with the Chinese. The former manufacture is important, paper entering into the construction of hats, umbrellas, clothing, &c. Corean sabres and poniards are much prized in Eastern Asia, the natives being skilled workers in metals.

In 1892 (the last returns) the export trade was estimated at $3,296,490, of which $852,721 represented gold in the rough; and the imports were understood to be $4,598,485, although that is probably half, as commerce proceeds all along the coast, of which no return is made.

The monarchy is an hereditary despotism, similar to that of China. Li-Hi, who succeeded in 1864, is now King of C. There are two chief offices of state, the Home and the Foreign, by which the affairs of the kingdom are carried on, subject to the control of the Crown.

The Coreans are of the Turanian stock, and speak a polysyllabic language of great purity, but becoming gradually corrupted by an infusion of Chinese words. The Chinese character is generally used in writing. The religion resembles that of China, but there are numerous Buddhists. C. studiously prohibited intercourse with other nations, with the exception of the Chinese and Japanese, till 1882, when treaties of intercourse were signed between C., Germany, America, and Great Britain. The intercourse with the Chinese had been limited to the annual embassy, and to periodical fairs at the 'Gate-town,' near Fêng-hwang, in Manchuria, while the Japanese were allowed to trade only at the single port of Futschan. In 1592 Christianity was introduced into C. through Christian converts from Japan. These, both princes and people, were enrolled in the army which Fidejosi, Tycoon of Japan, sent to chastise China. He thus got rid of his Christian subjects without incurring the odium of doing so by persecution, but his expedition was a failure. C. was taken and lay at the feet of the Japanese conquerors, but these could effect nothing against China, and a treaty of peace was signed in 1615 by which China gave up to Japan a small island which the latter occupied for 260 years. Ever since then C. has suffered from repeated Japanese invasions, but this was the last serious one until the recent inroad in 1894, the result of the assassination of a *protégé* of the Japanese with the connivance of the King of C. C. fell an easy prey to the invaders, and the country was held by them until the treaty was signed between the two empires of China and Japan, which guaranteed the autonomy of C. Jesuit missionaries established themselves in 1784; some French missionaries obtained a footing in 1835, and continued to proselytise with much success till 1866, when nine of them were massacred. A French retaliatory invasion, and two American expeditions, did not succeed in removing the opposition of the Coreans to intercourse with outside nations. See Williamson's *Journeys in N. China* (1870), and R. S. Gundry's *China and her Neighbours* (London 1895).

Coreg'onus, a genus of Teleostean fishes, included in the Salmon family (*Salmonidæ*), and distinguished by the height and forward position of the first dorsal fin. The scales are large, the teeth very small or rudimentary. The *pollan* (*C. Pollan*), occurring in Irish loughs, such as Loughs Derg, Erne, and Neagh, is an example of this genus; so are the *powan* of Loch Lomond and Lochmaben, and the *gwyniad* of Welsh and Cumberland lakes. These fishes frequently get the names of 'fresh-water herrings' and 'herring salmon.' The white fish of N. America is the *C. albus*.

Corell'i, Arcangelo, an Italian musician, was born at

Fusignano in 1653, educated under Simonelli and Bassani, travelled much through Europe, where he himself and his compositions were everywhere popular, and settled in Rome in 1681. He died 18th January, 1713. C. has been justly called the father of instrumental music; his trios, for violins and bass, with organ accompaniment, although written just two centuries ago, are as fresh and bright as if composed yesterday, and are probably even more familiar to violin-players now than they were in the time of their composer.

Corentyn', a river of S. America, dividing Dutch from British Guiana, rises in the Tumuchamac Mountains, which form the southern boundary of the country, flows in a general northerly direction, and after a course, with at least five formidable cataracts, of 300 miles, falls into the Atlantic 120 miles E.S.E. of Georgetown. Its estuary at its mouth is 25 miles broad. The C. is navigable for boats to where it is joined by the Cabalaba, 150 miles from the sea.

Coreop'sis (Gr. 'maiden's eye'), a genus of American Herbaceous plants, belonging to the order *Compositæ*, containing several species. The flowers of *C. verticillata*, a shrubby perennial species, are used in N. America to dye cloth red.

Corfe Castle (the *Corfes-geat* of the *Chronicle*, in allusion to the 'gate' or 'gap' in the ridge that runs along the peninsula), a village in the 'isle' of Purbeck, Dorsetshire, 24 miles E.S.E. of Dorchester. There are quarries of Purbeck marble in the vicinity, where also immense quantities of potter's clay are dug for the Staffordshire potteries. From the reign of Elizabeth to the Reform Bill of 1832 it sent two members to Parliament. The village grew up round the ancient castle, which seems to have been founded in the 10th c., though it is not entered in the Survey of William I. Here Edward the Martyr was murdered in 979, and King John starved to death twenty-two of Arthur's supporters in 1202. Here also Henry of Montfort was imprisoned in 1275. Lady Bankes in 1642 held the castle for six weeks against the forces of the Parliament, and Fairfax dismantled it in 1645. Pop. reg. sub-dist. 2289; civ. par. 1708.

Cor'fu (anc. *Corcyra*), the most northerly of the Ionian islands, is about 40 miles long, with a breadth varying from 3 or 4 to about 18 miles. Area of the nomarchy of C., which embraces the islands of C., Orthonus, Erikusi, Salmastraki, Pazo, and adjacent islets, is estimated at 431 sq. miles; pop. at 118,730. It is rocky and mountainous—one peak, Pandokratora, rising more than 3000 feet above the sea. The valleys and level tracts are fertile, yielding oil, wine, fruit, honey, and some corn. More than half of the island is covered with olive groves. Salt produced from the marshes communicating with the sea, and oil, are the chief articles of export. The *town* of C. is finely situated on an elevation overlooking a safe and spacious bay on the E. side of the island. It is the seat of a Greek and of a Roman Catholic archbishop, has considerable ship-building, and a large trade. Pop. 21,670. The University of Corfu was suppressed in 1864, when the Septinsular Republic was annexed to Greece.

Coriander.

Corian'der, an annual plant of the natural order *Umbelliferæ*, is a native of Southern Europe and the Levant, and cultivated in this and other countries. The seeds or fruits are carminative and aromatic, and are accordingly used for flavouring curries and spirits, and in making comfits, &c.

Coriar'ia, a genus of shrubs, by some considered the type of a separate order (*Coriariaceæ*), consisting of eight species. It is most nearly allied to *Ochnaceæ* (q.v.), but its affinities are by no means well understood. They are natives of the S. of Europe, Chili, Peru, New Zealand, and one is found in Nepal. The fruits of the latter species, as well as those of *C. sarmentosa* of New Zealand, are eaten, but the genus generally is regarded with suspicion, the seeds of *C. sarmentosa* (the 'wine-berry' shrub) being poisonous, though the pericarp of the fruit is wholesome. An agreeable 'wine' is made from it, which tastes like that made from elderberries. The seeds, however, cause convulsions and delirium, which often end fatally. Sheep are frequently poisoned by eating the plant. The fruit of *C. myrtifolia*, a European species, is said to have proved fatal to some French soldiers who partook of it in Catalonia. The leaves have been used to adulterate senna, and have caused tetanic convulsions in those who have partaken of the adulterated drug. They owe their poisonous properties to a glucoside called *coriamyrtine*. C. is also used in dyeing black.

Coriglia'no (anc. *Coriolanum*), a town of Italy, province of Cosenza, overlooking the Gulf of Taranto, from which it is about 4 miles distant. It has a citadel, custom house, hospital, and several churches and convents, and a trade in wine, oranges, olives, and lemons. Pop. 13,878.

Corin'ga, a seaport and town of British India, province of Madras, district of Godavari, at the mouth of the river C., a branch of the Godavari, and 290 miles N.N.E. of Madras. Its harbour is one of the finest on the coast. The inhabitants are principally engaged in the building and repairing of coasting vessels. Pop. 4397, of whom 4255 are Hindus. The trade has been declining for many years, and the ship-building business, which was the chief employment of the inhabitants, has almost disappeared except for the small native craft. A bar has formed at the entrance to the port. Tidal waves have twice destroyed the place, and a hurricane in 1839 caused great loss of life and property.

Corinn'a, a Greek poetess, a native of Tanagra in Bœotia, flourished about the beginning of the 5th c. B.C., and was a contemporary of Pindar, from whom she wrested at least one victory at the public games at Thebes. Her poems, chiefly lyrical, were composed in the Æolic dialect. They were collected in five books, but only a few fragments remain, which may be found in Bergk's *Lyrici Poetæ Græci* (Leipz. 1843). Statues were erected to her in several towns of Greece. She is often spoken of under the surname of *Muia* ('the fly').

Cor'inth (originally *Ephyra*), one of the most famous cities of ancient Greece, stood at the S.W. extremity of the isthmus which connected Hellas with the Peloponnesus. Its citadel, the Acrocorinthus, an isolated rock 1886 feet high, together with the walls which connected the city with its port, enabled C. to command the three passes which led from the isthmus to the Peloponnesus. The city, lying at the base of this natural fortress, and between two important seas, soon became a great commercial centre. The earliest established fact in the history of C. is its conquest by the Dorians led by Aletes, who with his descendants exercised regal sway for twelve generations. The Bacchiad oligarchy succeeded, under whom the city began to enlarge its commerce with the West, establishing colonies in Corcyra and Syracuse; but after lasting ninety years, this oligarchy was overthrown by Cypselus, aided by the general body of the populace, B.C. 657, and a democratic 'tyranny' followed and lasted for seventy-seven years, during which C. rapidly prospered. Under Cypselus and his son Periander (B.C. 625-585) it formed a chain of trading stations on the coasts of Ætolia, Acarnania, Epirus, and Myria, and spread its authority over the whole western sea; while by its colony of Potidæa in Thrace, and its alliances with the Greek towns of Asia Minor and with the kings of Lydia and Egypt, it established its influence in the East. On the expulsion of Periander's son a moderately aristocratic system was again introduced, and C. became a member of the Peloponnesian league under the leadership of Sparta, and as such took part in the great Peloponnesian War. Becoming jealous of the growing power of Sparta, C. united (B.C. 395) with other Grecian states against it, and in the 'Corinthian War' that followed (B.C. 394-387) suffered greatly. After the battle of Chæroneia (B.C. 338), C. was held by the Macedonian kings, but as a consequence of the battle of Cynoscephalæ (B.C. 197), obtained its freedom, entered the Achæan League, of which it became the centre, and was totally destroyed by Mummius, who carried to Rome its priceless works of art (B.C. 146). A century later it was rebuilt by Julius Cæsar, but during the Empire was merely the shadow of its former self. St. Paul founded here a church, to which he addressed two epistles. In A.D. 1458 it was captured by the Turks, who held it, with the exception of a few years when it was in the possession of Venice, till 1823. In 1858 it was destroyed by an earthquake, but it is now being rebuilt. It is in the nomarchy of Argolis and C., and has now a pop. of 4150.

Ancient C. was famous as a seat of art. Here painting is said to have been invented, and statuary, especially in works of bronze, reached especial excellence. Hence statuary metal was known as Corinthian brass. As a result of its wealth, and from its being a resort of traders and mariners, it acquired an evil fame for licentiousness.

The Gulf of Corinth, or Gulf of Lepanto (anc. *Corinthiacus Sinus*), an inlet of the Ionian Sea, 75 miles long, with an average breadth of 15 miles, extending eastward through the centre of Greece, which it almost divides into two parts, and forming the N. boundary of the Morea. It is separated from the Gulf of Egina by the Isthmus of C., which is in places not more than 5 miles broad. Nero attempted to unite the Ionian and Ægean seas by cutting through the isthmus, but he found the engineering difficulties insuperable. A canal has now been constructed through the isthmus and was opened for traffic in 1893. The length is about 4 miles.

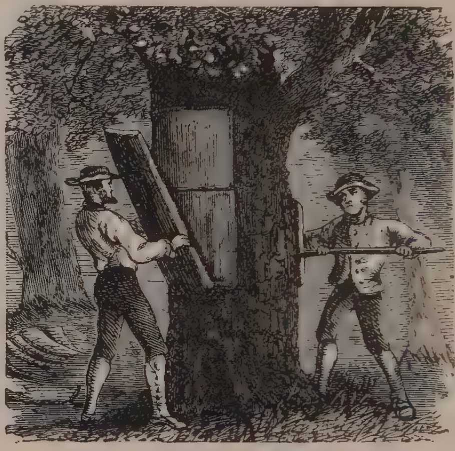
Corinth'ians, Epistles to the. Two were written by the Apostle Paul, as is commonly supposed, in A.D. 57-59, during the period in which, after leaving Corinth (Acts xviii. 18), he took up his residence at Ephesus (Acts xix. 1). The scope of the epistles is to 'rebuke party contentions and other fanatical disorders, incidentally defending Paul, as teacher of an all-embracing spiritual religion, in opposition to those who assailed his authority on carnal grounds.' It is also supposed, from 1 Cor. v. 9, that he had previously written to the Corinthians, but nothing further is known of the epistle. There is also an epistle to the C. by Clemens of Rome (q.v.).

Coriola'nus, Caius or **Cnæus Marcius,** was a legendary hero of early Rome, whose surname was conferred from the bravery with which 'he charged the Volscian home' at the capture of their chief city, Corioli. He was a proud and implacable enemy of the commons, and for having advised, during a famine, that corn should not be distributed to them unless the tribunes were discharged, he was condemned to exile. He joined the Volscii, and at the head of their army made successful war on Rome, and advanced to the Cluilian dyke. He turned a deaf ear to the entreaties of the citizens, till his mother Veturia and his wife Volumnia, accompanied by the noblest matrons of Rome, went to plead with him, when he withdrew his army. He died in exile. The date of the legend is B.C. 490.

Corium.

Corium, leathern body armour which was frequently made to resemble in appearance scale armour. Roman soldiers wore it, as may be seen from Trajan's column, and the Saxons also are represented on the Bayeux tapestry as protecting their bodies with a kind of C., which continued in use even as late as the Middle Ages. See also article SKIN.

Cork (Span. *corcho*, from the Lat. *cortex*) is the outer bark of a species of oak (*Quercus suber*), a native of Southern Europe and of Northern Africa, and specially abundant in Portugal, Spain, the South of France, and the islands of Sardinia and Corsica. The cork-tree grows from 30 to 40 feet high, measures 2 or 3 feet in diameter, and surpasses all other trees in the remarkable development of soft cellular tissue in its bark, which thereby possesses a degree of compressibility and elasticity that renders it peculiarly fitted for many common uses. The C., of which the great mass of the bark is composed, is systematically removed every six or ten years—an operation which, singularly enough, promotes a hardier and more vigorous growth of the tree, and leads to the production of C. of a finer and closer texture. The first crop, taken when the tree is from fifteen to twenty years old, is of an inferior quality, being cracked, woody, and hard, and suitable for making floats for fishermen's nets or for rustic garden-work. The usual mode of barking is to make two longitudinal cuts on opposite sides of the tree, under the main branches, and then a number of tranverse incisions, which admit of the C. being removed in semi-cylindrical pieces not less than 1¼ inch thick, with the aid of a curved implement. While incising the C., great care is taken not to injure the inner bark. The detached pieces are soaked in water and flattened by heavy weights, and to give a closer texture the C. is slightly charred on the surface over a fire. The imperviousness of C. to liquids, and its compressibility and elasticity, render it extremely suitable for stoppers to bottles and for bungs to barrels, &c.; its other uses are mainly as inside soles for boots, hat frames, life-preservers, false limbs, mattresses, and the construction of lifeboats. With caoutchouc it constitutes the kind of floorcloth called Kamptulicon, and C. chips when burned form *Spanish black*. In Spain, walls are lined with C. to overcome dampness. In the Maritime Exposition held in Paris in 1875, a novelty in the shape of 'C. leather' was exhibited. It simply consisted of thin sheet-C. covered on both sides with linen, and its suitability, as advocated by its inventor, De Berski, for tent-coverings and military accoutrements has been tested. Corks for bottles are mainly made by hand, being cut into the cylindrical or tapering shape from small square blocks by means of a broad-bladed knife, very thin and fine-edged. Cork-cutting is an important industry in many Spanish and French districts, and the corks manufactured in these countries excel those of English make. Cork-cutting is a most wasteful process, the clippings and trimmings constituting 70 per cent. by weight. A use has recently been found for this waste, as experiments at Bordeaux have demonstrated that good illuminating gas may be obtained from it on distillation in close retorts.



Cork Tree.—Cutting bark.

Cork, Korker, or **Korkalett,** a name applied in the

Highlands of Scotland and in Shetland to a Lichen (q.v.), *Lecanora tartarea*, which, according to Lindsay, is made into a domestic dye 'by macerating the powdered lichen for some weeks in putrid wine, with the addition of kelp or salt, and when the requisite crimson or purple tint is obtained, forming the paste into balls or lumps with lime or burnt shells, and hanging it in bags to dry. When used, it is powdered, and then boiled in water with a little alum' (Berkeley).

Cork, a city in the S. of Ireland, province of Munster, and capital of the county of the same name, built partly on an island on the Lee, and partly on the N. and S. banks of the river, is distant from Dublin 165 miles by the Great Southern and Western Railway. The site was originally a swamp, and known as *Corcach-mor-Mumhan*, 'the great marsh of Munster,' and C. is still called *Corcach* by the Irish-speaking population. The city has spacious streets, handsome public buildings and bridges, a public park, a fine cemetery (after the plan of Père-la-Chaise), and the Mardyke, a splendid promenade, a mile long, and shaded on each side by a double row of noble elms. Among the principal buildings are St. Anne Shandon's Church, with a tower 170 feet high, Queen's College, the Chamber of Commerce, Corn Exchange, Customhouse, County Club, &c. The harbour of C. is distinguished into the upper and lower, the former of which has quays extending nearly 5 miles, and can accommodate vessels of 600 tons. The lower harbour, formed by the estuary of the Lee, is one of the safest and most capacious in the empire. It contains several islands, on the largest of which, Great Island, is the town of Cove, now Queenstown (q.v.). The other islands are occupied by convict and ordnance depots, powder magazines, and a bomb-proof artillery barrack. A considerable shipping trade is done at the port, and steamers ply regularly thence to London, Dublin, Bristol, Liverpool, and Glasgow. The principal manufactures are leather, iron, glass, gloves, malt liquors, and whisky. C. exports grain, live stock, linen, butter, and bacon. It returns two members to Parliament. The city dates from about the year 600, when St. Barr or Finbarr founded an abbey here. It was long held by the Danes, received an English garrison and governor in 1172, but was twice recovered by the Irish before the close of the century, when it finally came under English authority. It was faithful to Elizabeth during the insurrection of Desmond, was taken by Cromwell, and again by William III.; and since then has not been the scene of any important historical incident. C. is the birthplace of many notable men—the painters Barry, Butts, and Maclise, the sculptor Hogan, the antiquary Wood, and the travellers Hastie, Murphy, O'Leary, &c. Charles Parnell represented C., but after his death, at the bye-election in November, 1891, an Anti-Parnellite was returned. Pop. 75,345.

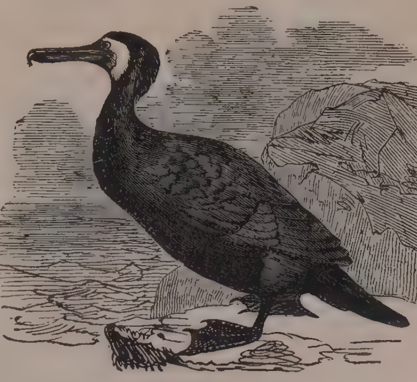
Cork, a maritime county in the province of Munster, and the largest in Ireland, having an area of 1,838,921 acres, of which 228,992 are under tillage, 169,726 under meadow and clover, 988,396 under pasture, 29,870 under plantation, 25,220 under turf bog, 68,900 under marsh, and 245,988 under barren mountain. It is bounded N. by Limerick, E. by Tipperary and Waterford, S. by St. George's Channel, and W. by Kerry; has an extreme length of 110 miles, and a breadth of 70. The W. part is rugged and mountainous; the S. and E. extremely fertile. The coast, bold and rocky, has numerous indentations, which furnish excellent harbours and roadsteads; and many islands lie along it, of which Cape Clear is reckoned the most southerly point in Ireland. The Bandon, Lee, and Blackwater, the principal rivers, flow eastward in parallel courses, separated by offshoots from the mountain range in the W; there are several lakes, but of no great size. The climate, though moist, is mild and salubrious. The soils vary much; dairy farming is carried on extensively, and the butter of C. is of superior excellence. The cattle are small, but yield milk in abundance. The principal minerals are coal, occupying an area of 400 sq. miles, in the N.W. of the county, iron, copper, manganese, limestone, and brick clay. The copper-mines are the most valuable in Ireland. The principal manufacture is linen; there are also numerous distilleries and breweries, and fishing is carried on to a considerable extent. The antiquities of the county are stone circles, cromlechs, raths, caves, and religious houses. There are also some remains of those strong fortresses and towers by which the English overawed the natives in olden times; but perhaps the place of most pleasant and abiding interest to a stranger is Blarney Castle, the ancient seat of the M'Carthys, and famous for its 'stone,' whose virtues are deliciously described in Father Prout's *Groves of Blarney*. Pop. 438,432 (including city of C.). The county of C. contains seven parl. divisions, each of which returns one member:—N. C. 49,248; N. E. C. 49,873; Mid. C. 49,462; E. C. 49,700; W. C. 48,623; S. C. 47,215; and S. E. C. 47,030. Of the above number of pop. of the whole county and city of C. 396,174 are of the Roman Catholic religion.

Corleo'ne, an old town of Sicily, province of Palermo, on a hill near the source of the Belici, 20 miles S.E. of Alcamo. Convents and churches are the principal public buildings. Pop. 16,391.

Corm is a fleshy underground stem, distinguished from a bulb by not being scaly, but only covered with thin membranes. It may be described as a bulb in which the scales are all solidified into one mass, or it may be regarded as 'a much shortened rhizome, consisting of a few undeveloped internodes.' Examples are afforded by the crocus, arum, tulip, &c.

Cor'menin, Louis Marie de la Haye, Vicomte de, a French statesman and jurist, was born at Paris, 6th January, 1788. He acquired very considerable influence during the reign of Louis Philippe by his knowledge of jurisprudence, and the strong common sense which he brought to bear upon the work of practical administration. After the Revolution of 1848, C., who was an advocate of universal suffrage, was made president of the commission which was appointed to remodel the constitution. Subsequently to the *coup d'état* he was made a member of the Council of State and also of the Institute. He wrote many pamphlets, and is the author of a work on the administrative law of France (*Droit Administratif*) which has been very popular. C. died at Paris, 6th May, 1868.

Cor'morant, a genus of Natatorial birds, belonging to the family *Totipalmatæ*, in which the hinder-toe is directed inwards, and united to the innermost of the three front toes by a web or membrane. The skin of the throat in the C. is distensible. The nail of the middle toe is serrated. The bill is compressed and rounded above, the upper mandible being strongly hooked at its tips. The nostrils are of linear shape. These birds are widely distributed throughout the world, the common C., and the green C., or Shag, being found in Britain. The common C. has black plumage, the feathers of the head and neck being whitish. It is about 33 inches long, and is a bird of powerful flight, and exceedingly voracious, feeding on fishes, which it catches with great dexterity, often throwing the prey into the air and catching it in



Common Cormorant.

its bill so as to swallow it in a convenient manner. The green C. is of a green colour, and the fishing-C., an inhabitant of China, is trained to catch fish for its masters. The brown C. is found off the coast of Sumatra. It is a very beautiful bird, and its sky-blue eyes give it a remarkable appearance when seen at close quarters. The name, which means 'sea-crow,' is partly of Latin, and partly of Celtic origin, *cor* being the Lat. *corvus*, and *mor* the Welsh and Armoric for 'sea,' allied to the Lat. *mare* and the Ger. *meer*.

Corn (Ger. *korn*, Goth. *kaurn*, allied to the Lat. *granum*), a term applicable to any grain, but usually applied to the seeds of Cereals (q.v.), used in making bread. In different countries it has, however, specific meanings, chiefly determined by the more prevalent use of the grain to which it is applied—*e.g.*, in America, by 'C.' is universally understood Indian-C. or maize, while in Scotland oats, and in England wheat, are more generally understood when the term C. is used. In the Bible it is usually applied to wheat—*e.g.*, when Joseph's brethren went down into Egypt 'to buy C.' Broom-C. is *Sorghum Dora;* Kafir-C., probably *Sorghum saccharatum;* goose-C., *Juncus squarrosus;* Guinea-C., *Sorghum vulgare*, a name applied in the West Indies to several species of *panicum*-bearing edible grain, &c.

Corna'ceæ, the Cornel or Dogwood order, a family of Dicotyledonous trees or shrubs, rarely herbs, natives of temperate Europe, Asia, and America, containing in all about forty species and new genera. The order is remarkable for its tonic, febrifuge, and astringent properties. The bark of 'dogwood bark' and other species of C., is esteemed in the United States and Canada as a substitute for Cinchona (q.v.), and contains a similar principle, called *cornine*. The astringent fruit of the Cornelian cherry is known to the Turks as *krania*, who use the juice in their sherbets, and for other purposes in which an agreeable acid flavour is valued. The fruits of *C. suecica* are eaten, and also possess tonic properties. The seeds of *C. sanguinea* yield a fixed oil burnt in lamps. Charcoal is prepared from the wood, though the 'dogwood' from which most of the charcoal of the gunpowder-makers is made is *Rhammes Frangula* (Buckthorn, q.v.). *Cornus Nuttalii* of N.W. America is a very handsome shrub. There are numerous other minor uses to which the species of C. are applied. See *Cornus*, in *Treas. of Botany*, and Blackie in *Canadian Naturalist*.

Corn Aphis, a species of aphides or plantlice, so named from its habit of feeding on the ears of corn, wheat, and barley, and of thus destroying the grain. The male of this insect is of a dull-green colour, the female of a yellowish hue.

Corna'ro, the name of a distinguished patrician family of Venice, members of which were more or less notable for four centuries.—**Marco C.,** celebrated for his eloquence, was elected Doge in 1368, and completed the conquest of Candia. His great-granddaughter, **Caterina C.,** born in 1454, married Jacques Lusignan, King of Cyprus, and after the death of her husband handed over the government of the island to her countrymen, and withdrew into private life. She died in 1510. But perhaps the most singular member of the family was **Lodovico C.,** born in 1467. He had so impaired a naturally feeble constitution by excess, that at forty death seemed inevitable. But by entirely changing his course of life, and adopting a regimen of rigid temperance and of judiciously-regulated exercise, he lived till about 100, dying in 1566 or 1569. When very old he published, in four successive parts, his *Discorsi della Vita Sobria* (Pad. 1558; Ven. 1866), which has been translated into many languages, and even into Latin. An English translation was published in 1779. Other Cornari who merit notice are **Giovanni I.,** Doge of Venice from 1625 to 1629; **Lucrezia Elena C. Piscopia** (died 1684), famous for her knowledge of classics, theology, and philosophy, and whose writings were edited by Bacchini (Parm. 1688); and **Giovanni II.,** elected Doge in 1709.

Corn Beetle, a genus of Beetles or Coleoptera (q.v.) of small size, the larvæ of which feed on wheat and other kinds of grain, and consequently do much harm in granaries.

Cornbrash, a group of rock formations belonging to the Bath or Lower Oolitic series, and averaging in Dorsetshire about 40 or 50 feet in thickness, whilst in Mid-England it is never more than 15 feet thick. It is a rubbly iron or ferruginous limestone, and lies in thin beds. It is full of fossils, the *Avicula echinata* (Lamellibranchiata) and *Nucleolites clunicularis* (Echinoderm) being the most typical forms.

Corn Bruiser, a machine for bruising oats and other grain for horses, cattle, sheep, and pigs, consisting of an iron frame, underneath which encased is a fluted barrel, the edges of whose grooves are sharp. These, when turned, press the corn against a resisting iron surface, and speedily bruise it to any form desired.

Corneille', Pierre, the first great dramatist of France, was the son of an inspector of waters and forests, and was born at Rouen, 6th June, 1606. He was educated by the Jesuits, and began business at the local bar. An incident in his own life suggested to him the plot of his first comedy, *Mélite*, which he wrote in 1625, and brought out in Paris when he came there, deserting the bar, in 1629. *Mélite*, and the plays which immediately followed it, such as *Clitandre*, *La Veuve*, &c., had a great run at both the Marais and the Hôtel de Bourgogne. They were marked by simplicity and neatness of style, impossible ingenuity of plot, and complete absence of humour, but they formed a pleasing contrast to the pedantic conceits of Scudéry and Viaud, and the rough melodrama which Hardy, Mairet, Tristan, Rotrou, and others manufactured, chiefly from Spanish materials. With some of the latter C. for a time co-operated at Richelieu's Palais-Cardinal, but quarrelling with his patron, he withdrew, and in 1635 produced his first tragedy, *Médée*, which was followed in 1636 by his masterpiece, *Le Cid*, founded on De Castro's play *Las Mocedades del Cid*. In Spain, however, the story of Campeador's love and conquests had taken the form of an historico-romantic pageant. C. treated the subject with originality, preserving unity of action, and fixing the interest on the moral struggles of the principal actors. Its success was immense; *beau comme le Cid* becoming a popular proverb. Next came *Horace* (founded on Livy's story of the Horatii), *Cinna* (which develops Seneca's brief account of the conspiracy against Augustus by the grandson of Pompey A.D. 4), and *Polyeucte*, a story of Christian conversion in Armenia during the persecution of Decius. In *Pompée*, C. has followed and improved upon a portion of the *Pharsalia* of Lucanus; while *Le Menteur* (1642), the most successful of his comedies, was based upon the plays of Lope de Vega and Alarcon, from the former of whom C.'s *Don Sanche d'Aragon* (1650) was also imitated. C. has been called the father of French tragedy, but his genius was very unequal, and among his later tragedies, *Œdipe* (1659) was the only striking success. His translation of the *Imitation of Christ* of À Kempis was much used by the Jesuits of the 17th c. C. died, after a peaceful domestic life, on the 1st October, 1684. The most interesting edition of C. is that by Voltaire (Par. 1762); the most complete, those by Renouard (Par. 1817), Lefèvre (Par. 1824), Didot (Par. 1854-55), and Taschereau (Par. 1857-62).

Corne'lius, Peter von, founder of a German school of art, was born 16th September, 1787, at Düsseldorf, of the picture gallery of which his father was inspector. He was carefully educated in art, and at the age of nineteen was employed to paint the cupola of the old church of Neuss with colossal figures in chiaroscuro, in which he displayed considerable grandeur of conception. In 1810 he removed to Frankfurt, where he executed a famous series of designs in illustration of Goethe's *Faust*, and in 1811 went to Rome, where, in alliance with his friends Overbeck, Schadow, Schnorr, and others, he devoted himself to the regeneration of German art, an object which he saw accomplished in his own day, and in great part through his own instrumentality. The young artists specially cultivated fresco-painting, and C.'s frescoes, the 'Interpretation of the Dream' and the 'Recognition of the Brethren,' from the history of Joseph, won for him the favour of King Ludwig of Bavaria, and a commission to decorate the Glyptothek at Munich. He left Rome in 1819, but his frescoes in the Glyptothek were not completed till 1830. They consist mainly of two series of designs—one, 'The Heroes,' illustrating the chief events of the Iliad; the other, 'The Gods,' the subjects for which were supplied by the Greek mythology. A 'Last Judgment' in the *Ludwigs Kirche*, Munich, 64 feet high and 30 wide, is remarkable at once for its size, its grandeur of conception, and the severity of its style. Other works are his designs in illustration of the *Nibelungenlied*, and the *Gerusalemme Liberata* of Tasso, the frescoes in the corridors of the Pinakothek, Munich, illustrating the history of Christian art, and those of the Campo Santo, Berlin. His later years were spent chiefly in Berlin, where he died, 6th March, 1867.

Cor'nell Univer'sity, one of the most vigorous of the newly endowed colleges of the United States, was founded by Ezra Cornell in 1868, at a cost of about £152,000. It also received Government grants as a state agricultural college, amounting to 990,000 acres of land. C. U. is situated in Ithaca, a small town in the western part of New York state. The institution is undenominational, and aims at being *national*. The students to some extent combine industrial pursuits with study. Goldwin Smith, a brilliant English scholar and political critic, expatriated himself to become the Professor of History here, which post he resigned in 1871, when he was appointed a member of the Senate of the University of Toronto.—**Ezra Cornell,** founder of the university, was born at Westchester, New York, 11th January, 1807, and received but a slender education—a circumstance which adds to the greatness of his generosity. Devoting himself to mechanical pursuits, he eventually became deeply interested in telegraph stock and Western land speculations, and acquired a large fortune. C. died 1874. His son was elected governor of New York in 1879.

Cor'net, or **Cornet-a-Piston,** a brass wind instrument (with three pistons or valves) of the trumpet class. It is much used in military bands, and to some extent also in the orchestra, where it can generally play the trumpet parts.

Cornet (from the Span. *corneta*, 'a standard') was formerly the lowest rank of commissioned officer in the cavalry, equivalent to *ensign* in the infantry. The special duty of the C. was to carry the standard. He also assisted the captain in his daily military duties. The rank was abolished in 1871, that of sub-lieutenant taking its place.

Corne'to, a fortified town of Italy, province of Roma, on the left bank of the Marta, 4 miles from its mouth, and 11 N. of Civita Vecchia. It is built from the neighbouring ruins of the ancient Tarquinii—a place peculiarly interesting to the ethnological and antiquarian student, as the source of almost all our knowledge of Etruscan life and art. From its tombs many treasures have been removed to the British Museum. C. is the seat of a bishop, and has a Gothic cathedral of the 9th c., and a palace of the 15th c., now an inn. Pop. 6323.

Corn-Fly, a name applied generally to various flies or *Diptera*, from their habit of producing in the larval state much disease and injury in corn plants. The *Chlorops tæniopus* is a familiar example. It is of minute size, and coloured yellow with black stripes. The larvæ deposited in the young plants cause the swelling popularly known as the *gout*. The species of the genus *Oscinis* are also named 'corn-flies.'

Corn Ground-Beetle, a Pentamerous Coleopteran or beetle, the larvæ of which burrow in the ground and feed on the roots and stems of corn. The perfect insect is about half an inch in length, and is of a black colour. The beetle itself lives on the ears of corn, barley, &c. The larvæ is white with a brown head and chest, and possesses tufts of hair along the sides of the abdomen.

Cor'nice (Gr. *koronis*, 'a curved line,' 'a flourish'), in classical architecture, the uppermost of the three members of an entablature—the architrave, the frieze, and the C. It is a horizontal moulded projection, and is characteristically distinguishable in each of the orders. In Gothic architecture, a plain face of parapet projecting slightly from the wall, with under it a row of blocks, sometimes plain, at other times variously ornamented, over which there is usually a row of small arches, frequently serves as a C. In the Decorated style, it chiefly consists of a slope above, then a deep sunk hollow, with beneath it an Astragal (q.v.). Several small mouldings often compose the C. in the Perpendicular style; but details of ornamentation exercised largely the fancy and ingenuity of workmen in all these later styles.

Corn-Laws. The early English statutes relating to the corn trade took the shape of general prohibitions to export except under royal licence, special prohibitions to export by royal proclamation, prohibitions to import or export, except as above, at certain prices. An Act of 1670 prohibited importation while home-corn was selling at less than 53s. 4d., and imposed a duty on the imports at a higher figure. A bounty was given during the 18th c. to the exporter, but in 1773 this was discontinued, exportation was prohibited except at prices below 44s., and importation was allowed above 48s. at a fixed duty of 6d. The figure at which importation was allowed was gradually raised to 80s. for wheat, 40s. for barley, and 26s. for oats; and in 1814 the sliding scale, in which the duties diminished as the price of importation rose, was introduced. The intention of this arrangement was the benevolent one of making the pressure of taxation lightest when corn was least plentiful. The result was to destroy the regularity of trade, and to make the people's food the subject of speculative and often ruinous contracts. The sliding scale not only hurt the import trade more than a fixed duty would have done, but it seriously affected domestic agriculture and manufactures. From 1821 to 1830 the annual average of British exports fell from forty-one to thirty-six millions. In 1840 agricultural wages simply meant starvation; in some districts estates were given up by the owners to the parish, because the poor-rates exceeded the rents. The system of protecting home agriculture was supported by many absurd arguments, inspired partly by the recollections of the French war, partly by the stupidity and selfishness of the landlord class. These arguments are still employed in the United States and in the Colonies; but although so late as 1852 Disraeli declined to admit that the repeal of the C.-L. was 'wise, just, or beneficial,' they have been generally abandoned in this country. In truth, the interests of the landlord class happened to be the same as those of the great mass of the nation. The rise of rents has been caused by the growth of manufactures, which implies a vast additional demand for agricultural produce. Manufactures have further enormously increased the value of land by introducing a spirit of improvement, and stimulating mechanical invention. By protection, therefore, the landlords were destroying their own customers, and latterly also their own labourers. In 1834 and 1838 Hume and Villiers made gallant efforts at least to secure inquiry into the evil. In 1841 Lord Melbourne's Government proposed, in lieu of the sliding scale, a fixed duty of 8s. per quarter on wheat, 4s. 6d. on barley, 3s. 6d. on oats. The ministry were defeated, and Peel came in pledged to protection. In 1842 he introduced the modified sliding scale of 1s. per quarter. In the meantime the majority against Villiers' annual motion for total repeal had sunk from 303 in 1842 to 132 in 1845. This was owing to the activity of the Anti-Corn-Law League, formed in 1839. It was only, however, under the pressure of the corn-famine and potato-disease of 1845 and 1846, which produced very great distress, that Sir Robert Peel was able to carry, on 25th June, 1846, his bill abolishing the corn-duties as at 1st February, 1849, and in the meantime fixing the duty of 10s. per quarter when the price was 48s., to fall by 1s. with every rise of 1s. in price, till on reaching 53s. it was fixed at 4s. All colonial grain was admitted at once at a duty of 1s. The Free-trade majority consisted of 112 Conservatives and 227 Liberals. Corn-taxes were, however, not finally abolished in 1846. There remained a duty of 1s. per quarter, which was intended by Sir Robert Peel as a registration duty, and was converted in 1863 by Mr. Gladstone into a duty of 3d. per cwt. Its importance will be seen from the following table of its produce:—

	1864.	1865.	1866.	1867.	1868.	1869.
Corn-meal and flour	£746,000	£562,000	£743,000	£797,000	£869,000	£897,000

It of course produced the largest revenue when the home harvest failed; it involved a collateral duty on arrow-root, potato-flour, sago, and other farinaceous substances, and it raised the price of home corn. Every one therefore applauded Lowe when he abolished it on 12th April, 1869, although in 1871 Disraeli, who had always opposed remissions of indirect taxation, denounced this measure as a wanton sacrifice of revenue. By statute 45 and 46 Vict. c. 37, which consolidated two former statutes, certain towns, to be named by an Order in Council from time to time, were ordered to supply weekly returns of the purchases of British corn within their town limits. Dealers and cornfactors in these towns are now bound to supply full information to the inspectors who collect the information—the penalty of £20 may be inflicted, should the party applied to refuse to inform. The Board of Trade, from these collected weekly particulars, publishes an average list which appears in the *London Gazette*. It may be explained that from 1834 to 1843 the average *Gazette* price of British wheat was 56s. 3d. (the highest being 70s. 8d. in 1839, the lowest 39s. 4d. in 1835); from 1844 to 1853 the average was 49s. 4d. (the highest being 69s. 9d. in 1847, the lowest 38s. 6d. in 1851); from 1854 to 1863 the average was 56s. 11d. (the highest being 74s. 8d. in 1855, the lowest 43s. 9d. in 1859); from 1864 to 1873 the average was 52s. 8d. (the highest being 64s. 5d. in 1867, the lowest 40s. 2d. in 1864).

The following table gives the prices per quarter of wheat, barley, and oats for 1874, 1879, 1884, 1889, and 1894:—

Year.	Wheat.		Barley.		Oats.	
	s.	d.	s.	d.	s.	d.
1874	55	9	44	11	28	10
1879	43	10	34	0	21	9
1884	35	8	30	8	20	3
1889	29	9	25	10	17	9
1894	22	10	24	6	17	1

We will now give a table showing the quantities of wheat and wheat-flour, barley, and oats imported into the United Kingdom at triennial periods from 1840 to 1870 inclusive, and in 1871, 1872, 1873, 1883, and 1893:—

	Wheat and Wheat-Flour.	Barley.	Oats.
	Cwts.	Cwts.	Cwts.
1840	10,560,290	2,333,707	1,487,024
1843	4,619,917	640,286	231,888
1846	10,195,930	1,324,432	2,170,682
1849	20,850,604	4,932,172	3,484,541
1852	18,092,627	2,234,071	2,720,539
1855	13,940,322	1,246,882	2,842,749
1858	23,200,941	5,933,543	5,104,773
1861	37,646,705	5,001,432	5,114,398
1864	28,837,203	4,921,362	5,562,959
1867	39,136,780	5,683,721	9,407,136
1870	36,906,115	7,217,327	10,830,630
1871	44,362,227	8,569,012	10,912,204
1872	47,612,896	15,046,566	11,537,325
1873	51,620,000	9,240,000	11,908,000
1883	85,074,000	16,460,000	15,138,000
1893	93,806,000	22,844,000	13,954,000

From these tables we perceive that, with the exception of the rise between the years 1854 and 1863, the average price of wheat has gradually declined since the first period mentioned (1834-43), when it stood at 56s. 3d. down to the year 1894, when it was gazetted at 22s. 10d. Nor is this decline to be wondered at, when the increase in the amount of wheat and wheat-flour imported is taken into consideration. In 1849, the year of the abolishment of the corn-duties, 20,850,604 cwts. were imported into the United Kingdom, and this was more than double the amount imported in 1846; but in 1873 the import had risen to 51,620,000 cwts., and in 1893 it reached the high figure of 93,806,000 cwts. It is true that the price has fallen to nearly a third of what it was in 1834-43; yet, low though it may be, the wheat and wheat-flour bill to be paid every year to the outside creditor is very large, and is one, moreover, which would seem likely to go on increasing. However, so long as the nation at large makes money enough to pay the bill without embarrassment, and so long as peace lasts, and the country is able to obtain the necessary supplies, every one, except those directly interested in agriculture, will be satisfied; but should war at any time put a stop to the import, and should the inhabitants of this country have to depend entirely upon British wheat, then they will probably discover the effects of the reduction, which has taken place in the wheat-producing acreage in consequence of the competition of foreign growers, to be more serious than they at present imagine. The whole question of the corn supply cannot fail to be a matter for grave reflection to any thoughtful citizen of these islands.

Corn-Moth, a species of moth belonging to the genus *Tinea*, which also includes the Clothes Moths (q.v.). Its larvæ is known as the 'C. worm,' and destroys grain stored in granaries. The moth itself is of a yellowish-white colour, the front wings being variegated with grey, brown, and black colours. The larvæ also attack books, pasteboard, and similar substances.

Corns are generally produced by tight boots or shoes, and consist of hard portions of the cuticle, the result of alternate pressure and freedom. They are generally described as *hard C.* and *soft C.* The latter are situated generally between the toes. C. are very painful, and are more easily prevented than cured. Boots and shoes should never be tight, but should always be large enough to contain the foot easy. For *hard C.* the best treatment is carefully to remove with a knife the hardened part of the skin, and then apply some substance which will dissolve the C., as glacial acetic acid. *Soft C.* are best treated with strong nitric acid.

Corn Salad, or **Lamb's Lettuce,** a genus of plants belonging to the natural order *Valerianaceæ*, common in Britain and on the continent of Europe. The common C. S. is often cultivated as a salad, more because it is in perfection early in spring, than because of its taste, which is insipid. The vineyard salad and the Italian C. S. are also similarly used on the Continent.

Corn Sawfly, a species of Sawflies (q.v.), the females of which, by means of their peculiar Ovipositors (q.v.), insert the eggs in or near the ears of wheat and other cereals. The larva consumes the substance of the grain, and passes its chrysalis stage in the stem. This fly is about half an inch long, and of a black colour, with yellow marks.

Corn Snake, occurring in N. America, between N. Carolina and Mexico. The body is long, the head narrow, and the tail small and tapering. The back is of a reddish-brown colour, and marked with reddish and dark brown spots; the sides are of a light brown, and the belly is silver-

Corn Snake.

white, with black marks of different sizes, but all of rectangular shape. The length varies from 4 to 6 feet. One of its least agreeable characteristics is a habit of making its way into, and of concealing itself in, dwelling-houses.

Cornstone is an arenaceous limestone, in which, however, there is a predominance of calcareous matter. It is a grade in the passage from calcareous sandstone to a good limestone, and its weathered surfaces are frequently of a dark brown colour, due to the presence of peroxide of iron.

Corn Thrips, a genus of insects variously regarded as belonging to the *Orthoptera* (q.v.), and included in a special group, *Physopoda*. The C. T. does great injury to wheat crops, both by eating the ears and stems of the plants. The tarsi consist of two joints, and the foot is sucker-like. The colour is black. The males are wingless; the females have four wings.

Cornuco'pia (Lat. *cornu*, 'horn,' and *copia*, 'plenty'), in classical mythology, the horn of the goat Amalthea, who suckled the infant Jove, and which he afterwards through gratitude raised to be a star, is now referred to as the emblem of fruitfulness and abundance. In architecture and heraldry the word denotes an ornament representing a horn, from which issue flowers, fruits, corn, &c. The C. is frequently found on ancient coins, especially those of Sicily.

Corn'wall, an English county, forming the S.W. extremity of Great Britain, bounded on all sides by the sea, except on the E., where it is separated from Devonshire by the Tamar. In form it somewhat resembles a right-angled triangle. On the side stretching from N.E. to S.W. are numerous shallow bays, of which the principal is that of St. Ives, while Trevose Head is the most commanding promontory. The S. coast has much deeper indentations and bolder promontories. Among the former are the harbours of Plymouth and Falmouth and Mount's Bay, and among the latter are Lizard Point and Land's End, off which are the Scilly Isles (q.v.). Through the centre of the county from N.E. to S.W. extends the S.W. continuation of the Devonian range of hills, forming the principal watershed, and from which the land slopes seaward on each side. The grey granite occurring in this range is rapidly decomposed when exposed to the air, and has formed valuable beds of kaolin, or porcelain clay, largely used in the manufacture of the finer kinds of ware. The old red sandstone strata occupy about three-fourths of C. The hills nowhere rise much above 1300 feet, and the rivers, numerous but short, are accessible to the tide, and their mouths form valuable harbours. The principal river, the Tamar, has a course of 56 miles. The climate is mild but variable, with frequent rain, from the almost insular situation of the county. The soil in the elevated districts is almost barren; on the coast and in the valleys it is comparatively fertile, but to produce abundantly it requires to be heavily manured. A favourite crop is potatoes, for raising which the soil is so well adapted that in some places two crops are produced in the year. In 1894 there were 603,121 acres under cultivation, and of these 128,800 were under corn crops; 50,086 under green crops; 176,253 under clover, grasses, &c.; 241,612 under permanent pasture; 1719 under small fruit; and 47 under nursery grounds. Mountain and heath occupied 40,265 acres; and woods and plantations covered 30,321. The principal corn crops are wheat, barley, and oats; green crops, turnips, mangold-wurzel, and potatoes. The fisheries of C. are of great extent and importance; the distinctive kinds of fish being mackerel and pilchard, the latter of which are exported in vast quantities, and the take is sometimes so great that they are sold for manure. But its mineral wealth is what mainly distinguishes the county, which abounds in iron, copper, lead, and tin ores.

C. is the *Cassiterides* ('tin islands') of the Phœnicians, who traded for tin with C. and the Scilly Isles, and probably formed the word from the Sanskrit *Kastîra*, much tin being found in the islands off the coasts of India (Lassen, in Ritter's *Erdkunde*). At the time of the Roman invasion, C. was inhabited by the *Damnonii* and *Cornabii*, from the latter of whom its name was Latinised into *Cornubia*. The English invaders called the people *Corn-wealhas* ('the strangers of the "Corn" or "horn" (Wel. *Kernou*) of the island'), whence the modern C. The county is rich in British and Roman antiquities, stone-circles, sepulchral tumuli, remains of camps, amphitheatres, &c.; and has, besides, some singular natural curiosities, of which the most notable are the Logan stones and Cheesewring. From its remote position, C. was naturally the last part of the S. of England to yield to the English, nor was it finally conquered by them till the reign of Æthelstan, in the 10th c. In 1329 C. was raised to a duchy, which is hereditary in the Princes of Wales. In the Wars of the Roses the Cornish men were Lancastrians; in the civil war they were Royalists. A Cymric dialect (see CYMRIC LANGUAGE AND LITERATURE) continued to be spoken down to the middle of the 18th c., and has given some words to the English tongue.

The area of C. is 868,208 acres. Pop. adm. and anc. county (each), 322,571; reg. county, 318,583. C. is divided into six parl. divisions, each of which returns one member: Mid, or St. Austell, 49,624; N.E., or Launceston, 48,084; N.W., or Camborne, 54,192; S.E., or Bodmin, 52,288; Truro, 50,742; and W., or St. Ives, 50,187.

Cornwall'is, Charles, Marquess, an English general and governor, son of the first Earl Cornwallis, was born 31st December, 1738, and was educated at Eton and Cambridge. After serving in the Seven Years' War, and holding several appointments, including that of Governor of the Tower of London, he was sent to the United States to command against the colonists in the War of Independence. He gained some successes over the American troops in 1780 and 1781, but was compelled to surrender, with all his troops, at York Town, in Virginia. Although this disaster precipitated the ruin of the British cause in America, C. was not censured when he returned to England, but, from 1786 to 1793, held the office of Governor-General in India and commander-in-chief of the troops there, signalising his term of office by crushing Tippoo Saib, and by a series of administrative reforms, which have conferred on him a still more lasting renown. To C. is owing the famous 'permanent settlement' of the land question in Bengal and Behar, by which the zemindars were invested with a permanent tenure of the land at a fixed and unalterable assessment. He also introduced great changes into the judicial system of the Bengal Presidency, confining the collector of revenue to his fiscal duties, and establishing a civil court in each district, with a judge, a registrar, and one or more 'covenanted' assistants. Returning to England, he was raised to the rank of marquess. The position he next obtained was that of Lord-Lieutenant of Ireland, and during his occupancy of it he succeeded in putting down the Irish Rebellion of 1798. After this he negotiated the Treaty of Amiens (1802) with France. Appointed a second time, in 1804, Governor-General of India, C. died at Ghazipore, in the division of Benares, in the same year (5th October). He was an able, honest, industrious ruler, and a general of superior capacity. See his *Correspondence*, by Ross (1859).

Corn Weevil, a genus of beetles belonging to the Tetramerous group of *Rhynchophora*, in which the tarsi are four-jointed, and the head prolonged to form a *rostrum* or beak. This beetle is about a quarter of an inch in length. It is of a dark-red colour. The front wings or wing-cases are alone present. The larva feeds on the corn grains, and the eggs deposited by the female insects are usually very numerous. The remedy for the attack of these insects is to frequently stir and shift the grain. The rice weevil feeds on rice; whilst the larva of C. W. of S. America lives in the stems of palms.

Coroll'a ('a little garland or crown'), the innermost or second floral envelope which in a perfect flower intervenes between the calyx and the stamens. In monocotyledons it is believed to be wanting, as well as frequently in the *Apetalæ* or *Monochlamydeæ* of Dicotyledons. The pieces of which it is made up are modified leaves, and are called petals. They may be either wholly or in part united (*Gamopetalous* or *Mono-*

petalous), or entirely separate from one another (*Dialypetalous, Polypetalous*). The shape of the C. has given rise to various descriptive terms, such as bell-shaped, salver-shaped, rosaceous, &c., and according as the petals are all of the same size, or of different sizes, *regular* or *irregular*. The C. may have also appendages in the form of *scales, spurs*, &c., or those vaguely-defined glandular or other appendages at the base called *nectaries*. Each petal consists of the *limb* or blade, and the *unguis* or claw, the former corresponding to the blade of a Leaf (q.v.), the latter to the petiole or stalk, and, like the petiole of a leaf, may be present or absent, long or short. The shape of the C. generally determines the form of the flower, and as it is usually the most brightly coloured part, the beauty of the flower is also to a great extent dependent on it. See CALYX and PERIANTH.

Coro'llary, in mathematics, is an immediate deduction from a demonstrated proposition, and many of Euclid's propositions might be proved as corollaries of some foregoing proposition.

Corolliflo'ræ, a subdivision of Dicotyledonous plants, in which the stamens are usually inserted (or seem to be inserted) in the corolla, and in which the Corolla (q.v.) is gamopetalous, and inserted below the ovary. The heaths, *Labiatæ*, &c., are examples.

Coroman'del, a peninsula and county in the N. island of New Zealand, 30 miles E. of the town of Auckland; pop. 2846. It is traversed by a rocky range of hills in which gold is found, and has been worked for a number of years. The yield is fluctuating, but has reached 16,000 oz., worth £50,000, in a year. Kapanga, the principal township, is a thriving little place.

Coromandel Coast (Ind. *Chola Mandalam, i.e.*, 'the land of Chola,' an ancient ruler of the region) is the name of the E. shore of the Indian peninsula, province of Madras, from Calymere (*Kalamari*) Point to the mouth of the Kistna, or from about lat. 10° 17′ to 15° 20′ N. The coast, from the shallowness of the water and the violence of the N.E. monsoon, is so dangerous that ships of any considerable size are obliged to anchor several miles from shore, and debarkation is effected by means of native boats.

Coro'na, or **Crown,** in botany, a rather indefinite term, usually applied to any appendage that intervenes between the corolla and the stamens, as the cup of a daffodil, or the rays of a passion-flower.

Corona, in classical architecture, the lower member, or drip, of the projecting part of the Cornice (q.v.). In the language of ecclesiastical writers, the apse of a church is called the C.—as 'Becket's Crown' in Canterbury; so also is a large circle containing tapers which depends from the roof of a church, or in some cases stands on the floor.

Corona Borea'lis, a northern constellation between Hercules and Bootes, with one bright star of the second magnitude.

Cor'onach, properly *Coranaich* (Gael. *Co-ranaich*, 'roaring or howling together'), a term now applied almost exclusively to a wild lament, consisting partly of inarticulate wailing, with which the Irish and the Scottish Highlanders gave expression to their sorrow for the death of a friend. It was chanted, like the Latin *ululatus*, over the dead body, but the custom is now abandoned. Among many races this custom has prevailed, and to this day the death of the father or mother of a Chinese family is announced to the neighbours by the wild and discordant howling of a party of mourners who are usually hired for the occasion.

Corona'tion. The ceremony of C., and the use of the crown as an emblem of sovereignty, are of great antiquity. From the Bible we learn that Solomon and Ahaziah were crowned. Among the Greeks a kind of crown was awarded to the victors in public games; and to citizens of especial merit, C., with substantial privileges, was a frequent reward of valour among the ancient Romans. In Westminster Abbey, against the altar screen, stand the two C.-chairs of the sovereigns of England. One, the king's chair, covers the 'Stone of Destiny,' carried off from Scone, in Scotland, by Edward I., in 1296. The other, the consort's chair, was constructed for the C. of Mary, wife of William III. Both are still used at coronations. In the Cottonian MSS. is a copy of the Gospels, believed to be that on which the Saxon kings were sworn. (See CROWN.) Consult *Chapters on Coronations* (Lond. 1838), and Bohn's *Cyclopædia of Political Knowledge*.

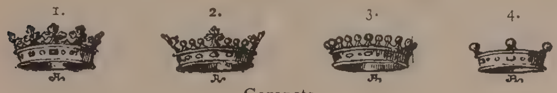
Coronation Gulf, an arm of sea, to the E. of Dease Strait, opening into the mainland of N. America, opposite Victoria Land. It is studded with small islands.

Coronation Oath. Previous to the Revolution of 1688 the form of this oath was variable. At least, if there was a regular form, it was liable to be tampered with, a copy of the oath taken by Henry VIII. being in the Cottonian MSS., with alterations in his own writing. The present form of C. O. was fixed by a statute of William and Mary (1 W. and M. c. 6), which form was afterwards altered to suit the terms of the Union between England and Scotland, and Great Britain and Ireland. The sovereign swears to 'maintain the laws of God, the true profession of the gospel, and the Protestant reformed religion established by law,' also to 'maintain and preserve inviolably the settlement of the united Church of England and Ireland, and the doctrine, worship, discipline, and government thereof, as by law established, within England and Ireland, and the territories thereunto belonging;' also to 'preserve to the bishops and clergy of England [and Ireland], and to the church [es] there committed to their charge, all such rights and privileges as do or shall appertain unto them.'

The security of the Church of Scotland is provided for by a passage in an Act of Parliament ratifying the Treaty of Union. It is thereby enacted that 'after the decease of her present Majesty (whom God long preserve), the sovereign succeeding to her in the royal government of this kingdom shall in all time coming (not at the coronation), *at his or her accession to the crown, swear and subscribe* that they shall maintain and preserve the foresaid settlement of the true Protestant religion, with the government, discipline, and worship of this Church, as above established,' that is, as established by Act 1 Will. and Mary, c. 5. The C. O. is to be regarded as the ratification by the sovereign of a compact with Parliament, the terms of which compact may be altered at the will of the contracting parties.

Cor'oner (lit. 'a *crown*-officer'). In England the C. is an officer possessing both judicial and ministerial authority. In his judicial capacity he holds inquisitions in cases of violent, unnatural, sudden (cause unknown) deaths, or where the deceased has died in prison, or where and how a statute requires an inquest, whether the cause of death sprang within his jurisdiction or not. It is part of his duty to inquire after and take care of treasure-trove, wreck of the sea, &c. The C. acts ministerially in the execution of writs of the crown when the sheriff is disqualified. Coroners are chosen for life for the county by the County Council under the Local Government Act of 1888; as franchise coroners by the Crown, Cinque Ports, Mayor and Commonalty of London, Dean and Chapter of Westminster, the Universities of Oxford and Cambridge, &c; as borough coroners by the council of a borough having a separate court of quarter sessions; and as deputy coroners by nomination of coroner and approval of Lord Chancellor, or by appointment of franchise coroner, or by certificate in writing (backed by mayor or two justices) of borough coroner when the appointment can be only temporary, and through necessity, but they are removable for incapacity or misbehaviour. The number for each county is not fixed. The Municipal Corporations Act of 1882, and the Local Government Act of 1888, are the principal statutes which deal with the appointment of the C., his jurisdiction, &c. The court of a C. is a *close court* for the purpose of the inquisition, and he may exclude any one who is present merely as a spectator or reporter, and, being a court of record, the coroner may commit for any contempt in his court, but he cannot, as a judge of a superior court can, commit for contempt outside his court; thus his power does not extend to cases of publication or writing of articles which reflect on his conduct as coroner. The C. may order the disinterment of a corpse. It is a misdemeanour to obstruct in any way (by burying, burning, or otherwise getting rid of the body) the holding of the inquest in due course, where such inquest is held to be necessary by the coroner. The office does not now exist in Scotland, but it is said to have existed.

Coronet, in heraldry, is an ornamental fillet of gold worn above the coats-of-arms of peers and peeresses. In a *duke's* C. (1), here shown, the circlet of gold is chased, and is surmounted by eight strawberry leaves. The C. of a *marquess* (2) has four strawberry leaves, separated by pearls. A *viscount's* C. (3) is a rim of gold surmounted by sixteen pearls, while a *baron's* C. (4) has only six or four pearls, and is otherwise plain. See *Art Dictionary*.



Coronets.

Cor'poral (Fr. *caporale*, Ital. *caporale*, from *capo* (Lat. *caput*), 'the head') is in the British army the rank immediately below that of a non-commissioned officer. The special function of the C. is to maintain discipline among the private soldiers in barracks or in camp. The pay of the C. is from 1s. 8d. to 2s. 8d. per day. He has an assistant called a lance-C., who receives no extra pay. In the navy there is a ship's-C., who is under the Master-at-Arms (q.v.).

Corporal (Lat. *corpus*, 'the body'), a linen cloth placed over the consecrated bread and wine after the celebration of the Lord's supper. In England the term is applied also to the linen cloth, or rather, according to old usage, two cloths, spread on the altar while the sacrament is being consecrated. This cloth is also called *palla*, *Chrismale*, *anti-mensia*, *sindon*, *thronus*.

Corpora'tion is a legally fictitious person or body politic, created by royal charter, under special or general Act of Parliament, or prescription. It holds its property, rights, and immunities in perpetuity. A C. or body corporate may be either *lay* or *ecclesiastical*. In an ecclesiastical C. the members are the holders of spiritual office; and the object of such corporations is mainly the holding of ecclesiastical property. *Lay* corporations are either civil or eleemosynary, the former are established for the government of towns, for public improvements, or for the advancement of commerce and learning. Eleemosynary corporations exist for the administration of funds devoted to charitable or educational purposes. Corporations are either *sole* or *aggregate*, that is, of one, or of more than one. The Queen or a bishop is a C. *sole*. Corporations *aggregate* are commonly the Mayor (q.v.) (in Scotland, the Provost, q.v.) and burgesses of a town, the head and fellows of a college, the dean and chapter of a cathedral church. A name is essential to every C. The powers usually bestowed on corporate bodies are,—to have by descent, election, or otherwise, perpetual succession, to sue and be sued in their corporate capacity, to purchase lands and have a common seal, to make bye-laws for the better government of the C. But they can make no bye-laws contrary to the laws of the country. A C. cannot commit felony or treason. It can only appear in legal proceedings by attorney or other officers authorised to act for it.

Under recent Acts of Parliament any society of persons having a legal purpose may acquire the character of a C. See BENEFIT FRIENDLY SOCIETIES, BUILDING (BENEFIT) SOCIETIES, JOINT-STOCK COMPANIES, PARTNERSHIP. See also MUNICIPALITY, BURGESS ROLL, TOWN COUNCIL.

Corps d'Armée, a term formerly confined to the organisation of the military forces of the more powerful nations of Continental Europe in times of peace. Each C. d'A., consisting usually of not less than 50,000 men, had the staff, artillery park, and all the equipments of a complete army. The term is now generally used, in England, as elsewhere, for the largest division of an army in the field, which is subdivided into brigades, and these into regiments and battalions.

Cor'pus Chris'ti, or **Benet College, Cambridge,** was founded in 1352 by the two united guilds of C. C. and of the Blessed Virgin, on the intercession of Duke Henry of Lancaster, an alderman of the guilds, who obtained a licence from King Edward III. to that effect. Archbishop Parker increased the endowments of the college, and left to it his manuscripts, including the only authentic manuscript copies of the Thirty-Nine Articles. There are now a master and twelve fellows, each of the fellowships being open to all subjects of the Queen. There are besides the following scholarships:—2 of £60 per annum, 1 of £40, 3 of £30, 3 of £25, 3 of £20, all being tenable by students of the college for one or two years; also 5 of £30—80, as entrance scholarships, and tenable for one or two years. In addition, there are 7 exhibitions, varying in value from £18 to £36 per annum. There now are 257 belonging to the college members of the Senate, 100 undergraduates, and 456 members on the boards. The patronage consists of 10 livings in Cambs, Dorset, Essex, Middlesex, and Norfolk.

Corpus Christi, Oxford, founded in 1516 by Richard Fox, Bishop of Winchester, was at first characterised by stringent discipline, and was the first foundation in which Greek was made imperative in an academic course. According to the provisions of the statutes of 1881 there should be a president, 28 fellows, and 36 scholars, but at present there are, besides the president, 15 fellows, and 28 scholars. The latter are competed for by candidates under 19 years of age, are of the annual value of £80, and are tenable for four or five years. There are also two exhibitions. The college now has 229 members of Convocation, 375 members on the books, and 91 undergraduates.

Cor'pus Chris'ti Fes'tival, a festival called in France the *Fête Dieu*, the most splendid in the Roman Catholic Church, was instituted by Pope Urban IV. in 1264 in honour of the consecrated host, and ordered to be kept on Thursday after the festival of the Trinity, otherwise called the Octave of Pentecost. Grand processions are its chief features.

Cor'pus Delic'ti, a Scotch criminal law-term denoting the leading fact specified in a criminal charge. Thus, if a person be charged with murder, it must be proved that there has been a murder, otherwise C. D. is not established.

Corr'ea, a genus of Rutaceous shrubs, natives of Southern and Eastern Australia, where they are known as 'native fuchsias.' The leaves of some of them are used as a substitute for tea.

Correction of the Press. The functionary of a printing establishment whose business is to detect and correct the errors of the compositor is called the 'Reader.' To be a good *reader* requires more natural aptitude and more practice than the uninitiated would expect. Besides the errors of the compositor, there are certain kinds of errors of the author which must be looked to—faulty spelling or punctuation, misquotation, &c. The form or scheme of a work, that is, the arrangement of chapters, paragraphs, notes, or tabular matter, is also more or less troublesome. After the reader's revision, the writer or author usually revises. An author should write his work as legibly as his skill in penmanship enables him to do. He should then revise and correct with the utmost care. In his *proof*, if he be particular regarding his composition, he will surely, despite his own care and that of the reader, find many blunders. If he wish to save expense, corrections should be made so as to cause as little derangement of space as possible. The author should revise a second proof, to see that the corrections made in the first have been carried out. There should be no fresh corrections in a second proof, if the author has been duly careful; but the fastidious writer will probably find that correction is an endless task.

Besides familiarity with typography, a good reader must have an eye to note each word and letter, while at the same time he takes in the meaning and connection of the whole. In printing a volume it is usual to correct one sheet at a time, but sometimes it is more convenient to take a proof on long slips before dividing into pages. Corrections are marked on the margin by established signs understood by all printers; but it is not necessary that the author should use these signs in correcting. He should mark the margin where a change or correction is to be made, write very legibly, and be careful to avoid confusion.

Correg′gio, an old town in the province of Reggio, N. Italy, in the Val de Molini, 12 miles to the S. of the Po, and 5 E. of Carpi. It has a fine cathedral and a rare old castle, was formerly a barony of the princely family of C., but is best known as the birthplace of the great colourist, Antonio Allegri, who hence derives his famous surname. Pop. 13,075.

Correg′gio, Anto′nio Alle′gri, derives his surname from Correggio, a town in Reggio, near which he was born in 1494. To this great painter history has been unkind. His career and condition in life were at first misrepresented and encrusted with unfounded tradition by his contemporary, Vasari; and recent investigation has but tended to overthrow traditionary evidence, without replacing it with much of verified fact. Vasari's narrative has been proved to be fabulous with respect to most of his statements, and all the traditionary matter in connection with the name of C., including the famous *Anch' io sono pittore* ('I also am a painter'), is now regarded as without foundation. The facts recently established concerning him are few. His father, Pellegrini Allegri, was a merchant of Correggio in good circumstances; his mother was Bernardina Piazzoli, of the Aromani family. C. commenced to paint in boyhood, but from whom he received tuition is unknown. He removed to Mantua in 1511, and there spent some time studying the works of Mantegna, an artist of fair ability. He returned to Correggio in 1514, and in that year he produced his first authenticated picture, 'The Madonna with St. Francis,' a work admirable in composition and expression. In 1518 he was invited to Parma, and there he painted the frescoes in the convent of San Paolo, and many pictures. He became heir to all his uncle's property in 1519, and in the same year married Girolama Mertini, who brought him a small dowry. After residing for a number of years in Parma, where his wife is supposed to have died about 1528, C. returned to his native town, and died there, 5th March, 1534, aged forty. His pictures are characterised by perfect chiaroscuro, luscious and splendid colour, and a bright and joyous grace of style. There seems to have been perpetual sunshine in his mind. His children, round and plump of limb, roguish in expression, and perfectly graceful and beautiful in drawing, are beyond criticism. The Carracci were overwhelmed and delighted with the loveliness of his Madonnas and his children, and studied his works to good purpose; while Titian is reported to have said if he 'were not Titian he should wish to be C.' In modern times Sir Joshua Reynolds studied him with a too slavish assiduity, and in the luminous eyes of his cherub faces we see the design and the expression of the old master. C. was the father of Reynolds' children. Among the great works of C. are the 'School of Love,' and the 'Ecce Homo,' in the National Gallery, London; the 'Madonna Enthroned,' 'La Notte,' the 'Holy Night,' and the 'Madonna in Glory,' in the Dresden Gallery; the 'Sleeping Venus,' and the 'Mystic Marriage of St. Catherine,' in the Louvre; the 'Vine Arbour,' the two 'Angelic Choirs,' and the 'Madonna della Seodilla,' or the 'Rest after the Flight into Egypt,' in Parma. See *A. A. la C.*, from the German of Julius Meyer, edited by Mrs. Heaton, and the splendid volume, *The Works of C. at Parma*, reproduced in photography from the engravings of Paolo Toschi, with biographical and descriptive notices by Louis Fagan, Prints Department, British Museum.

Correg′idor, the chief magistrate of a Spanish town, appointed by the king. In Portugal, the name is nearly synonymous with our *judge*, an administrator of justice.

Corrèze′, a mountainous department of Central France, part of the old province of Limousin, and traversed by the river C., from which it takes its name. It is in part richly wooded, though barren in the higher districts. Its rivers are the C., the Dordogne, and the Vezère. C. has considerable mineral riches, but the inhabitants are chiefly engaged in agriculture, the manufactures being almost confined to the making of firearms at Tulle. The department is divided into the arrondissements of Tulle, Brive, and Ussel. Area, 2265 sq. miles; pop. 328,119.

Corr′ib, Lough, a lake in the county of Galway, Ireland, next in size to Lough Neagh, being 27 miles long and from 2 to 6 broad, with an area of 68 sq. miles. C. is only a few feet elevated above the sea-level. It has numerous small islands, with some fine ruins; and its northern and western shores are remarkable for their beautiful scenery. Through subterranean channels it receives the waters of Lough Mask, and discharges its own superfluous waters into Galway Bay, 3 miles distant.

Corr′idor (Span. *corredor*, 'a runner,' from *correr*, Lat. *currere*, 'to run'), in architecture, a gallery, or open communication to the different apartments of a house or public building, each of which has a door opening into it. C. railway trains are now running on some of our principal lines, and are so called because the carriages are not shut off in compartments as others are, but have a passage through their entire length, which enables the passenger easily to proceed from his own to any other compartment, while the train is in motion.

Corrien′tes (Span. *corrientes*, Lat. *currentes*, 'currents, rapids'), the name of a province, and of its capital, in the Argentine Republic, S. America.—The *capital*, at the confluence of the rivers Paraña and Paraguay, is a well-built town, and possesses admirable facilities for inland and foreign commerce. It has a fine church (San Francisco), and a natural history museum, of which Bonpland (q.v.) was director from 1854 till his death. The harbour is good, and the town has an important trade in timber. Pop. 14,200.—The *province* embraces the northern portion of the peninsula formed by the rivers Paraña and Uruguay, the southern portion being occupied by the province of Entre Rios. The greater part of the surface is low and swampy, but the S. and E. are hilly. Cotton, tobacco, rice, sugar, indigo, maize, barley, arrowroot, sweet potatoes, and various tropical fruits are raised. Area, 54,000 sq. miles; pop. 291,325.

Corro′sive Sub′limate is a compound of chlorine and mercury or quicksilver, and is called by chemists bichloride of mercury, or mercuric chloride. C. S. is prepared by heating a mixture of 2½ parts of mercuric sulphate (obtained by the action of sulphuric acid on mercury) with 1 part of common salt in a subliming apparatus. C. S. rises in vapour, and condenses in needle-shaped crystals in the cool part of the vessel, whilst sulphate of soda remains. C. S. is a colourless crystalline body, much more readily soluble in boiling than in cold water; it dissolves also with ease in alcohol or ether. It differs from mercurous chloride or calomel, not only in chemical composition, but also in its physiological action, it being a most deadly poison, even if swallowed in small quantities. The best antidote is white of egg. C. S. is a preservative, and has been used in embalming.

Corr′ugated Iron is made by passing thin sheet-iron between revolving fluted rollers, so arranged that each projection upon one roller coincides with a hollow upon the other. The iron thus corrugated is dipped into a bath of molten zinc, and so covered with a thin coating of that metal, or, as it is called, galvanised. The corrugations add very greatly to the strength of the iron, and enable it to be used for walls and roofs in places where, as mere sheet-iron, it would be impossible to employ it. The zinc is used to prevent rust, which, if it be once allowed to commence, very rapidly eats away thin iron plates. A good coating of oil-paint, renewed at intervals, helps very much also to prevent the destruction of the iron from the same cause.

Corryvrech′an, or **Corrievrek′in** (Gael. 'Brecan's cauldron'), a strait between the islands of Scarba and Jura, Argyllshire, Scotland. The tides—running sometimes 13 miles an hour—round a pyramidal rock which rises with a rapid slope from a great depth to within a few fathoms of the surface, cause a whirlpool very dangerous to small vessels in stormy weather and at flood tide. The name was first applied to another whirlpool in the sound between Rathlin Island and the coast of Antrim, and was probably transferred to the Scotch locality by the monks of Iona. See Joyce's *Irish Names and Places*, Second Series, pp. 408-410 (Dubl. 1875).

Cor'sac, the name given to some species of dogs or *Canidæ*, the best known being the *Cynalopex C.*, found in Hindustan and in Central Asia. The body and head are fox-like, the ears long and pointed, the tail bushy, and the limbs slender. It is gregarious in habits, and lives in burrows, feeding on small mammals, birds, and even insects.

Cor'sair (Span. *corsario*, from the Lat. *cursor*, 'a runner,' *i.e.*, one who scours the sea), a term applied in the S. of Europe to a pirate or his ship from the N. of Africa. The corsairs of Barbary were privateers rather than pirates, being commissioned by their princes to prey upon the ships of countries with which they were at war.

Cor'sica ('the woody'), an island in the Mediterranean belonging to France, and forming the department of *Corse*; area, 3377 sq. miles; pop. 288,596. A mountain chain traverses the interior from N. to S., the culminating point of which, Monte Rotondo, has a height of 9068 feet. Other summits exceed 7000 feet, and for the greater part of the year they are covered with snow. C. is watered by numerous small streams, of which the chief are the Golo and the Tavignano. The mountains are extensively covered with forests of oak, pine, cork, larch, and chestnut, or afford excellent pasture. The valleys and plains yield the ordinary cereals in abundance, fruit is largely raised, and the less elevated slopes are clad with vines. Corsican wine has, however, never had a high character. One of the principal industries is fishing—tunny, pilchard, and sardines abounding along the coast. The mineral wealth of the island, which is considerable, has not been much developed. C. has many fine natural harbours on its W. coast. The capital is Ajaccio; Bastia, Calvi, Corte, and Sartene being next in importance. The Corsicans are in speech and character Italian. The Vendetta (q.v.) is one of the most notable of Corsican institutions.

The original inhabitants of the island were of the Ligurian stock. After the conquest of the seaboard by the Etruscans, a considerable trade was developed. At a later period the Carthaginians became masters of C., but were forced to surrender it to the Romans after the close of the first Punic War (3rd c. B.C.). Roman colonies were established here by Marius and Sulla, and under the Empire it was extremely prosperous, possessing thirty-three cities. It suffered severely from the devastations of the Vandals, and was successively subject to the Greeks, Goths, Longobards, Franks, and Saracens. About the 11th c. it passed under the dominion of the Pisans, and, after repeatedly changing its rulers, became a possession of France in 1768.

Corsican Moss, a name applied to a species of seaweed which has been used as a vermifuge, though it is dubious whether its virtues have not been over-estimated. According to Berkeley, *Laurencia obtusa*, another seaweed, forms the greater part of what is sold in the shops as C. M.

Cor'slet (Fr. *corselet*, dim. of *corps*, 'the body'), a cuirass, or leathern piece of defensive armour formerly worn by pikemen. It was considered pistol-proof. In entomology the term is applied to that part—otherwise called the *thorax*—of a winged insect's body to which the wings and legs are attached.

Cor'sned was a piece of bread, or sometimes cheese, used in early times in England in a form of trial by Ordeal (q.v.). Blackstone says it 'was consecrated with a form of exorcism, desiring of the Almighty that it might cause convulsions and paleness, and find no passage, if the man was really guilty, but might turn to health and nourishment if he was innocent.'

Cor'so (Ital. 'running' and 'racecourse,' from Lat. *cursus*), applied to the running of horses without riders; to the procession in ranks through the principal street of an Italian town, especially at the Carnival; and to the street through which the race or procession is wont to pass. Hence many streets in Italy are named C., the most famous of which is the C. at Rome, 3500 paces long, from the Porta del Popolo to the foot of the Capitol.

Cort, Corne'lis, a famous Dutch designer and engraver, born at Horn, 1536, and after studying his art in Holland, went to Venice, was received into the house of Titian, and executed copperplate engravings of a number of the works of that master. Later C. removed to Rome, where he founded a famous school of engraving, and where he died in 1578. His works are chiefly remarkable for accuracy of design and refinement. He worked with rapidity, and executed in all over 150 plates.

Cortes' (Span.), from *corte* (*curia*), *i.e.*, a court or residence, is in Spain (q.v.) and Portugal (q.v.) the name given to the Legislative Assembly, or House of Representatives.

The Spanish C. is composed of a senate and congress, the authority of each being equal. Senators are members of the senate by their own right (80), or are nominated for life by the crown (100), or are elected by the state corporations (180). The first class consists of the sons of full age of the king or of his immediate heir, grandees of the kingdom, admirals and captain-generals, archbishops and patriarch of the Indies, presidents of the state council, of the tribunal of Cuentas del Reino, of the supreme tribunal, and of the chief council on war and marine, after serving for two years. Half the elected senators must retire after five years' tenure; they can be re-elected. Every 50,000 of the population elects for five years one member for congress. At present there are 431 of such deputies. Both houses sit every year, but the king may dissolve them, in which case a fresh Cortes must assemble within three months.

The Portuguese C. is composed of a house of peers and a house of commons. Until 1885 the right to sit in the former was hereditary. It is so no longer. Now, the members are princes of the royal family, 12 bishops, and 100 life peers appointed by the Crown; hereditary peers and their immediate heirs only are, however, permitted to retain their seats, and until these be weeded out the crown can appoint only one out of every three of the life peers; the remaining two being selected by certain corporations and districts. The other house consists of 149 delegates chosen by the electoral districts.

Cortes (or **Cortez**) **Fernan'do,** or **Hernando,** a Spanish *conquistador*, was born at Medellin, in Estremadura, in 1485. After a short stay at Salamanca, and a turbulent and licentious youth, he joined the expedition of Ovando to Haiti in 1504, where he obtained an estate, and amused himself by fighting with the natives till 1511, when he rendered important help to Velasquez in the conquest of Cuba. Here also he practised agriculture, and wrought gold with the *repartimiento* of Indians then commonly assigned to the conquering strangers. In 1518 C. took the command of the *Armada* fitted out by Velasquez and himself for the conquest of Mexico, or rather for obtaining a recognition of Spanish supremacy, and as much gold and precious stones as possible. Against the orders of Velasquez, who suspected C.'s ambition, the latter sailed on the 10th February, 1519, from Havanna. At his final muster at Cape Antonio, he had only 110 marines and 550 soldiers, with a few Indians. After establishing himself in Tabasco (where he first met with Marina), C. proceeded to a point near Vera Cruz, and entering into friendly relations with the natives, demanded permission to visit Montezuma, the Emperor of the Aztecs, in his capital, Mexico, which was refused. After burning his ships, and allying himself with the Totonac tribe, and with the republic of Ilascale (which, however, at first resisted the Spaniards), C. advanced to Cholula, where he was well received, but where Marina soon discovered a plot which led to a massacre of the inhabitants. On 8th November, 1519, C., with 400 Spaniards and 6000 natives, entered the capital, and by a bold, menacing attitude contrived to get the meek and superstitious Emperor into his custody at the palace of Axayacatl. Montezuma declared himself a vassal of Karl V., gave up enormous treasures, and assigned a native temple (part of the Teocalli) for Christian worship. Leaving Alvarado in command, C. was now obliged to descend to the coast, and encounter the force which Velasquez had sent out against him under Narvaez. This was successfully done, but on his return to Mexico he found that the slaughter of 600 Caciques had at last provoked open war. A long struggle was ended by the *Noche Triste*, when the Spaniards were driven out of the capital, but the desperate engagement at Otumba (8th July, 1520), in which the Aztecs fled, encouraged C. to prepare at Tezcuco a second expedition, in which a large number of natives became his allies. After a terrible siege of nearly three months, marked by the loftiest heroism on the part of the new Emperor, Guatemogin, and his people, Mexico fell (13th August, 1521) amid the most frightful carnage and destruction of property. Appointed Captain-General of the conquered territory, C. energetically set about the work of reconstruction; he rebuilt the capital, founded and conferred municipal privileges upon the colonies of Zacatula, Coliman, San Esteban, and Medellin, introduced the Franciscan mission, which in twenty years secured at least a nominal acceptance of the Christian religion throughout the country. The regulated slavery which he sanctioned in the system of *encomenduro* and *repartimiento* was not unsuited to the Aztec character. In 1526, partly because, without apparent reason, he had put Guatemogin to death, C. was recalled to Spain, where he was received with great honour. Returning to America as military governor, but without civil authority, he spent ten years in exploring the Darien isthmus and the coast up to California. The arrival of the Viceroy Mendoza, in 1540, disgusted him with Mexico, and he again withdrew to Spain, where, after a decided rebuff at court, he died near Seville on the 2nd December, 1547. His great wealth was devoted partly to the erection of an hospital, a college, and a convent in Mexico. The despatches of C. to Karl V. have been published in English (New York, 1843). See Helps' *Life of C.* and Prescott's *Conquest of Mexico*.

Corti, Organ of, one of the delicate apparatuses found in the internal ear in connection with the terminations of the auditory nerve, discovered by the Marquise di Corti, an Italian nobleman, and hence named after him. See EAR.

Corto'na, a town in the province of Arezzo, Italy, 52 miles E.S.E. of Florence. It was one of the most ancient cities of Etruria, and possesses the massive remains of masonry known as *Cyclopean walls*. The Romans founded a colony here in the time of Sulla, but it is not mentioned by any ancient author subsequent to Pliny and Ptolemy. C. decayed for a time, but revived after the 11th c. Its cathedral has some fine paintings, and its museum has numerous relics of antiquity, especially bronzes. Excellent marble is worked in the vicinity. Pop. 26,996.

Coru'ña, a fortified seaport at the extremity of a small peninsula at the mouth of the C. river, on the N.W. coast of Spain, province of C. (part of the former Galicia). It consists of two towns, the upper and lower (called also Pescaderia), the former of which is walled, and has a citadel which protects the harbour. This is commodious and well frequented by ships, which makes C. one of the most prosperous towns in Spain. It has manufactures of cigars, soap, starch, and cotton, and its sardine fishery is extensive and valuable. Its commerce with England, France, and America is considerable, and it has steamboat communication with Ferrol and the N. coast of Spain. Pop. 37,251. C. is said to have been founded by the Phœnicians. It was known to the Romans under the name of *Caronium* (whence the modern C.). From its bay the Armada set sail in 1588. Ten years later it was captured and burned by the English, and here Sir John Moore fell after a glorious repulse of the French, 16th January, 1809. The *province* abounds in copper and iron ore. Area 3079 sq. miles and pop. 613,881.

Coruña.

Corun'dum (Hind. *karund*), a mineral species which includes under its varieties the most precious stones—the ruby, the sapphire, oriental topaz, and oriental amethyst, as well as that commonly recognised as C. and emery. Commercially the name C. is restricted to the crystalline forms of emery forming hexagonal dingy-coloured crystals. It is composed essentially of pure alumina, and next to the diamond is the hardest of all known substances. It is found abundantly in Asia Minor, the Carnatic, Ava, and near Canton, besides many places in the United States. It is used as Emery (q.v.).

Cor'vei, or **Korvei** (*Corbeia nova* or *Saxonica*), formerly a Benedictine abbey of princely rank, on the Weser, near Höxter, in Westphalia. It dates from the year 816, and its first monks were a colony from a monastery of the same name in Picardy. Acquiring large possessions and important privileges, C. became in the Middle Ages a centre of Christian civilisation in Northern Germany. In 1794 it was erected into a bishopric by Pope Pius VI., and at that time it owned land 22 sq. miles in extent, with 10,000 inhabitants. This territory came into the possession of the House of Orange in 1802, and of Prussia in 1815. It now belongs to the House of Hohenlohe-Schillingsfürst. The magnificent Gothic church contains numerous interesting monuments, but the library and all reliable records of the history of the abbey have been destroyed.

Corvette', a ship of war ranging next to a frigate. It is flush-decked and ship-rigged, and has one tier of guns only.

Cor'vidæ, the Crow family, included in the Conirostral (q.v.) section or sub-order of the order Insessores or Perching birds. The members of this group are recognised by their strong, compressed, and conical bills, covered with small stiff feathers at the base; by the ridge of the upper mandible being curved and its top notched, and by the tarsi being 'plated' in front. The food consists of both animal and plant matters. Various sub-families exist, including the true crows, tree crows, jays, magpies, choughs, nut-crackers, &c.

Corvo, one of the Azores, the most north-westerly of the group, 6 miles long by 3 broad, is of volcanic origin. It is fertile and well-wooded, and exports hogs, wood, and wheat to the other islands. Pop. 806.

Cor′wen ('the white choir'), a town in Merioneth, N. Wales, on a height overlooking the Dee, 10 miles W. of Llangollen. It is said to be the spot to which Owen Glendower retreated when Henry IV. invaded and overran Wales, and tradition points out his sepulchre in the parish churchyard. Pop. reg. sub-dist. 7479; civ. par. 2680.

Corygaum′, or **Korigaum,** a small town in the district of Poona, province of Bombay, 16 miles N.E. of Poona, memorable for the defeat, on 1st January, 1818, of the Peshwa (Baji Ráo) of the Mahrattas, whose forces (25,000 in number) were repulsed with immense loss, after a protracted struggle, by Captain Staunton with a mere handful of sepoys and some twenty-four European artillerymen, of whom twenty were killed. A stone obelisk commemorates this exploit, remarkable from the fact, apart from any others, that there were only twenty-five Europeans in the field on the side of the British and yet their presence enabled the 800 or so natives to defeat their opponents.

Corym′bus (Gr. *korumbos*, 'the top,' 'the head'), a mode of dressing the hair among the Greeks by tying it in a cluster or knot on the top of the head. The name was also given to the cluster of ivy leaves, garlands, or berries, with which Greek vases were encircled, and to the high sterns of ships.

Corynocar′pus, a genus of New Zealand trees belonging to the natural order *Myrsinaceæ*, one of which, *C. lævigatus*, is cultivated in this country. The fruits and seeds of this tree are valued as articles of food by the natives. The seeds contain a farinaceous substance which renders them nutritious, but if eaten before being steamed for at least twenty-four hours, and then being either buried in the ground or allowed to soak in water for some days, they are poisonous, producing partial paralysis, spasmodic pains, and giddiness.

Coryphæ′us (from Gr. *koruphē*, 'a summit'), lit. the head man or leader, but specially applied in the Attic drama to the leader of the chorus. Hence any one of admitted pre-eminence in his art is called a C.

Cor′phene, a genus of Teleostean fishes, family *Coryphænidæ*, having a compressed body, with the dorsal fin running from head to tail, and the head as if abruptly truncated. The Dorado, found in the Mediterranean Sea and elsewhere, is best known of the family. They are remarkable for their iridescent metallic tints, which pass through a series of changes when the fish is dying, giving rise to many poetical allusions. The Dorado is also, but erroneously, styled 'Dolphin' (q.v.).

Cos, or **Kos,** known in more ancient times by the names of Meropis and Nymphæa, is an island on the western shore of Asia Minor, nearly opposite Halicarnassus. Its modern name is Stanko or Stanchio. It is about 23 geographical miles in length, and about 65 in circumference. It is mountainous in the S. and W., but level and fruitful in the N. and E. The great fertility of C. gave rise to the proverb, applied to an insatiable person, 'Quem Cos non nutrit, hunc neque Ægyptus.' C. was famed for its ointment and purple dye, and specially so for its wine, and also for its silk and cotton manufactures. It was the birthplace of Ptolemy Philadelphus, of the painter Apelles, and of the physician Hippocrates. The chief town, C., near which stood a magnificent temple of Æsculapius, was in the N.E. The island now belongs to Turkey.

Coscin′ium, a small genus of plants belonging to the natural order *Menispermaceæ*. The wood, bark, and roots of *C. fenestratum* of Ceylon are valued as stomachics and tonics. The wood has been imported and sold as the true Calumba-root (Bentley): it contains *berberia*, and yields a yellow dye.

Coscinoman′cy (Gr. *koskinon*, *manteia*), practice of divination by means of a sieve, was chiefly used for the discovery of thieves. The sieve having been suspended by a pair of shears, and mystical words spoken, on the mention of the thief's name the sieve turned round.

Cosen′za (anc. *Consentia*), the capital of the province of the same name in Italy, stands in a valley at the junction of the Crati and Busento. C. has manufactures of silk, pottery, and cutlery, and a trade in wine, fruits, and flax. It was the ancient capital of the Bruttii, and was an important town during the Middle Ages. Alaric the Visigoth died here in 410. Pop. 15,149.

Cos′mas, commonly called *Indicopleustes* ('Indian voyager'), in early life a merchant and traveller, afterwards a monk, was an Egyptian who flourished in the 6th c. A.D. His chief work, the *Topographia Christiana*, in twelve books, was written to prove that the earth is a vast plain. It contains much, and in general accurate, historical and geographical information, and is specially noted for its description of the *Monumentum Adulitanum*.

Cosmet′ics (Gr. *kosmetikos*, 'skilled in adorning') are, broadly speaking, preparations applied to the human frame with the view of beautifying it, but the word is commonly limited to powders, salves, &c., designed to improve and preserve the complexion. Many of the preparations, containing bismuth, &c., are noxious.

Cosmog′ony (Gr. *kosmos*, 'the universe,' and *gonē*, 'generation') is an account of the genesis or creation of the universe, or the science which treats of its origin. Every nation possessed of an antique literature has also a C., held by those who believe in it to have been committed to the writer by divine inspiration, and to differ from all other cosmogonies exactly as truth differs from fiction or human speculation. The germs of all these cosmogonies and theogonies are to be found in the Vedas and Zend-Avesta, the most primitive extant literature of the Aryans. In the first chapter of the Laws of Manu (q.v.) we find the ancient Hindu C. The universe existed at first only in the divine idea, as if involved in darkness. Then first God created the waters, called *nara*, because the product of God's breath or spirit (of his nostrils, *nara*); hence he is called Narayana (moving on the waters, cf. Gen. i. 2). He then created the heavens and the earth. The creation of mankind was by God drawing forth from the supreme soul *mind*, then consciousness, then all vital forms endowed with the qualities of goodness and darkness (sin), and the five senses. He gave names to all creatures, and being to time and its divisions, to the stars, planets, mountains, oceans, rivers, valleys, &c. That the human race might multiply, he made them half male and half female. In the C. of the Zend-Avesta, Ormuzd (q.v.) created the visible world by his word in six periods or thousands of years. A remarkable analogy exists between the cosmogonies of the Phœnicians, Hebrews, and Babylonians, which are all evidently derived from the primitive Chaldean or Accadian trinity of Na or Anu ('the sky'), Ea or Enci ('the earth'), and Mulge ('the lord of the under world'). In the beginning all was darkness and water; this was followed by the division of day and night; then came the making of the sun and the moon, followed by that of animals and man. The Accadian mythology, being based on a rude astronomy, was very fond of the number *seven*, every seventh day being a 'day of rest.' The basis of the Phœnician C. is the Trinity Baau ('chaos'), Spirit, and Mot ('slime'); of the Babylonians, Sige ('the sky, or the primitive substance of the universe'), Aos ('the earth'), and Bel ('the Demiurge, or Creator'). Sige bore Moumi (Heb. *mami*, 'waters'); the spirit of Aos brooded over the abysmal deep, and was married to Davke (Phœn. *bahu*, Heb. *bohu*, Gen. i. 2, 'emptiness').

Cosmora′ma (Gr. *kosmos*, 'order,' 'ornament,' and *horaō*, 'I see'), an exhibition of pictures of different parts of the world, which are placed horizontally on a table, reflected by mirrors leaning diagonally opposite them, and looked at through a convex lens in front of each mirror. The pictures are illuminated by lights so placed as not to be reflected by the mirrors.

Cos′mos. See COSMOGONY.

Cosne, a town of France, department of Nièvre, at the confluence of the Loire and Nohain, 33 miles N.N.W. of

Nevers, with which it has railway communication. The ruins of its fortifications and castle show it to have been a place of great importance and strength in the Middle Ages. It has several old churches, a suspension bridge over the Loire, manufactures of chains, anchors, cutlery, &c., and a trade in vegetables, grains, wood, wine, and cattle. Pop. commune 8672; arrond. 76,029.

Coss′acks (Russ. *Kasak*), a warlike Slav-people of S. Russia, who formerly played a considerable *rôle* in the progress of Russian conquests, from their efficiency as light cavalry. They still constitute an important part of the Russian army, and are settled or stationed in different parts of the kingdom. The principal branches of this race are (1) the *Malo-C.*, or C. of Little Russia, of whom the *Zaporovian* sub-division, on the Dnieper, are a predatory and unruly class; and (2) the C. of the Don, nearly 1,000,000 in number, who hold 60,000 sq. miles of steppe-lands, and form a distinct government, military in its organisation, and under the rule of a Hetman, holding the rank of general. Their chief town is Novo-Tscherkask. There are also several Cossack tribes who, from the localities in which they are stationed, are serviceable as frontier guards—as the Siberian C. on the S. border of Siberia, the C. of the Caucasian line (254,000 divided into twelve regiments), &c. See Wallace's *Russia*.

Cossimbazar′ (*Kásimbázár*, 'market of Kasim'), a ruined town in Murshidabad district, Bengal, British India, on the left bank of the Bhagirathi offshoot of the Ganges, the chief industrial and commercial depot of Bengal during the 18th c., being the political capital of Murshidabad and residence of European merchants. In 1811, C. was well known as a seat of manufacture of silk and ivory work, while the neighbourhood was a pestilential swamp and jungle. Within two years the town was deserted, owing to the sudden and inexplicable change of the course of the river which left no communication with the outer world by water. Now C. is only known as the home of the Rani Swarnamayi, a noble and charitable Hindu lady.

Cos′ta, Isaac da, a poet and theologian, was born of Jewish parents at Amsterdam, 14th January, 1798. After receiving a liberal education, and graduating in his twentieth year as Doctor at Law, he renounced Judaism and received Christian baptism, a change which subjected him for a time to persecution. Among his best-known works are his version of Byron's *Cain*; his *Israel and the Gentiles*, and *Harmony of the Gospels*, which have been translated into English; and the *Battle of Nieuwpoort*, a poem of much excellence. He died at Amsterdam, 28th April, 1860.

Costa, Sir Michael, a musical composer and conductor, was born in February, 1810, at Naples, and educated there. He came to England in 1828, and his reception was such as to induce him to settle in this country. He was the conductor of the Royal Italian Opera (Covent Garden), and also of the Sacred Harmonic Society, for many years, and received the honour of knighthood in 1869. His reputation as a composer rests chiefly upon two oratorios of considerable merit—*Eli* (produced 1855) and *Naaman* (produced 1864). Died 3rd January, 1885.

Costa Rica, the most southerly of the republics of Central America, bounded on the N. by Nicaragua, on the S. by the United States of Colombia, and extending E. and W. from the Caribbean Sea to the Pacific. Area 22,484 sq. miles; pop. estimated at 268,300, of whom about 4000 are descendants of aboriginal inhabitants. C. R. is intersected diagonally by a mountain range. There are numerous volcanoes, and earthquakes are frequent. The low grounds along the coasts are very unhealthy. The soil is fertile, the principal products being bananas and coffee; sugar, cocoa, tobacco, potatoes, maize, rice, and wheat are also grown. Railway communication connects Limond and Alajuela, and Punta Arenas and Esparza, distances of 147 and 14 miles respectively. Both lines are being continued to meet one another so as to provide in that way a quick means of transit from the Atlantic coast to the Pacific. The capital is San José, and the principal port is Punta Arenas ('Sandy Point'), on the Gulf of Nicoya. The value of the exports is estimated at £1,737,916, and that of the imports at £1,057,083. The value of coffee exported is put at £1,494,833. There is a growing export of cattle, horses, and sheep. The principal imports are cotton goods, iron, silk, cloth, hardware, flour, salt, provisions, and wines. Gold, silver, and copper are found, but mining industry has greatly decreased. There is no manufacturing industry. The revenue is £860,000, and is derived mainly from customs, the spirit monopoly, and the tobacco monopoly. The expenditure is £850,290. By January, 1887, the country had borrowed largely, and still owed £2,691,300, besides £2,119,512 as interest. This debt now stands by conversion at £2,000,000 at 5 per cent. and has been taken over by the C. R. Railway. The internal debt is £505,250. The government is republican, its constitution dating from 1882. The President is elected for four years, and the National Congress is composed of a chamber of 26 Representatives—one for every 10,000 citizens—elected for 4 years.

Cos′tello, Louisa Stuart, an English authoress, was born 1815. She became known to the literary world by her *Specimens of the Early Poetry of France*, published in 1835. From that time almost to her death, in 1870, she wrote incessantly, her works being chiefly accounts of travelling, tours, histories, and novels. Her style, especially in the description of scenery, is very pleasing.

Cos′ter, Laurens Janszoon, claimed by the Dutch as the inventor of printing, was born at Haarlem about 1370, and must have commenced to practise the art at some period between 1420 and 1426. His invention, said at first to have been used by him only to print verses of the Bible and moral precepts for the instruction of his children, was afterwards practised for gain, but in secret. The assistants he was compelled to employ were sworn not to divulge his secret; but on his death in 1439, one of them, Johann Gänsfleisch, stole some of his tools and types, and set up a press at Mayence. C. at first used wooden types, but afterwards metal ones, cast in sand. His *Speculum Humanæ Salvationis*, commenced with wooden blocks, was finished with the movable metal types, and presents a singular mixture of pages in fixed and movable characters. Before he availed himself of cast types, his impressions were produced by rubbing, and the page was printed only on one side; afterwards he used the press, and printed both sides of the page. Such is the account given by the Dutch, which is pressed with much cogency by Auguste Bernard in his *Histoire de l'Origine de l'Imprimerie*, and by many others, among whom is Ottley in his *Inquiry into the Origin of Engraving*. C. died about 1440. For the arguments in favour of the German claim to the invention, see GUTENBERG. In July, 1856, the people of Haarlem erected a bronze statue to C. in the market-place.

Costs is the technical name in English law for expenses in legal proceedings. Generally the C. of the successful party are mainly paid by the loser, although at common law neither party can claim costs as his right. The statute of Gloucester, passed in the reign of Edward I., however, allowed costs to a successful plaintiff, but in suits where the Crown and a subject were concerned this rule did not hold good, and no costs could be obtained against the Crown, until the passing of statutes 18 and 19 Vict. c. 90, and 23 and 24 Vict. c. 34, by which the judgment in causes where the Crown is a party, and in petitions of right, carries costs. There are in all lawsuits extra-judicial expenses incurred on both sides which each party will have to pay for itself, whatever be the issue. Then, while one gains on the main point, it may be found to have been wrong on minor points, which will cause a modification of C. The Judicature Act, 1890, provides that costs incurred before the Supreme Court and in administering estates and trusts shall be payable by the party determined upon by the Court or judge, provided, of course, such determination infringes no statute or statutory rules of Court. C. are 'taxed'—that is, the items are allowed or disallowed—by an officer of the court, called *the master*. The equivalent legal term in Scotland is *Expenses* (q.v.). (See also AUDITOR OF THE COURT OF SESSION.) In actions for libel and some others, the smallest award of damage usually carries full C., unless the judge certifies *in favour of the defendant*, which deprives a plaintiff of C.

Any one suing *in forma pauperis* does not pay C., but he is entitled to receive them if successful. To entitle one so to sue, he must prove that he does not possess the value of £25, beyond his clothes and the matter under dispute, and obtain counsel's opinion that his grounds for proceeding are reasonable—opinion and affidavit of pauper or his solicitor as to the facts must be produced in court.

Costume' (Old Fr. *coustume*, Mid. Lat. *costuma*, from Lat. *consuetudinem*, by contraction, 'custom or habit'), dress or clothing, in its historical relations, and regarded as connected with dignities, official position, and functions. C. is thus spoken of as characteristic of particular periods of time, of distinct tribes and nationalities, of certain stages of civilisation, and as indicative of rank, position, and power. In modern days, the incessant fluctuations of fashion, and the tendency of our civilisation to produce a level uniformity among nations as well as individuals, have greatly interfered with the continuance and development of the characteristic costumes of different peoples. But as the so-called leaders of fashion operate only within certain very narrow bounds, and fundamental changes in dress are slowly effected, we are warranted in saying that, so far as regards male attire at least, the C. of the 19th c. is as characteristic as that of any preceding age. The costumes of classes, however, such as that of the peasantry, and of small isolated communities, are rapidly disappearing, and, indeed, in the most advanced countries, have almost entirely vanished. In the Middle Ages, and down to comparatively recent times, the costumes of various social grades were strictly prescribed by sumptuary laws; and even had freedom of choice existed, far less variety of materials was available than can be commanded by the very humblest of the present day. Costumes indicative of rank and position still exist, as in the case of the robes, crowns, and coronets of royalty and nobility, and many professional, academic, and official positions are indicated by peculiarities of C. A characteristic class of C. is still rigidly adhered to by the 'fishwives' along the E. coast of Scotland, the agricultural labourers of Lincolnshire, the costermongers of London, &c.

It is only in recent times that the study of C. in its historical relations has come to be pursued with care and painstaking. Artists of the 16th c., in their treatment of all Scriptural subjects, from the Creation down to the Christian era, did not hesitate to employ the C., architecture, and formal gardens of the Renaissance period, and similar anachronisms were the rule on the stage. For the study of ancient C., it therefore becomes necessary to obtain contemporary representations of the period or people under investigation; and for this end illuminated MSS., coins, medals, carvings, and painted pottery are of the utmost value. Such remains of the principal nations of antiquity are fortunately still largely available, and they yield abundant stores of information regarding the C. and other ethnographic relations of the periods to which they belong. With such sources of information laid open by the labours of archæologists, fidelity in the representation of C. is a modern essential in all delineations, both literary and artistic. The artistic treatment of the C. of the present day is a matter of no small difficulty, especially to the sculptor, and by many artists the difficulty is avoided by resorting to the more graceful flowing robes of antique models. This, however, is as indefensible as the representation of the Virgin in the guise of an Italian *contadina* by Renaissance artists. The unpromising task of the faithful and artistic management of modern C. in statuary was very fairly and successfully grappled with by the late J. H. Foley, R.A.

Cos'way, Richard, R.A., of Flemish extraction, was born at Tiverton, Devonshire, in 1740, studied art to such purpose that between his fourteenth and twenty-fourth year he obtained five premiums from the Society of Arts. He was patronised by Sir Joshua Reynolds, elected a member of the Royal Academy in 1771, and rapidly acquired fame and fortune as a painter of miniature portraits. His wife, Maria Hadfield, was a most accomplished musician and artist, and the receptions he gave at his house were among the most brilliant of his era. C. died 4th July, 1820.

Cot (Old Eng. *cote*, *cyte*, 'a bed,' 'a cottage'), in nautical language, an officer's bed, as distinguished from a seaman's hammock. It is made of canvas in the form of a chest, and is kept stretched by a wooden frame. The mattress is placed within the C., and, like the hammock, it is suspended from the roof of the cabin. The term C. is also applied generally to a child's bed, especially the swinging cradle.

Côte-d'Or, a department in the E. of France, and part of the old province of Burgundy, named from the chain of the Côte-d'Or ('hill of gold,' so called from the excellence of its vintages) which traverses it from N. to S. C. is watered by the Seine, the Saône, and the Aube, and is intersected by the Burgundy Canal. It is one of the most fertile districts of France. The surface is in general elevated and covered with coppice, and the climate salubrious. Iron and coal, anthracite, and marble are abundant; there is a large trade in lithographic and mill stones and also in wine. C. is divided into four arrondissements. The chief towns are Dijon (the capital), Beaune, and Châtillon-sur-Seine. Area, 3383 sq. miles; pop. 376,866.

Côtes-du-Nord ('coast of the North'), a department in the N. of France, part of the old province of Bretagne. From E. to W. it is traversed by the Montagnes Noires, of granitic and Silurian formation, the highest point of which, Menez Haut, is 1112 feet above the level of the sea. The largest rivers are the Rance, Arguenar, Blavet, and Oust. Flax, hemp, pulse, beetroot, and even maize are cultivated; the hills afford excellent pasture; the cattle and horses, especially the latter, are famed; and along the coast are valuable fisheries. The chief manufacture is that of linen. C. contains five arrondissements. The principal towns are St. Brieuc (the capital), Dinan, Lannion, Loudéac, and Guingamp. Area 2659 sq. miles; pop. 618,652.

Cotes', Roger, a mathematician, was born 10th July, 1682, at Burbage, Leicestershire, studied at Trinity College, Cambridge, where he took his degree in 1706, and was appointed Plumian Professor of Experimental Philosophy. In 1713 he published a new edition of Newton's *Principia*, the characteristic feature of which is the preface. The high expectations which were entertained of this promising genius were blighted by his premature death on 5th June, 1716. He published a few papers in the *Philosophical Transactions*, and his principal works are *Harmonia Mensurarum* (1722) and his *Lectures on Hydrostatics* (1737), both posthumous publications.

Cotes'wold or **Cots'wold Hills** (Welsh, *coed*, 'wood,' and Eng. *wold* (earlier *weald*), the same, hence 'woody hills'), a range in Gloucestershire, extending from N. to S. upwards of fifty miles. The highest point is Cleare Hill, 1134 feet. Turnips and clover are cultivated on these hills, and coarse-haired sheep are fed there. The forests from which they derive their name have disappeared.

Coti'llon (from the Old Fr. *cote*, Lat. *cottus*), literally a gown or petticoat, was figuratively applied to a French dance extremely popular in the beginning of the 17th c. It combined the diverse qualities of the polonaise and the minuet, greatly resembling the quadrille, by which it was eventually eclipsed. In Burns' *Tam O'Shanter* occurs the line—

> 'Nae *cotillons* brent-new frae France.'

On the Continent, however, it retained its position of being the leading feature of an evening's entertainment, and has been revived in England. The leader of the C., as it is now danced, is chosen not only for his knowledge of the different figures, but also for his skill in varying their character, and, when possible, in adding to their number. The prizes or presents awarded during the dance are usually offered by the giver of the ball, and are often very costly.

Cotin'ga, a genus of Insessorial birds belonging to the family *Ampelidæ*, or 'Chatterers,' and section *Dentirostres*.

It is S. American in its distribution, and the bill, which is of feeble conformation, is deeply cleft. The plumage exhibits very brilliant hues.

Cotise′, or **Cotice** (Fr. *côté*, 'a side'), in heraldry, a diminutive of the Bend (q.v.), being a fourth of its width. The other diminutive is the *bendlet*, which is twice as wide as the C. Couped at its extremities, the C. becomes a *riband*. C. describes a bend between two cotises, a fesse or bar between two barrulets, or any heraldic object sided or accompanied by another.

Cotoneas′ter, a genus of plants consisting of trees or small trailing shrubs, belonging to Northern Europe and the mountains of India, cultivated for the beauty of their foliage, flowers, and fruit, the latter being (especially in the case of *C. frigida* and *C. affinis*) of an intense scarlet colour, and remaining on the trees for the greater part of the winter. *C. Vulgaris* is believed to be a native British species. In addition to those mentioned, *C. microphylla*, *C. marginata*, *C. rotundifolia*, and *C. buxifolia* are among the most valued cultivated species.

Cotopaxi, viewed from Salto.

Cotopax′i, a volcano in the Cordilleras of the Andes, 18,811 feet above the sea-level, with a cone rising in perfect regularity 4400 feet above the plateau of Quito, and covered with snow almost to the verge of the crater. Its flame is said to have risen in 1738 to the height of 3000 feet. In 1803 its internal heat was great enough to melt the snow on the exterior walls of the cone, and Humboldt, who was at the time at Guayaquil, 130 miles distant, heard day and night the awful explosions of the volcano, as though heavy artillery were at practice in the neighbourhood. A great eruption of C. took place 26th June, 1877.

Cotro′ne, the ancient *Croton* or *Crotona*, a town in the province of Catanzaro, Italy, on a projection at the mouth of the Esaro. Its streets are narrow, and its harbour, protected by a mole, admits only vessels of light draught. C. has a cathedral, and corn, wine, oil, and silk are produced in the vicinity. The ancient C., founded by a colony of Achæans in 710 B.C., was one of the wealthiest and most famous cities of S. Italy. The inhabitants excelled in athletic exercises, and the celebrated Milo was a native of the place. Pythagoras founded here a school of philosophy. The city was so exhausted by the ravages of the second Punic War that the Romans sent a colony to recruit its population in 194 B.C. Some ruins are still visible in the neighbourhood of the modern town. Pop. 9662.

Cott′a, the name of an old and still flourishing German publishing house. The first publisher of the name was **Joh. Georg C.,** the descendant of a family which had removed in the beginning of the 15th c. from the Milanese to Germany. He acquired by marriage in 1642 the book trade established in Tübingen by Brunn. His son, **Joh. Friedr. C.,** a distinguished theologian, was born at Tübingen, 12th May, 1701, and died there, 31st December, 1779, chancellor of the university. The grandson of the last mentioned was **Joh. Friedr., Freiherr von C.,** born at Stuttgart, 27th April, 1764. After serving some time in the Austrian army, and subsequently practising as an advocate, he undertook in December, 1787, to conduct the family publishing business, and soon distinguished himself by his judgment and enterprise. In 1798 he established the still influential *Allgemeine Zeitung*. Other periodicals followed, as the *Almanach für Damen*, the *Morgenblatt*, and *Literaturblatt*. He also published the works of such authors as Goethe, Schiller, Herder, Fichte, Jean Paul, Tieck, Voss, the brothers Humboldt, and Johann von Müller. Johann Friedrich retired to Stuttgart in 1810. The ancient nobility of the family was restored in his person, his title being Freiherr C. von Cottendorf. He died 29th December, 1832. He was a man of fine character—liberal, pure, and unselfish in all his actions. The business of the firm is widespread.

Cott′age, the general name for the rural dwellings, small and isolated, of the poorer classes. Adjoining each C. there is usually an allotment of ground which is cultivated by the occupants. The cottages of the agricultural labourers were, till a few years ago, in a very neglected condition, and the recent improvements in their construction with regard to ventilation, general convenience and comfort, and economy in erection, are in a great measure due to the deliberations of the Society of Arts, in whose *Journal* much valuable information may be obtained. A neat detached house for persons in better circumstances, in town or country, is called a *C. orné*.

Cottin, Sophie, a favourite French novelist, born at Tonneins (Lot-et-Garonne) in 1773. She married a banker of Bordeaux, and being left a widow at the age of twenty, thenceforth followed literature. Her chief works are *Claire d'Albe* (1798), *Malvina*, *Amélie Mansfield*, *Mathilde*, and (greatest of all) *Elisabeth, ou les Exilés de Sibérie*, published in 1806. The many translations of this book attest its popularity. Madame C. died at Paris, 25th August, 1807. A collected edition of her works was published at Paris in 1817.

Cott′on, the hairs which surround the seeds of various species of *Gossypium*, a genus of plants belonging to the natural order *Malvaceæ* (mallows, hollyhocks, &c.), and

Shrub Cotton.

which constitute the well-known textile material of that name. Between twenty and thirty species of *Gossypium* are imperfectly described, but the real number of distinct forms is probably much less. The genus is indigenous to Asia and America, but it is now almost universally cultivated in all parts of the world 36° N. and S. of the equator. They are herbaceous, or shrubby perennial plants, varying from 2 to 15 feet in height. The flowers are generally large and showy, and the seeds, which are covered with the long filaments called 'C.' (and each of which consists simply of long Cells, q.v.), contain a bland oil, used for various purposes in the arts. From the seeds is also formed a cake used in feeding cattle. Of Shrub C., the species cultivated in the United States, there are two well-marked varieties—the long-staple or Sea Island C., and the short-staple Upland, Georgian, or bowed C., which forms the bulk of the C. crops in America. Egyptian and Bourbon C. also belong to this variety. In the United States the harvest commences in August, and lasts until December. *G. herbaceum* is a native of India, and is grown in Persia, the Mediterranean countries, &c. *G. Peruvianum*, or kidney-C., is indigenous to Peru, Bahia, and other parts of Brazil, &c. *G. arboreum* is a tree-like plant of India, China, &c., but commercially is of little importance. The term 'C.' is, however, applied to various other plants—*e.g.*, French C., lavender C., New Zealand C., silk C., the fibre from *Bombax*, &c., wild Australian C., wild Natal C., &c., and the C.-plant of Otago.

Production and Commerce.—The cultivation of C. takes rank in extent and value above all other crops, wheat and rice only excepted. The enormous demand for C. manufactures may be well conceived when it is borne in mind that almost every individual human being uses C. largely for dress purposes; besides which it is employed for a vast variety of domestic purposes. Although C. now occupies this preeminent position among manufactures, it is only within comparatively recent times that it has risen into importance. It is known to have been cultivated and used in India and China at least 500 years B.C., but it did not rank as a great European staple till about the beginning of the present century. In 1700 the amount of C.-wool consumed in Great Britain did not exceed 1,000,000 lbs., yielding employment to 25,000 operatives. By 1775 the consumption had risen to 4,800,000, after which, owing chiefly to the inventions of Hargreaves, Arkwright, and Crompton, the industry rapidly developed, and we find that in 1800 the imports of C. fibre into Great Britain were 56,010,732 lbs., and the consumption about 50,000,000 lbs.

The table, setting forth the import of Raw C., C. Yarn, and C. Waste (of Raw and Yarn), in the year 1894 is now given. The value of the materials imported from each country is placed beside the weight. These statistics furnish very conclusive evidence of our dependence upon foreign countries, especially the U.S. of America and Egypt, in spite of the import from Canada and our possessions in the East.

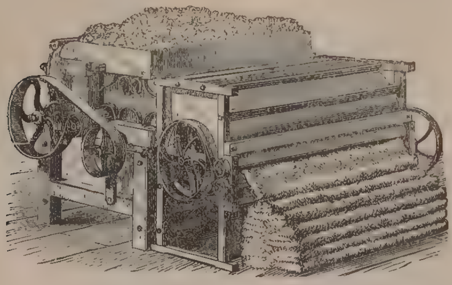
IMPORT OF COTTON DURING THE YEAR 1894.

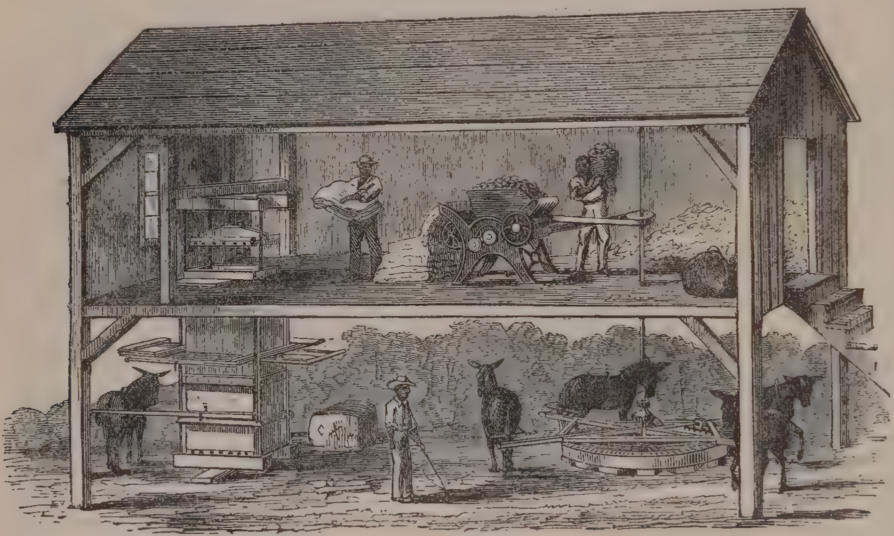
Raw Cotton from—	Cwts.	£
Russia	9,851	22,566
Denmark	9,130	16,520
Germany	3,487	7,311
Holland	2,231	4,475
Belgium	5,666	11,960
France	4,278	8,001
Turkey	21,660	45,939
Egypt	2,290,080	5,785,538
China	53,834	93,195
Islands in Pacific	3,574	14,360
U. S. of America	12,438,295	24,716,678
Colombia	2,197	3,592
Peru	62,613	152,803
Chili	3,969	8,870
Brazil	355,869	733,992
Other foreign countries	1,347	2,454
Total from foreign countries	15,268,081	31,628,254
From British Possessions—	lbs.	£
Bombay	370,475	711,393
Madras	203,661	374,347
Bengal	114,981	211,162
Burma	393	640
Straits Settlements	1,984	5,929
Australasia	929	2,234
British W. India Islands	4,214	9,058
Other British possessions	608	1,324
Total from British possessions	697,245	1,316,087
Total	15,965,326	32,944,341
Cotton Yarn from—	lbs.	£
Germany	6,111,464	305,715
Holland	835,337	47,261
Belgium	212,077	10,471
France	162,805	12,007
U. S. of America	125,236	3,748
Other foreign countries	2,720	124
Bombay	1,800	60
Total	7,451,439	379,386
Cotton Waste (*of Raw and Yarn*) from—	lbs.	£
Holland	109,097	1,039
Belgium	366,379	2,915
France	1,089,554	9,026
Italy	555,664	7,146
U. S. of America	1,400,312	16,227
Other foreign countries	421,249	3,197
Total from foreign countries	3,942,255	39,550
Bombay	1,784,898	9,848
Bengal	844,376	5,357
Canada	13,532	163
Total from British possessions	2,642,806	15,368
Total	6,585,061	54,918

C., as a crop, is cultivated in tropical and sub-tropical regions, its widest range being 40° on each side of the equator. Humboldt states that the three species, *Gossypium barbadense*, *G. hirsutum*, and *G. religiosum*, flourish best from the equator to 34° in a mean annual temperature ranging from 68° to 82°, while *G. herbaceum* is best suited for more temperate climates, with a summer heat of 73° to 75°, and a winter temperature of not less than 46° to 48°. The great C.-growing region of the world is the Southern (formerly slaveholding) States of the United States, after which range in productiveness the E. Indies, Brazil, various countries bordering on the Mediterranean, Peru, and China. It is from these regions that the European demand is at present principally supplied, but in Japan and other localities a great amount of C. is grown for native use.

In the United States the C.-seed is sown in March or early in April. The ground is prepared in ridges, and the seeds are placed in small clumps about 18 inches apart. After about a week the young plants are seen above ground, and when they have shot out their third or fourth leaf, they are gone over and thinned out. Later on they are subjected to further thinning, only a single strong plant being then left in each place. In from ten to eleven weeks after sowing, the plants blossom, and the bolls continue to form and develop till the autumn frosts nip the plants. In India the sowing takes place in June, and the harvest is picked from February to April of the ensuing year. C. is a very delicate crop, easily affected as to bulk of yield and quality by climatic conditions, nature of soil, method of culture, and other influences, and the plants are also peculiarly liable to suffer from the attacks of various insects. When fully ripe the capsule containing the fibre and seed bursts, exposing the C. in a snow-like mass, which may then be readily detached from the husk by hand-picking.

The seeds are removed from the C. fibre which envelops them by a process called *ginning*, or by other mechanical agency. The C. *gin* consists of a cylinder about 4½ feet in diameter on which are fixed circular saws projecting about 2 inches above the cylinder. As the mass of C. is pushed towards the cylinder, the teeth of the saws catch the C. and drag it between the bars which stop the seeds from passing through with the lint. Another cylinder below, furnished with brushes, removes the C. from the teeth of the saws. A revolving fan then wafts the lint out of reach of saws and brushes. These are the main features of a gin, but there are numerous modifications and improvements. The C. is then compressed, either by a powerful screw-press or by a hydraulic press, into bales, which are secured by iron hoops, and it is then ready for the market. Bales from different countries vary in weight, Americans averaging 440 lbs.; Brazils, 160; Egyptians, 560 to 600; W. Indians, 200 to 220; Surats, 380 to 400; and Bengals, 300 lbs. C. is sampled, or its quality tested, by drawing out the fibres of a small tuft between the fingers and thumb, so as to lay them parallel and show their length and strength. A good sample should be bright, clear, smooth, firm, elastic, and strong. The fibre varies in natural colour from a pure silky white into slightly bluish and reddish tints, and in the case of the Nankin C. of China it has a strong yellowish-brown colour. The filaments vary in length from about half an inch to fully two inches; when not more than an inch in length it is denominated 'short-staple,' and when more than an inch, it is known as 'long-staple.' C. ordinarily contains about 6 per cent. of moisture; but exposure of bales in damp situations may cause it to absorb as much as 25 per cent. of water without feeling obviously wet. Damp C. is extremely subject to spontaneous combustion, and when any portion is soaked with oil it spontaneously ignites with very great readiness.


Exterior view of the Gin.


The Gin House.

In the C. trade a standard graduated scale of qualities is recognised, that for Americans being, in descending series, 'fine,' 'good,' 'good fair,' 'fully fair,' 'middling fair,' 'good middling,' 'middling,' 'low middling,' 'good ordinary,' 'ordinary,' 'inferior.' According to the great geographical divisions from which the fibre is derived, stocks are classified and statistics are compiled; and under each of these divisions various qualities are recognised and prices quoted in trade lists. The Liverpool Cotton Brokers' Association arrange their returns under these six heads:—(1) *American.* This includes the whole produce of the United States, the principal varieties of which are Sea Island or Long Georgia (the famous long-staple C., which is the finest and costliest grown), Upland Georgia, New Orleans, Mobile, Alabama, &c. (2) *Brazilian*, including such varieties as Pernambuco, Santos, Bahia, Maceió, Maranhão, and Parahyba. (3) *Egyptian.* (4) *Turkey and Greece*, a division which includes the Mediterranean region, Egypt excepted. (5) *West Indies, Peru*, and other South American localities. (6) *East Indian*, under which are ranged Bengal, Tinnevelly, Surat or Bombay, Dhollerah, Dharwhar, Broach, and Rangoon, &c.

The following table exhibits the imports and consumption of C. in Great Britain for the years 1860-67, and points out the effect of the American civil war on the trade. It also exhibits the average price per lb. each year of three standard qualities of C. The imports from various countries are stated in thousands of bales, and the total imports, as well as the consumption, is given in millions of lbs. The difference between the imports and consumption roughly represent the amount exported from Great Britain, and fluctuations in stocks held.

Year.	In thousands of Bales.					In millions of lbs.		Mid Upland. Pence per lb.	Fair Pernambuco. Pence per lb.	Fair Surat. Pence per lb.
	American.	Brazil.	Egyptian, &c.	West Indian, &c.	East Indian.	Total Imports.	Total Consumption.			
1860	2,518	103	109	10	563	1,427·1	1,083·6	6¼	8 3/16	5
1861	1,841	100	98	10	987	1,259·9	1,007·4	8 9/16	9¾	6 5/16
1862	72	134	147	20	1,072	533·2	451·7	17¼	18⅛	12⅛
1863	132	138	248	23	1,391	691·6	508·4	23¼	24¼	19¼
1864	198	212	319	60	1,798	895·1	553·6	27½	28¾	21½
1865	462	340	414	131	1,408	983·5	723·2	19	19¼	14½
1866	1,163	407	200	112	1,867	1,355·3	881·1	15½	17⅜	12
1867	1,226	437	198	129	1,511	1,274·3	966·7	10⅞	11⅝	8¾

The subjoined statement exhibits the annual export and import in reference to the C. trade of the United Kingdom from 1890 to 1894. The annual bill is certainly a heavy one, which the country has to pay for the raw material, &c.; yet the receipts for the exported merchandise, although in each succeeding year less than in 1890, have since 1891 shown an upward tendency in proportion to the disbursements, so that in 1894 the balance in favour of this country was over 21 millions, the highest balance in the period treated of. That so large a balance may, or may not, necessarily mean a proportionately large profit to the capitalists engaged in the British C. business is a question which is impossible to discuss within the limits of this article. It must be allowed, at all events, that the country at large profits vastly by reason of its C. manufactures, and that, should the policy of the government ever happen to be antagonistic to the interests of the British C. trade, the country will be in danger of losing the command of the world's market owing to such an interference with one of the chief sources of its commercial wealth.

	1890.	1891.	1892.	1893.	1894.
	£	£	£	£	£
Export .	62,089,442	60,230,256	56,265,468	54,699,367	57,278,884
Import .	45,559,422	49,284,617	41,175,143	33,727,964	36,163,789
Balance in favour of the United Kingdom	16,530,020	10,945,639	15,090,325	20,971,403	21,115,095

Under *exports* are included—C. yarn and twist (grey, bleached, and dyed)—C. manufactures (piece goods—grey, unbleached; white, bleached; printed; dyed; mixed materials with C. predominating—lace and patent net—stockings and socks—thread for sewing—hosiery and small wares).

Under *imports* are included—C., raw and yarn—C. manufactures (piece goods and other sorts).

Cotton-Grass, or **Cotton-Rush** (a genus of plants belonging to the natural order *Cyperaceæ* (tribe *Scirpeæ*), so called from the fine silky hairs or bristles which spring from the base of the ovary, and give the plants the appearance of being topped by cottony tufts, especially when seen waving in the wind on the bleak moors on which they grow. This 'cotton' has been used for stuffing pillows, making candlewicks, &c., and it has even been proposed to utilise it for textile purposes. The stem of the Himalayan species called *Bhabhur* yields a fibre of which strong ropes are made. There are several British species the leaves of which were at one time employed as a remedy for diarrhœa, and the pith as a vermifuge for tapeworm.

Cotton, Sir Robert Bruce, an eminent antiquary, was born at Denton, in Huntingdonshire, 22nd January, 1570. He was educated at Cambridge, and afterwards resided at London, where he devoted himself to archæology, and collected a number of charters, deeds, manuscripts, &c. (in many cases obtaining them from the monasteries, which had been dissolved half a century before), of the greatest value for their bearing upon the history and constitution of Britain. C. was knighted by King James, who employed him to defend Mary Queen of Scots against the shameful attack of Buchanan (q.v.), and published a pamphlet on the question of precedency between England and Spain, and another on the antiquity and dignity of Parliaments. Latterly, however, he lost the royal favour, and was even shut out from his own library. He died 6th May, 1631.

The *Cottonian Library* is the library of Sir R. B. C., considerably increased by his son and grandson, which was vested in trustees for the benefit of the public. Besides coins and antiquities, it consists of about 900 volumes, a large number of which are state papers of the highest value, including diplomatic correspondence between England and the Continental states, from the reign of Edward III. to that of James I. The library was placed in 1730 in Ashburnham House, Westminster, where a fire partially destroyed some of the volumes. Among the MSS. that suffered severely on this occasion was that of the Old English poem of Beówulf (q.v.). As the work had not then been printed, and no other MS. existed, it is singular to reflect that the most ancient, the most poetic, and the most picturesque product of the early Teutonic muse, was within an ace of absolutely vanishing from human knowledge. The Cottonian Library was removed in 1757 to the British Museum. See Edwards' *Memoirs of Libraries.*

Cotton-Seed Oil, a secondary product of the cultivation of cotton, of considerable value, is found in the oil obtained by expression from the seeds. The seeds are treated in the same manner as linseed, and yield a brownish fluid oil used for general purposes. The oil-cake of cotton-seed is a valuable cattle-feeding substance.

Cotton-Spinning. The various industries connected with the preparation of cotton for use constitute the most extensive and important of all textile manufactures. In Great Britain, cotton is indeed the staple of the leading industry, giving direct employment to more persons than any other, and absorbing the largest amount of capital. Though it is only in recent times, and principally within the present century that cotton has attained a pre-eminent position in manufacturing industries, the fibre has been utilised in India, China, and other Oriental countries from the most remote period, and the indigenous cotton of America was employed as a textile material before the discovery of that continent by European explorers. The manufacture of cotton embraces spinning, weaving, bleaching, calico printing and dyeing; but only C.-S. will be here dealt with, the others being noticed under their respective heads.

The first operation in the preparation of cotton for spinning, after the fibre has been gathered, consists of *ginning*, or separating the fibre from the seeds which are enclosed within it. This is chiefly performed at the place of growth of the fibre, previous to packing it in bales for exportation. A variety of mechanism has been adapted for the operation, the most common being the saw-gin, in which a kind of revolving circular-saw apparatus tears the fibre away from the seed. Cotton, as imported, requires frequently to be freed from the grosser impurities mixed up with it by means of the *willow*, an apparatus so named from having being originally a cylindrical box or basket of plaited willows. It now consists of a box in which a series of iron spikes revolve with enormous rapidity over a gird-bottom, and in their revolution they toss about and open the cotton fibre fed into the apparatus, the impurities falling through the bottom. From the willow the fibre passes to the *opener* or *scutching machine*, which, in the case of clean staples, is the first apparatus through which the raw cotton passes. In this machine all the matted lumps of the cotton are teased out by means of a revolving beater, which strikes against the fibre with great violence. The impurities from the cotton fall through a gird-bottom under the beater, and the fibre is carried forward by the suction of a fan-blast. From the first opener the cotton passes to a second machine of the same nature called the *spreading frame* or *lap machine*, where, in addition to undergoing an additional opening and blowing, it is formed into a *spread lap*, or continuous roll of uniform breadth and thickness. The material is now ready for *carding*, the purpose of which is to disentangle the separate filaments, and lay them all parallel to each other. The carding engine is a complex apparatus, the principal feature of which consists of a series of cylinders revolving in opposite directions, such cylinders being covered with leather or vulcanised cloth studded with wire teeth or hooks, bent forward in the direction in which the cylinders are intended to revolve when in operation. Commonly the main cylinder of the carding engine is arched over by a series of flat top-cards or *flats*, which are toothed and stationary, and act against the main cylinder revolving under them. For fine C.-S. the fibre is passed through two such engines:—1st, the *breaker card*, which delivers the material in a broad thin fleece; and 2nd, the *finisher card*, from which the cotton issues in a loose riband or *sliver*, ready for the drawing frame. Instead of the finisher card, a combing machine is sometimes used for the finer qualities of yarn, by which the short fibres are combed out, and the long fibres arranged in a beautiful uniform sliver. Still further to render the fibres parallel with each other, and to produce a uniformity in the sliver, the material next passes to the *drawing frame.* This apparatus consists of three pairs of rollers, placed behind each other, and caused to rotate at different rates of rapidity, so that the material fed into the first pair, when caught by the more rapidly moving second pair, is drawn out lengthwise in proportion to the different rate of motion. Between the second and the third pair the same difference holds, and generally the drawing frame is so arranged that six slivers fed together into the first pair are passed out of the third elongated six times, and having consequently the thickness of one of the original slivers. The slivers are repeatedly subjected to this operation, till by doubling and drawing, the sliver, as delivered by the carding engine, is drawn out to one thousand times its original length. The drawn sliver is next passed to the *slubbing frame*, where it is further drawn out, receives a slight twist, sufficient to hold it together as a thin, loose rope, and is wound on a bobbin. In the *roving frame* the coils from two bobbins of slubbing are united, drawn out to still greater tenuity, twisted, and wound on a bobbin, and at this point the fibre is ready for the final operation of *spinning*. For this operation two kinds of machine are employed:—(1) the *throstle*, in which the roving is drawn out to a sufficient tenuity, twisted, and wound on bobbins in a series of continuous operations; and (2) the *mule*, in which a certain length of roving is first drawn out, which portion is then twisted and wound on cops. When two strands of yarn are subsequently twisted together, the product is called doubled yarn or thread.

A perusal of the following tables cannot fail to be of interest to the reader, who may be watching the competitive struggle for employment which is in progress between the sexes, and which is one of the characteristics of the age.

The plan adopted for table A differs slightly from that afterwards followed in tables B and C; but as the difference is slight, there can be no difficulty in comparing the statistics contained in the first with those in the others.

In the first place we may note, amongst other things, the gradual decrease in the number of factories in England and Wales (2542—2481—2406); and the fluctuations in Scotland (105—147—124); and in Ireland (8—7—8). And yet, although the total number of factories was less in 1885 than in 1875 and less in 1890 than in 1885, the total number of employed (male and female) gradually increased by 24,554 in 1885 and by 49,280 in 1890, as compared with that in 1875.

In the next place, we may consider the employment of children and half-timers as set forth in these tables. We find that in 1875 (Table A) the boys were more numerous than

TABLE A.

August, 1875.	Number of Factories.	Number of Carding Machines.	Number of Combing Machines.	Total Number of Spinning Spindles.	Total Number of Doubling Spindles.	Total Number of Power-Looms.	Number of Power-Loom Weavers.	Number of Persons Employed.					Total Number of Persons Employed.		
				Running and Standing.	Running and Standing.	Running and Standing.		Number of Children under 13 Years of Age. Males.	Fem.	Number of Males between 13 and 18 Years of Age.	Number of Females of 13 Years of Age and above.	Number of Males above 18 Years of Age.	Males.	Females.	Total Males and Females.
ENGLAND AND WALES:—															
Factories employed in spinning	1,172	37,491	2,486	21,449,102	3,692,651	...	...	13,637	10,255	14,937	68,722	37,213	65,787	78,977	144,764
Factories employed in weaving	600	...	...	...	...	170,665	56,845	4,614	5,849	5,363	45,980	19,831	29,808	51,829	81,637
Factories employed in spinning and weaving	610	30,183	230	14,585,130	332,232	260,724	91,496	15,023	16,464	16,550	109,791	52,245	83,818	126,255	210,073
Factories not included in either of the above descriptions	160	114	6	...	...	...	...	68	69	166	2,599	960	1,194	2,668	3,862
Total	2,542	67,788	2,722	36,034,232	4,024,883	431,389	148,341	33,342	32,637	37,016	227,092	110,249	180,607	259,729	440,336
SCOTLAND:—															
Factories employed in spinning	41	1,738	160	686,678	319,326	...	...	165	426	422	9,625	1,734	2,321	10,051	12,372
Factories employed in weaving	33	...	...	...	...	13,596	6,977	19	15	273	8,209	955	1,247	8,224	9,471
Factories employed in spinning and weaving	22	1,364	4	686,776	18,434	15,575	7,145	59	72	429	11,639	1,610	2,098	11,711	13,809
Factories not included in either of the above descriptions	9	9	...	...	...	...	...	12	3	32	285	120	164	288	452
Total	105	3,111	164	1,373,454	337,760	29,171	14,122	255	516	1,156	29,758	4,419	5,830	30,274	36,104
IRELAND:—															
Factories employed in spinning	4	102	15	66,608	2,944	...	...	...	6	58	294	94	152	300	452
Factories employed in weaving	3	...	...	...	...	1,746	770	...	...	131	814	199	330	814	1,144
Factories employed in spinning and weaving	1	165	...	41,478	430	812	399	75	69	196	709	430	701	778	1,479
Factories not included in either of the above descriptions	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Total	8	267	15	108,086	3,374	2,558	1,169	75	75	385	1,817	723	1,183	1,892	3,075
Grand total of cotton factories	2,655	71,166	2,901	37,515,772	4,366,017	463,118	163,632	33,672	33,228	38,557	258,667	115,391	187,620	291,895	479,515

the girls by 705 in England and Wales, and by 261 in Scotland. The advantage was not long retained, as we find that the boys in 1885 (Table B) were in the minority by 1591 in England and Wales, and by 591 in Scotland, and that in 1890 (Table C) the difference had increased to 2121 in England and Wales, and to 611 in Scotland. The numbers of the boys and girls in Ireland were even in 1875; in 1885 the boys were in the minority by 2, and in 1890 in the majority by 1. It would appear, therefore, that, unless the capitalists prefer to employ girls, the boys are slower to avail themselves of the advantages conferred by the half-time clauses.

When we consider the total numbers of male and female hands and compare those relating to England and Wales with those concerning Scotland and Ireland, we note a somewhat curious dissimilarity. In England and Wales, the number of hands of each sex has gradually increased; and the balance in favour of the females has also increased—(Table A) 79,122; (Table B) 87,080; (Table C) 89,607. In Scotland the number of each sex had increased in 1885, but fell again in 1890, that of the female hands being, indeed, lower than in 1875. In Ireland there would appear to have been a very considerable decrease in the number of each sex in 1885, and only a slight rebound in 1890. In Scotland the balance in favour of the females has been gradually shrinking —(Table A) 24,444; (Table B) 23,869; (Table C) 22,361; while in Ireland it has fluctuated—(Table A) 709; (Table B) 364; (Table C) 453. According to the grand totals, the majority in favour of the females over the males employed in the Cotton Factories in the United Kingdom was 104,275 in 1875; 111,313 in 1885; and 112,421 in 1890.

These tables deal with only one industry out of the many in progress in Great Britain and Ireland; nevertheless, this industry employs over half a million of hands, and for that reason any preference of female labour to that of the more expensive male must be not only a matter of some importance to the capitalists, but also of vital interest to those who are dependent on the wage-earners. In the article Cotton the reader may see how the gross profits in the export trade have been steadily growing since 1891 (£21,115,095 in 1894) and he may very reasonably conclude that the net profits of the capitalists have proportionately increased. If that conclusion be correct, the result has been obtained owing to a proportionate reduction in the aggregate wages paid by the capitalists, who, in spite of a slight increase in the individual wage and a considerable increase in the number of hands, may have really paid less wages seeing that they continue to use the cheaper labour of the female hands, wherever it is possible. May we understand that *home* trade pays the wages, &c., and *export* trade ranks as profits?

It is impossible at present to form any definite opinion as to the effect which Indian and Japanese competition is said to have had upon our Cotton trade during the last five years, and until some honourable member of Parliament may move for and obtain a more recent return under the Workshops and Factories Acts, we must remain equally uncertain concerning the present statistics of matters treated of in these tables.

TABLE B.

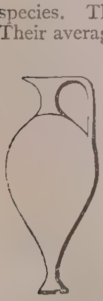
August, 1885.	Number of Factories.	Total Number of Spinning Spindles or Throwing Spindles in Silk Factories.	Total Number of Doubling Spindles.	Total Number of Power Looms.	Number of Children working Half Time.		Number of Males under 18 Years of Age working Full Time.	Number of Females above 13 Years of Age working Full Time.	Number of Males above 18 Years of Age.	Total Number of Persons Employed.		
					Males.	Females.				Males.	Females.	Both Sexes.
England and Wales :—												
Factories employed in spinning . . .	1,048	26,548,523	3,374,173	...	8,323	5,712	15,755	68,811	45,221	69,299	74,523	143,822
Factories employed in weaving . . .	797	...	...	264,873	6,014	8,010	8,528	71,328	30,457	44,999	79,338	124,337
Factories employed in spinning and weaving	495	12,866,430	339,365	263,892	9,248	11,443	14,562	107,664	49,872	73,682	119,107	192,789
Factories not included in either of the above descriptions . .	141	...	...	...	51	62	154	3,337	1,102	1,307	3,399	4,706
Total . .	2,481	39,414,953	3,713,538	528,765	23,636	25,227	38,999	251,140	126,652	189,287	276,367	465,654
Scotland :—												
Factories employed in spinning . . .	39	410,364	499,380	...	115	624	408	9,741	1,859	2,382	10,365	12,747
Factories employed in weaving . . .	63	...	...	23,282	24	57	403	13,836	2,027	2,454	13,893	16,347
Factories employed in spinning and weaving	15	226,530	13,240	6,407	40	75	196	4,695	868	1,104	4,770	5,874
Factories not included in either of the above descriptions : .	30	...	...	...	73	87	97	1,403	539	709	1,490	2,199
Total . .	147	636,894	512,620	29,689	252	843	1,104	29,675	5,293	6,649	30,518	37,167
Ireland :—												
Factories employed in spinning . . .	3	27,308	2,060	...	7	6	20	118	50	77	124	201
Factories employed in weaving . . .	3	...	...	1,851	...	...	44	464	179	223	464	687
Factories employed in spinning and weaving	1	41,296	252	650	9	12	38	206	95	142	218	360
Factories not included in either of the above descriptions . .	...	...	...	...	...	...	...	...	...	...	...	...
Total . .	7	68,604	2,312	2,501	16	18	102	788	324	442	806	1,248
Grand total of cotton factories . . .	2,635	40,120,451	4,228,470	560,955	23,904	26,088	40,205	281,603	132,269	196,378	307,691	504,069

TABLE C.

July, 1890.	Number of Factories.	Total Number of Spinning Spindles or Throwing Spindles in Silk Factories.	Total Number of Doubling Spindles.	Total Number of Power Looms.	Number of Children Working Half Time.		Number of Males under 18 Years of Age working Full Time.	Number of Females above 13 Years of Age working Full Time.	Number of Males above 18 Years of Age.	Total Number of Persons Employed.		
					Males.	Females.				Males.	Females.	Both Sexes.
ENGLAND AND WALES:—												
Factories employed in spinning . . .	900	27,250,478	3,076,562	...	6,244	4,280	15,629	66,561	46,682	68,555	70,841	139,396
Factories employed in weaving . . .	929	...	...	339,785	7,853	9,800	12,057	90,196	40,849	60,759	99,996	160,755
Factories employed in spinning and weaving	428	12,563,825	348,345	245,877	8,395	10,519	14,482	106,035	47,602	70,479	116,554	187,033
Factories not included in either of the above descriptions . .	149	...	...	...	52	66	254	3,620	1,371	1,677	3,686	5,363
Total . .	2,406	39,814,303	3,424,907	585,662	22,544	24,665	42,422	266,412	136,504	201,470	291,077	492,547
SCOTLAND:—												
Factories employed in spinning . . .	32	508,727	555,200	...	75	590	417	10,526	2,320	2,812	11,116	13,928
Factories employed in weaving . . .	58	...	...	22,047	16	69	420	12,795	2,036	2,472	12,864	15,336
Factories employed in spinning and weaving	9	130,836	9,350	6,046	22	38	124	3,859	584	730	3,897	4,627
Factories not included in either of the above descriptions . .	25	...	...	...	24	51	62	689	156	242	740	982
Total . .	124	639,563	564,550	28,093	137	748	1,023	27,869	5,096	6.256	28,617	34,873
IRELAND:—												
Factories employed in spinning . . .	3	23,068	3,176	...	6	14	13	116	31	50	130	180
Factories employed in weaving . . .	3	...	...	1,759	...	...	61	597	169	230	597	827
Factories employed in spinning and weaving	1	35,000	252	200	14	5	42	167	109	165	172	337
Factories not included in either of the above descriptions . .	1	...	...	...	...	...	...	15	16	16	15	31
Total . .	8	58,068	3,428	1,959	20	19	116	895	325	461	914	1,375
Grand total of cotton factories . . .	2,538	40,511,934	3,992,885	615,714	22,701	25,432	43,561	295,176	141,925	208,187	320,608	528,795

Cotton-Weed, a plant belonging to the natural order *Compositæ*, a native of the S.E. shores of Europe and of N. Africa. It gets its name from its leaves being clothed with dense greyish hairs, which look like wool.

Cott'us, a genus of Teleostean fishes, including the species known as 'Bullhead' (q.v.), some of which are marine, whilst others inhabit fresh water. They belong to the Gurnard family, and are remarkable for the large size of the head, which is provided with formidable-looking spines and processes. The sea-scorpion and the father-lasher are common British species. They can live out of water for considerable periods. Their average size is from 6 to 10 inches.


Cotyliscus.

Cotyle'don (Gr. 'cup or hollow-shaped'), a part of the embryo of Plants (q.v.); also a genus of shrubs and herbaceous plants belonging to the natural order *Crassulaceæ*. The C., called pennywort, or pennypies, is a common plant in the W. of England, and in some parts of Wales. Several species, especially those of the Cape of Good Hope, are frequently cultivated.

Cotyliscus, a small one-handled vase used by the Greeks for holding wine or water. In shape the C. resembled the amphora, which, however, was rather larger and had two handles.

Couch'ant (Fr. *coucher*, 'to lie down'), in heraldry, a lion, or other beast, lying down with his head erect. See DORMANT.

Couch-Grass.

Couch-Grass, Wheat-Grass, Dog-Grass, Quickens, Squitch, or **Quitch,** the two latter names being also given to other grasses, a perennial species of grass, belonging to the same genus as wheat, common in Europe and N. America. Being from its long, spreading roots difficult to be eradicated, it is a troublesome weed in cultivated grounds. C. is useful in binding sandy soils together, but though the roots are sweet and mucilaginous, and used in Naples for feeding horses, and even for making into bread in times of scarcity, and for brewing a domestic beer valued as a diuretic and diaphoretic, the foliage is not greatly esteemed as a feeding material. Its leaves, probably owing to a volatile oil, have a pungent flavour, and act upon dogs, at least, as a powerful emetic.

Cou'cy, Renaud, Castell'an of, a *trouvère* of the N. of France, of whose life nothing more is definitely known than that he lived about the 12th c., and was a crusader, probably with Richard Cœur-de-Lion and Philippe Auguste. He is known for his extremely passionate and beautiful love-poems or *Chansons*, an admirable edition of which was published by Michel (Paris), in 1830.

Coue'pia, a genus of plants of the natural order *Chrysobalanaceæ*, comprising about a dozen species, all natives of S. America. The fruits of many of them are eaten—*e.g.*, that of *C. Chrysocalyx*, planted near the villages of the Amazonian Indians. The Indians use the bark of C. of Guiana in the manufacture of pottery.

Cou'gar. See PUMA.

Cough'ing is a symptom of irritation in the respiratory passages, or in the respiratory organs themselves. This irritation may depend upon a variety of causes, and it is a symptom of several diseases entirely distinct from each other. C. may be spasmodic, depending on a state of nervous irritability, without any obvious exciting cause; or it may be occasioned by pressure on the lungs from obesity, enlargement of the liver and spleen, &c. C. may also be caused by the inhalation of irritant matters, brought into contact with the fauces, trachea, or bronchial tubes. Severe and prolonged C., not unfrequently simulating the symptoms of organic disease of the lungs, is often caused by enlargement and elongation of the uvula, the result of inflammation of that organ, the irritation being caused by the uvula tickling the adjacent parts. C. may also depend upon the absence of the normal amount of mucous secretion in the respiratory passages, and when such is the case, it is not followed by expectoration; or it may be caused by an excess of mucous secretion, as in ordinary catarrh and bronchitis. C. is also a symptom of such diseases of the lungs as pneumonia and phthisis; and of such local affections as croup, diphtheria, and whooping-cough. The C. of asthma is usually accompanied with distressing dyspnœa. In many diseases C. is a secondary symptom, owing to the respiratory organs being affected in connection with the general constitutional derangement. When it depends on acute or sub-acute inflammation, it is accompanied with febrile symptoms, as in bronchitis, pneumonia, and frequently in phthisis; but when chronic, or depending on local irritation only, there may be no pyrexia. By stethoscopic and other means of diagnosis, the nature of the disease, the seat thereof, and the extent to which the lungs are implicated, can always be determined. C., in all cases, is an effort of nature to relieve itself from a source of irritation.

Coulomb', Charles Augustin de, a well-known French physicist, was born at Angoulême, 24th June, 1736. His fame rests upon his experimental researches in electricity and magnetism, especially his discovery of the law of the inverse square. (See TORSION BALANCE.) Through the influence of the projectors of a canal in Bretagne, C. was imprisoned for a time on account of his unfavourable report of the scheme. In 1786 he became a member of the Academy of Sciences, and in 1806 of the Institute. C. died 23rd August, 1806. His principal literary productions are his memoirs *Sur les Aiguilles Aimantées* (1779), *Sur la Statique des Voûtes* (1779), and *Sur la Chaleur* (1804).

Cou'marin is a crystalline substance contained in the Tonka bean, in woodruff, and in several other plants. It may be obtained by extracting Tonka beans with boiling alcohol, and evaporating the solution till it crystallises. C. has a pleasant aromatic odour; its taste is burning. When heated it melts, and may be volatilised unchanged. C. has been prepared artificially.

Coun'cil, in the New Testament, signifies the Jewish Sanhedrim (q.v.). The clergy of a city or district, presided over by one of their own number as moderator, formed a consistorial court or C. of one Church. Of this nature was the meeting of the Church at Jerusalem recorded in Acts xv., which is sometimes called the first Christian C. In the 3rd c. the moderator was developed into a Bishop (q.v.), who presided over the councils of the presbyters of his diocese. An ecclesiastical C. proper, however, is a meeting of delegates from a number of confederate Churches. The custom of holding such councils began among the Greeks, who were accustomed to hold similar assemblies (synods) in connection with a political confederation of cities; and from them it was extended throughout the whole Church, the meeting receiving in the West the Latin name of C. At first the councils were merely provincial, and had very limited powers; the bishops and presbyters came as the representatives of their churches, and were presided over by a Metropolitan (q.v.). The earliest councils of this kind of which there is authentic notice were those which met concerning the Montanists, about 170. These councils having thus come to be regarded as the highest ecclesiastical tribunal in the several provinces, when the Church was established and consolidated under Constantine, it was easy to extend the idea to the whole Roman Empire, and the Emperor summoned a general or Œcumenical C. (q.v.) to discuss matters affecting the whole Church or the general principles of Christianity. The authority of convening general councils in the East was exercised by the Emperors; the Popes afterwards exercised the same power in the West.

The four general councils recognised by all Churches are those of Nicæa (325), of Constantinople (381), of Ephesus (431), and of Chalcedon (451). The chief subject discussed at these four was the doctrine regarding the person of Christ. The first condemned Arius (q.v.), who denied the proper divinity of Christ, and decreed his *true* Godhead. The second condemned Apollinaris (q.v.), who gave to Christ only an incomplete human nature, and decreed his *perfect* manhood. The third condemned Nestorius (q.v.), who separated Christ's two natures, and decreed that he was God and man *indivisibly*. The fourth condemned Eutyches (q.v.), who confounded Christ's two natures, and decreed that he was God and man *distinctly*. The Greek Church recognises other three in addition to the above; II. Constantinople (553), at which Origen was condemned; III. Constantinople (680), at which the Monothelites (q.v.) were condemned; II. Nicæa (787), at which image-worship was established. The Church of Rome recognises in addition to these seven, other eleven; IV. Constantinople (869); I. Lateran (1122), II. (1139), III. (1179), IV. (1215), at which Pope Innocent III. forbade the formation of new orders of monks; I. Lyon (1245), at which Innocent IV. declared Friedrich II. unworthy of the imperial throne of Germany; II. Lyon (1274), remarkable for the new regulations it enacted for the election of the Popes, including the shutting up of the cardinals in conclave; Vienne (1311), at which the Beghards and Beguines (q.v.) were condemned, and the Knights Templars suppressed; Florence (1439), which was chiefly occupied in settling the disputes between the Greeks and Latins; V. Lateran (1512), called by Pope Julius II. in opposition to that of Pisa; Trent (1545), convened to settle the controversies with the Protestants. The French divines, however, substitute for the Councils of Lyon, Florence, and V. Lateran, those of Pisa (1409), by which the *two* contending Popes were excommunicated; Constance (1414), at which the discord between the *three* contending Popes was extinguished; and Basel (1431), which discussed the union of the Greeks and Latins, and the reformation of the Church.

Besides these general councils, called by the Emperors and the Popes, many local councils were held, at which the bishops freely expressed their opinion, and often gave decisions opposed to those of the Popes; for it was long till the Church of the West especially could be brought to regard the decisions of the Roman Bishop as final. Of these local councils the chief are: Constantinople (754), called by Constantine (son of Leo the Isaurian) against image-worship; Frankfurt (794), called by Charlemagne against image-worship; Constantinople (842), which restored image-worship; Constantinople (861), called by some of the Greeks a general C.; Constantinople (879), which confirmed image-worship, and is held by some of the Greeks to be the eighth general C.; Placentia and Clermont (both 1095), at which Urban II. recommended the first crusade; Pisa and Milan (1511), called by Louis XII. of France to oppose Pope Julius II. The most important Protestant councils have been the Synod of

Dort (q.v.) in 1618, which condemned Arminianism, and the Westminster Assembly, which met in 1643 to aid the English Parliament in settling the government, worship, and doctrines of the Church of England. See Whately's *Kingdom of Christ*, Guericke's *Manual of Church Hist.*, Walcot's *Sacred Archæology*, and Michaud's *Discussions sur les Sept Conciles Œcumeniques* (Bern 1878).

Council of War, is a conference during war of general officers, or of the superior officers of a detachment, to advise with the commander. The British military code leaves the taking of this advice to the discretion of a commander; but the French code makes special provision for it, especially as regards the defence of a garrison. In the navy, flag-officers only are considered qualified to take part in a C. of W.; but officers of a lower rank are sometimes invited.

Count, or **County** (Lat. *comes*, Fr. *comte*), formerly an official, but now merely an honorary title, used on the Continent, and corresponding to the English Earl (q.v.) and the German Graf (q.v.). On the breaking up of the Roman Empire, the title *Comes* (q.v.) was retained in the new European kingdom, and under Charlemagne was applied both to military and civil officials. In France, where the C. of the palace ranked next to the mayor of the palace, the various Counts or governors of provinces were enabled, as the Karoling dynasty grew weaker, to acquire jurisdictions independent of the crown, and to make their titles, which they took from their respective possessions, hereditary. Thus arose the powerful Counts of Champagne and Toulouse, independent sovereigns, who appointed Counts under them, who are known as *Counts-palatine*. After the 12th c. the power of the French Counts decreased, the division of the country into counties was destroyed, and since the French Revolution C. has been merely an honorary title. In England, the Norman successors to the possessions of the English Earls were, for a time, known as Counts. Hence the wife of an Earl is still called a *Countess*. C. Palatine was, in England, applied to the noble or churchman (such as the Earl of Chester and the Bishop of Durham) who exercised royal prerogatives within his county. To this day there exists the C. Palatine of Durham, having its own staff of legal officers, just as the royal Duchy of Lancaster.

Count and Reck'oning is the name given in Scotch law to a form of process by which one party may compel another to account with him judicially, and to pay the balance which may be found due. In these actions, a remit is usually made to an accountant. The form of summons is called one of Count, Reckoning, and Payment, and is issued in accordance with a decree of the Lords of Council and Session.

Coun'ter-Approach', in defensive military engineering, a trench leading towards the besiegers from the covered way of the fortified place, and frequently ending in a small redoubt or battery. Its object is to get a point from which to enfilade the trenches of the enemy, and thus keep the fighting farther away from the besieged fortress.

Counter-Changed, in heraldry, describes a field divided in such a manner that it is tinctured in part with metal, in part with colour, the charges being reciprocally of the same colour and metal.

Coun'terforts, in fortification, are buttresses of brick or stone, built against the revêtment wall, to resist the outward pressure of the rampart, or the natural ground on the opposite side of the ditch. Their depth is usually equal to the mean thickness of the revêtment, and they are placed about 18 feet apart.

Coun'terguards, in fortifications, are small outworks, with parapets and ditches, occasionally constructed to cover the bastions and ravelins of a fortress. They run parallel to the faces of these interior works, and their crest is 3 or 4 feet lower than theirs, so as not to obstruct the defence, when the enemy has made a lodgment on the counterguard. The rear parapet never exceeds 18 feet, that there may not be space to establish a battery there when a lodgment has been made.

Counter-Irr'itants are medicinal agents having the property of irritating that part of the body to which they are applied, and of thereby exerting a curative influence on diseased parts or organs. They are chiefly used to modify the vascularity and nutrition of diseased parts; and to control congestion and inflammation, on the hypothesis that the production of artificial irritation on a sound part of the body affords relief to a part or organ previously diseased. Such agents have been employed by physicians from the earliest times. They are divided into three classes, viz., *rubefacients*, *epispastics*, and *caustics* or *escharotics*. The more prominent effects of C.-I. are purely mechanical, an artificial inflammation being produced which, when duly regulated, palliates or cures those which arise primarily or idiopathically, the blood being withdrawn from the congested or inflamed part, and accumulated in that to which the irritant is applied. C.-I. are applicable chiefly to cases of pain, congestion, or inflammation, the cause of which is confined chiefly to the affected parts, and they have but little influence upon the local developments of idiopathic general diseases, as fevers. They are of advantage at the early stage of diseases, when there is local determination of blood, but not during the stage of febrile action. When the intensity of the febrile action has subsided, as indicated by the pulse being softer and less frequent, the appropriate time has arrived for the application of C.-I. to obviate the effects of inflammation, and the less the extent of the disease the more amenable it is to this mode of treatment. The principal C.-I. are acid sulphuricum, ammonia, tartar emetic, aqua fervens, cantharides, capsicum, croton oil, moxa, sabina, setons and issues, mustard, succini oleum, turpentine. By the application of irritant ointments to a blistered surface, the counter-irritant action may be kept up for any length of time desired.

Coun'termines, in military engineering, are chambers or galleries excavated by the defenders of a fortified place to intercept the mines, discover the mining, or destroy the works of the besiegers. Listening galleries are effective means of defence, since the sound of a pickaxe can be heard 60 feet through the ground, and are always provided in a large fortress; so also are envelope and counterscarp galleries, and passages for communication. The countermining was a remarkable feature of Inglis's heroic defence of Lucknow in 1857.

Coun'ter-Pas'sant, in heraldry, describes two lions, or other beasts, passing each other in contrary directions.

Coun'terpoint ('point against point') is, in music, the accompanying of one melody or theme with others. Originally this was the only form in which any melody was harmonised, while in modern music (except in church-music and oratorios) it has been to a great extent superseded by harmony, which relies for its effect rather upon the construction and progression of the whole chords than upon the movement of the different separate notes of which each consists. There are many treatises on C., the authors of most of which seem to have taken as great delight in devising combinations possessing no merit but ingenuity, as in fostering the beauty of their art. The art of C., as described in these works, is highly complex and artificial, hemming the composer round with all sorts of restrictions, but at the same time its study is an essential part of a musician's education, just as in many other branches of knowledge the learner is compelled to work under strict rules at first, in order to give him greater freedom in his original work afterwards.

Coun'ter-Proof, in engraving, an impression obtained from a proof, while it is still wet from the plate, by laying it on a sheet of paper, and passing them through a press. The design on the C.-P. being the reverse of the proof, is in the same direction as that on the plate, and is made chiefly as a means of judging of the success of the engraver's work.

Coun'terscarp, in fortification, is the wall of a ditch on the besiegers' side, the wall next the body of the fortress being the escarp or scarp.

Coun'tersign, in military language, is a watchword given daily by the commander of an army during actual warfare or manœuvres, the pronouncing of which is a warrant for being allowed to pass the sentinels as a friend. It is generally some simple word. In diplomatic language, the C. is the signature of a secretary to the charter of a king, prelate, or other superior, as a certificate of its authenticity. In the Middle Ages, common additions to the C. are *obtulit, recognovit, relegit et subscripsit.*

Coun'ter-Ten'or, a male voice singing—mostly in *falsetto*—the alto part. The C.-T. takes the upper part in male-voice music, and sometimes the alto in mixed choruses. For this latter purpose it must be entirely condemned, for it is artificial, hard, and quite wanting in that freshness which characterises the true alto voice of women and boys.

Coun'ter-Vair, in heraldry, is one of the Furs (q.v.). Vair exhibits azure and argent shields or bells in horizontal rows, with the bases or points of the tinctures touching on each other. C.-V. shows the same objects with azure touching on azure and argent on argent.

Countervalla'tion, in siege operations, is a chain of redoubts all round a fortified place to hinder the sorties of the garrison. The redoubts are either isolated or connected by earthworks. A similar chain of redoubts to protect the besiegers from external attack is a Circumvallation (q.v.).

Coun'ties in England and Scotland are the same as shires. (See SHIRE.) C. are districts into which the country is divided for purposes of government and administration of justice. Each county in England is ruled by its Sheriff (q.v.). Lancaster and Durham are *C.-palatine*, which were invested with an independent jurisdiction. Certain cities and towns, with land and territory annexed, having liberties and jurisdiction by grant from the crown, are called *C. corporate.*

County Councils are popularly elected bodies, instituted by the Local Government Act, 1888, for taking over all duties connected with matters of local government in England and Wales, hitherto performed by justices of the peace, relating to county finance, rating and assessment, county buildings, bridges, lunatic asylums, reformatories, licensing for races, dancing and music, theatres, registration and polling of parliamentary electors, contagious diseases (animals), appointment, fees, district, and salary of coroners, pollution of rivers, and other minor matters named in the Act. The control of the county police is vested in them jointly with the quarter sessions, except in London, where the Government retain the control of the Metropolitan Police. They are empowered to make and levy county and other rates, and also receive a share of certain license duties, and of the probate duty collected by the Imperial Government. They are elected every three years by electors (men and women) who are qualified the same as borough burgesses, and have been enrolled for the purpose as 'county electors.' In addition to the C. Councillors elected there are aldermen, elected by the C. Councillors, either from their own body or from those persons qualified to be councillors. The aldermen are elected for six years, half the number retiring every three years. The chairman is elected by the aldermen and councillors from their own body or from persons qualified to be so placed on the Council. Qualification for a seat on the C. C. is similar to that for a seat on the borough council, and includes ministers of religion, peers possessing property in the county, county parliamentary electors, and military officers. There are altogether 62 C. C.'s in England and Wales, including those of London, Isle of Ely, the three Ridings of Yorkshire, and the Isle of Wight.

County Courts. The dilatory and expensive proceedings necessary for the recovery of small debts in the old courts led to the establishment in 1846 of the present C. C.'s with more efficient and definite powers for the hearing of cases of a minor importance in civil matters only, and an extensive jurisdiction in questions of law and equity.

If a cause involve more than £5, or be one in equity, a jury may be demanded by either party, or if it do not exceed £5, the judge may grant a jury trial. Under order of the judge, and with the consent of both parties, the issue may be settled by arbitration. Judgment in the C. C. is final, except on a point of law, equity, or the hearing or non-hearing of evidence, in which case, when either party is dissatisfied, appeal may be made to the High Court, but only with leave of the C. Court judge, if the claim be no more than £20. Certain provisions serve as a deterrent to persons contemplating bringing small actions before the High Court, in place of the C. C. The judges of C. C. are appointed by the Lord Chancellor from barristers of seven years' standing at least, who are no longer permitted to practise or act as arbitrators. The size of each district is fixed from time to time by the Order in Council. There may not be more than 60 C. Court judges. When the action is one concerning libel, slander, breach of promise of marriage, seduction, ejectment, title to corporeal or incorporeal hereditament, fair, toll, franchise, or market, the fact of the claim being more than £50 does not take the case out of the jurisdiction of C. C., and the C. Court judge may also adjudicate in cases where the subject matter does not exceed £500 in certain actions, brought by the creditors or legatees of a deceased person, or relating to relief against mistake or fraud, the maintenance of infants, or the dissolution of partnerships.

Important enlargements were made in the powers of the County Courts by various Acts and amendments from 1846 to 1875, and all these statutes were in 1888 consolidated and amended by the amending County Courts Act of that year.

County Rates are assessments in each parish in a county, assessed by the justices on the annual value of lands and tenements rateable for relief of the poor. They are applicable to payment of the county police, maintenance of prisons and county buildings, prosecution of felons and vagrants, and other county matters. By the Local Government Act, 1888, the assessing and expenditure of C. R. were vested in the County Councils.

Coup, a French word meaning 'a blow,' 'a stroke,' (old Fr. *colp*, from Low Lat. *colpus*, a contraction of *colapus*, from the classic Lat. *colaphus*), is known as the first word of certain expressive phrases which have become universally current. *C. d'état* signifies a stroke of policy; *C. de grâce*, the stroke of mercy by which an executioner ends a condemned wretch's sufferings; *C. de main*, a military phrase, meaning a rapid, successful attack—literally a stroke of the hand; *C. d'œil*, a glance of the eye—quick, comprehensive observation; *C. de soleil*, sunstroke; and *C. de théâtre*, a stage trick—surprising effects in real life as well as on the stage.

Couped (Fr. *couper*, 'to cut off'), in heraldry, describes the head or any limb of a lion or any beast cut off smoothly, not torn off with a ragged edge, or, as the heraldists say, *erased*. *C. close* is applied to the same kind of charge when no part of the neck or trunk is left. The term C. describes also a cross, bar, bend, or other similar charge when it does not extend in any direction to the border lines of the shield.

Coup'le (Lat. *copula*), the name given by Poinsot to a pair of equal forces acting in dissimilar directions in parallel lines. Such a system has a zero resultant acting at an infinite distance, yet it does not balance, the motion generated being one of rotation. The shortest distance between the directions of the forces is termed the *arm*, and the product of either force into the arm the *moment*. The *axis* is a straight line drawn from a convenient point of reference, perpendicular to the plane of the C., and representing by its length and direction the magnitude of the moment and the direction of rotation. If the rotation be positive, the axis is drawn towards the side from which the C. is viewed; if negative, towards the other side. Hence a C. regarded from the direction in which the axis points, is one which produces a positive rotation, and thus the axis completely determines the C. both in direction and magnitude. The resultant C. of two given couples is that C. whose axis is the diagonal of the parallelogram formed by the axis of the two given couples in precisely the same manner as in the Composition of Velocities and Forces (q.v.). It is evident, then, that the forces acting upon a material system may be all reduced to a force, a C., or a force and C.; and the reduction may be so ordered that the resultant force acts perpendicular to the plane of the resultant C., in which circumstances each will produce the respective effects of translation and rotation as if the other were not present. For the investigation and demonstration of the fundamental propositions in the theory of couples, see Thomson and Tait's *Elements of Natural Philosophy*, Todhunter's *Analytical Statics*, Pratt's *Mechanics*, and Duhamel's *Cours de Mécanique*.

Coup'ler, a piece of mechanism in an organ, by means of which two keyboards, or one manual and the pedals, can be connected together.

Coup'let is the name given to any couple of consecutive rhyming verses, but is more strictly used to denote two rhyming verses of equal length and rhythm, embodying an idea usually of the nature of a proverb or aphorism—

> 'Great wits are sure to madness near allied,
> And thin partitions do their bounds divide.'

The C. is very frequently used by the old dramatists as the 'tag' or concluding passage of a speech, in which a train of thought is rounded off with rhetorical completion—

> 'I go, and it is done; the bell invites me.
> Hear it not, Duncan, for it is a knell
> That summons thee to heaven or to hell.'

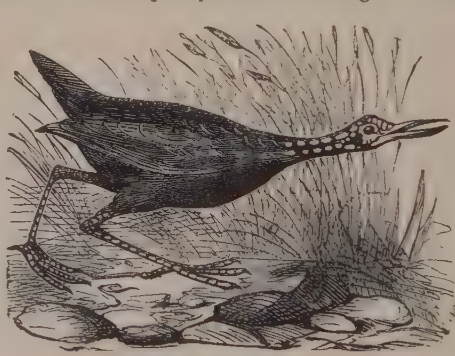
Cou'pon (Fr. *couper*, 'to cut off'), a certificate or warrant of interest or dividend due, printed at the bottom of transferable bonds given for a term of years, and cut off and presented for payment by the holder. In Great Britain a C. must be stamped.

Courante', a lively dance in triple time. The C. frequently occurs as one of the movements in the Suites (q.v.) of the older composers.

Courbevoie', a town in the department of the Seine, France, on the left bank of the Seine, 5 miles N.W. of Paris, with manufactures of white lead and brandy, and a trade in wine, brandy, and wood. Pop. commune 17,597; canton 98,407.

Cou'rier (Fr. *coureur*, from *courir*, Lat. *currere*, 'to run'), as a servant of a Government, is the bearer of important despatches to and from ambassadors at foreign courts. The employment of such messengers is of great antiquity. The Persian *angaros*, or mounted C., was kept always in readiness at certain stages throughout the country, to carry the king's despatches. Among the Greeks the C. was *hemerodromos*, a man who could run all day. The Romans styled him *cursor*, 'runner.' The duties were performed chiefly on horseback. In the Middle Ages couriers were known as *trotarii*, 'trotters.' In the 17th and 18th centuries they were called *running footmen* in England. Couriers now proceed by steamer, rail, or hired carriage, as well as on horseback; generally speak several languages; are acquainted with routes and officials, and are furnished with credentials and money by their Government. The C. in the Queen's Foreign Service is called Queen's Messenger. The appointment is one of those exempted from open competition, but a nominated candidate must be between the ages 25 to 35, must be a British subject, must pass an examination in French, German, or Italian, and in the first four rules of arithmetic, must be able to ride and perform journeys on horseback, and must possess sound bodily health. There are now nine Queen's Foreign Service Messengers, and eight Queen's Home Service Messengers, who are, however, on quite a different footing. The term C. is also applied to a private attendant on travellers, who arranges for his employer's convenience on journeys. He usually speaks several languages, knows the best routes, hotels, and places and objects of curious interest. The wages of this kind of C. are from £8 to £10 a month, independently of travelling expenses, out of which he is supposed to pay his own bill at hotels.

Courier, Paul Louis, was born at Paris, 4th January, 1773, of rich *bourgeois* parents, and after a successful study of Greek and mathematics, entered the artillery as scholar in the Camp of Châlons (1792). While serving in the army of the Moselle (1794-95), the 'army of England' (1798), and in the French occupation of Rome, C. found time to keep up his classical studies. He superintended the ordnance of Paris till 1801, translating in that period the chief orations of Cicero. In 1803 his *Éloge d'Hélène* (a work of Isocrates) was published. In 1805 he served in Italy, and took part in the conquest of the Two Sicilies, which gave an insecure throne to Joseph Bonaparte. In the midst of the guerilla warfare of the Sicilian peasants against the French general, Reynier, C. continued his studies and translations of Xenophon (the works upon Cavalry and Equitation). Misunderstandings with his superiors at various Italian stations caused him in 1809 to resign, although he returned to serve for a short time in the concluding campaign on the Danube. Soon after he made at San Lorenzo, Florence, the discovery of the manuscript of Longus, which he was afterwards stupidly accused of mutilating. In 1812 he settled in Paris, published his translation of the *Daphnis and Chloe* of Longus, and married in 1814. The management of his estate in Touraine brought him into contact with the absurd pretensions of the restored aristocrats. C. began his political writings by his famous *Pétition aux Deux Chambres*, and soon afterwards attached himself to the opposition journal, the *Censeur*. In 1821 his *Simple Discours* involved him in a political trial for insulting the court, resulting in a sentence of imprisonment. His *Pétition des Villageois qu'on empêche de danser* had nearly the same fate. On 10th April, 1825, C. was assassinated on his estate of Veretz, in circumstances which have never been rightly explained. His exact and extensive learning, fine taste, powerful satire, and simplicity and directness of style, give him a high place among French literary men. In some respects he has been likened to Swift. His *Livret*, or memorandum-book, gives a valuable and humorous picture of French politics and society after the Bourbon restoration. His complete works were published by Armand Carrel, with an essay on his life (Par. 1834).


South American Courlan.

Cour'lan, a large wading bird belonging to the order *Rallidæ* or Rails. The N. American C. has a depressed bill, broad rounded wings, and long hind toe; is of chocolate colour with a white throat and most of the feathers streaked with white. It runs quickly but is slow in flight. Its length of body is rather over 2 feet. It occurs in the W. Indies and in Florida, where it feeds upon a large green snail. The nest is fastened to water-reeds, and the number of eggs is either five or six. The S. American C. resembles that of N. America, though it is larger and only the feathers on the head and neck have white streaks. Both species are excellent eating.

Cour'land (Slav. *Kars*, Ger. *Kurland*), a Russian Baltic government, S. of Gulf of Riga, has an area of 10,535 sq. miles, and a pop. of 693,300. It is mostly covered with wood, consisting of beech, pine, alder, birch, and oak, and is in general level and full of lakes and marshes, the highest eminence being Silberberg, in the vicinity of Mittau, the capital, only 500 feet high. Distilleries and tilling form the most important sources of industry. The wealthiest and most intelligent of the inhabitants are Germans; the peasantry are for the most part Letts. The territory of C., taken under the protection of Poland in 1561, was merged in Russia in 1795. At one time it formed two duchies, the property of the Teutonic knights.

Cour'ses, in a ship, are the whole of the lower sails—*e.g.*, foresail, mainsail, mainstay-sail, &c.

Cour'sing is a mode of hunting hares by greyhounds. When a hare is started, it is allowed to get about 100 yards in advance of the dogs, which are then let loose from the 'slips,' or cords, held by the 'slipper,' and fastened to the dogs' collars. The judge keeps his eye on the dogs, and notes when either one makes what is called 'a point,' that is, causes the hare to turn or 'double,' as it is called, or otherwise gets a decided advantage over the other. The victory is not *necessarily* adjudged to the dog which kills the hare, but to the one which makes most 'points.'

Court (Fr. *cour*, Old Fr. *court*, from Lat. *cohortem*, 'a yard,' also in peasant speech *cortem*, according to Varro; allied to the Teutonic *garden*, *garten*, and *yard*), among the Franks and other Germanic tribes the country-house of a lord or chief, where also he administered justice. Later on it denoted the space enclosed by the buildings of a feudal castle; hence it came to be applied to those persons immediately surrounding the chief. In England, when we speak of 'the C.' we denote the family and household of the sovereign.

Court, Presentation at, or introduction to the sovereign, can in England only be obtained by means of some one who has been already introduced. The distinction is valued as a stamp of character and social status, though not usually cared for by those who have distinguished themselves in science, literature, or art. The 'C.-dress,' which must be worn on the occasion, probably forms to some an objection to going through the ceremony. It is antiquated, fantastic, and expensive. There are special days, advertised in the newspapers, on which the Queen holds levées and drawing-rooms. The former is for the reception of men only; the latter chiefly for the reception of women. The names of those who wish to be presented must be sent in to the office of the Lord Chamberlain some days previously, that they may be submitted to the Queen. No man or woman of doubtful reputation will be received. Lists of presentations appear on the following day in the principal London newspapers. Any British subject who has been presented at the C. of his own sovereign has a right to be presented at any foreign C. by the British Ambassador.

Court of Judicature, Supreme, Acts, 1873 and 1875 (England). The statute of 1875 amended and extended the Act of 1873, and is to be construed along with it, the Acts together totally changing the constitution of the supreme law courts of England. By the Act of 1873 the Courts of Chancery, Queen's Bench, Common Pleas, Exchequer, Admiralty, and Probate and Divorce, were consolidated as one Supreme Court, in two divisions, Her Majesty's High Court of Justice, and H.M. Court of Appeal, the appellate jurisdiction of the House of Lords being regulated by the Acts of 1876 and 1887. (See COMMON LAW.) All actions which had hitherto been commenced in the superior courts of Common Law at Westminster, or in the C. of Common Pleas at Lancaster, or in the C. of Common Pleas at Durham, and all suits which had hitherto been begun by a bill or information in the High C. of Chancery, or by a cause *in rem* or *in personam* in the High C. of Admiralty, or by citation or otherwise in the C. of Probate, were now by these Acts to be instituted in the High C. of Justice by a proceeding to be called an *action*. There were to be five divisions of the C., called the Queen's Bench, the Common Pleas, the Exchequer, the Chancery, and the Probate, Divorce, and Admiralty Divisions. The numbers of divisions and of judges were to be increased or decreased by the Queen in Council, and an Order in Council, issued in 1881, joined together the three first-named divisions and made them one division, the Queen's Bench division, so there are now three divisions. Her Majesty's C. of Appeal was also constituted by the Acts. (See APPEAL.) The most important change effected by these Acts was the power given to each divisional judge to administer law and equity concurrently with power to prefer the latter when opposed to the former. Registrars were appointed to several districts to hear the proceedings up to the trial. Rules of Practice were put forward and these have been amended from time to time, and at length consolidated in 1883. The Act of 1883 united the London C. of Bankruptcy to the High C. of Justice. No appeal on a final decree is to be pleaded before fewer than three judges. If the subject of appeal is an interlocutory decree or order, it may be pleaded before two judges, but not before fewer. New regulations are made respecting circuits, and the fixing and collection of fees in the High C. and C. of Appeal.

Court of Session is the supreme civil court of Scotland. It was instituted in 1532 by James V. Formerly it consisted of fifteen judges, 7 churchmen, 7 laymen, and a president, who sat in one court; but by 48 Geo. III. c. 151, the judges were required to sit in two divisions, and by 1 Will. IV. c. 69, their number was reduced to thirteen—the Lord President, the Lord Justice Clerk, and eleven ordinary Lords. The Lord President and three Ordinary Lords form the First Division, and the Lord Justice Clerk and the other three Ordinary Lords form the Second Division; five judges being left in the Outer House not attached to either division.

The First and Second Division form what is called the *Inner House*. There are five permanent Lords Ordinary, each of whom holds a court; the courts of the Lords Ordinary forming collectively what is called the *Outer House*. The judgments of the Outer House are subject to the review of either division of the Inner House. The junior Lord Ordinary officiates in the Bill Chamber (q.v.) during session (15th October—20th March and 12th May—20th July, except certain holidays and recesses at the end of the year and in February). The C. of S. is the only court in Scotland which has jurisdiction over heritage, or in questions affecting it. With a few exceptions, no action respecting Movables (q.v.), where the interest of the Pursuer (q.v.) is under £25, can originate in the C. of S. The judgments of inferior courts, except that of the small-debt courts (see SHERIFF), are mostly subject to the review of the C. of S.; and even when this power is excluded, it may interfere when the inferior courts deviate from statutory regulation. The judges hold their office *ad vitam aut culpam*. Their appointment is from the crown. No one can be appointed who has not served as an advocate or principal clerk of session for five years, or as a writer to the signet for ten. Either division of the court may call in the aid of the three judges of the other division, when equally divided in opinion. In cases of extreme difficulty the Lords Ordinary are also called in, and pleadings are heard before the whole court, or *in presence*, as it is called. Judgments of the C. of S. may, in all ordinary cases, be appealed against to the House of Lords within two years, and the appeal is in the form of a petition. See Professor Mackay's *Treatise on the Practice of the C. of S.*

Courtall'um (*Kútt'alam*), a village in the district of Tinnevelly, province of Madras, 700 feet above the sea-level, near the junction of the Eastern and Western Ghâts. From the salubrity of the atmosphere and the picturesqueness of the scenery, it is much frequented by invalids. Its flora is singularly rich.

Cour'tesy or **Cur'tesy of England.** When a wife dies seized in fee (simple or tail) of an estate, having or having had living issue, her husband holds the estate during his life, and is called *tenant by the C. of E.*

Courtesy or Curialty of Scotland is the same right of a husband in Scotland, and dependent on essentially the same conditions.

In both countries the child must be the mother's heir; it consequently appears that C. falls to the husband as the father of the heir. In Scotland, the test of the child being born alive has been decided to be that it shall have been heard to cry, and this rule is still adhered to. It is an error to suppose that the right is peculiar to either nation.

Courtesy Titles are titles accorded by society to individuals who have no legal right to them. The term is chiefly used in connection with the titles assigned to the children of peers in Great Britain and in Ireland. The eldest son usually bears the second highest title belonging to his father, unless the inferior title is of the same name as the first, in which case, to prevent confusion, some other title belonging to the father is assumed, or the family surname with the prefix of 'Lord.' When there is no secondary title, as must be the case with barons, the eldest son has the courtesy title of 'Honourable.' In Scotland he is known as the 'Master of——.' The younger sons and daughters of dukes and marquesses have the courtesy title of 'Lord' or 'Lady' prefixed to their Christian name and surname. The younger sons and daughters of earls are entitled 'Honourable' and 'Lady' respectively. The younger sons and daughters of viscounts and barons are entitled 'Honourable.' Wives of baronets have the courtesy title of 'Lady,' but their sons and daughters bear no title. Members of the Queen's Privy Council are by courtesy 'Right Honourable.' Judges of the Court of Session in Scotland are addressed as 'Lord' on and off the bench. 'Esquire' (q.v.), though properly applicable to only a limited class, is now almost universally assumed. Ladies, who have acquired a title by a first marriage retain it by courtesy after a second marriage, though the husband have no title. No courtesy title raises the bearer above the rank of a commoner. The eldest son of a duke, marquess, or earl, or any son of a peer, may therefore sit in the House of Commons; so may an Irish peer, but a Scotch peer cannot.

Court Fool, a jester formerly attached to a court or royal household, whose business it was to help to make the time pass agreeably by facetious or extravagant remarks, which often pleased in proportion as they were personal. The institution of the office is of very ancient date, but the palmy period of the C. F. was during the Middle Ages. He was distinguished by the shaven head, the peaked cap of divers brilliant colours, generally having bells attached to it, the cockscomb, the ass's ears, and a sceptre of some fantastic shape. He also wore a collar of extravagant dimensions, and a dress which varied with the taste or the caprice of his master. Some of these officials have obtained a name in history, and many of their facetiæ, which sometimes expressed shrewd practical counsel, and even considerable political sagacity, have been preserved. Of court fools who have become historical, among the best known are Triboulet, the jester to François I. of France, and his successor, Brusquet; Scogan, jester to Edward IV. of England; and Archie Armstrong, the last of his order at the English court, who flourished in the reigns of James I. and Charles I. Court fools survived longest in Russia, but are now extinct even there.

Court'hand, the old English style of handwriting, as distinguished from the modern or Italian style. It is so named because it was used in courts of law after it had been generally superseded.

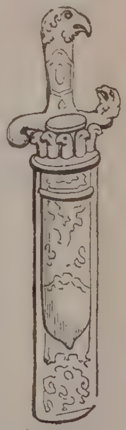
Court-Martial is a court for trying naval and military officers for breach of naval or military law. No capital punishment can be passed by a military general or district C.-M. unless two-thirds at least of the judges concur, or by a naval C.-M. unless four at least of the judges where the number does not exceed five, or in other cases unless two-thirds concur. When the court does not exceed its power, there is no appeal against its sentence; but it requires to be ratified by the crown. Every military general C.-M. is attended by the Judge Advocate-General, Judge Advocate, or representative, who advises the court on points of law, procedure, &c., swears and summons the witnesses, takes notes, and if necessary, assists the prisoner. Should the Judge Advocate-General be not present, his representative transmits the notes to him and his opinion may quash the verdict; when the C.-M. is held abroad, the proceedings are notified to the Judge Advocate-General, who files the notes. In the naval C.-M. the president appoints an officiating judge advocate whose duties are similar to those of the official in the military C.-M. The Army Act, 1881, which is renewed by an annual Act of Parliament, provides for the military C.-M., while the Naval Discipline Act, 1866, deals with the naval C.-M.

Cour'trai (Flem. *Kortryk*, the Lat. *Cortoriacum* of the *Notitia*, afterwards *Curtricum*), a fortified town in the province of W. Flanders, Belgium, on the Lys, 28 miles S. of Bruges. It is connected with Ghent, Lille, and Tournay by railway, has fine churches and a splendid Gothic town-hall, manufactures of linen, lace, thread, tablecloths, also extensive bleaching and soap-boiling works, sugar-refineries, &c.; and the finest flax in Flanders is grown in the neighbourhood. Pop. 31,319. The Battle of the Gold Spurs, so called from 700 gilt spurs being stripped from the French knights slaughtered by the Flemings, was fought at C., 11th July, 1302.

Cousin, Victor, an illustrious French author, was born at Paris, 28th November, 1792, of poor parents. He was educated at the École Normale, where he subsequently taught classics, till the inspiration received from Laromiguière decided him to teach philosophy at the Sorbonne under Royer-Collard. The retrograde policy of the Government of Louis XVIII. drove him into Germany, where he met Hegel and studied Plato and Proclus. He recommenced his lectures in 1828, and the courses delivered during that and the two following years were probably unequalled in popularity in modern times. To this his handsome figure and splendid eloquence greatly contributed. After the Revolution of July he entered the Council of Public Instruction, to which he presented his valuable reports on education (chiefly primary) in Germany, Prussia, and Holland. Created a peer of France, he did not cease to lecture on Aristotle at the École Normale, of which he was now director. He was Minister of Public Instruction in the Thiers ministry of 1840. His speeches in the Chamber of Peers, especially that on philosophy in the universities, earned for him a high reputation as a public orator. At the same time the amount of his literary work was enormous. His editions of Proclus, Plato, Descartes, De Biron, Abelard, his works on the philosophy of the 18th c., on the scholastic philosophy, on Kant, on Aristotle's metaphysics, his book upon Mme. de Longueville, and his edition of Pascal's *Pensées*, all contain valuable material. His most popular work in Great Britain is the *Discours du Vrai, du Beau, et du Bien*. C.'s theory that there are in every act of consciousness three fundamental elements, viz., an element of plurality, compounded of finite self and finite not-self, an element of absolute, infinite substance, and an element of relation between the finite and God, or effect and cause, has been criticised by Sir William Hamilton in the *Edinburgh Review*, and is of course rejected by all who think that the knowledge of God comes by inference from experience. C.'s report on German education, and his *Projet de Loi* of 2nd January, 1833, have been ably discussed by Sir William Hamilton (*Discussions*). C., who died at Cannes, 13th January, 1867, left a considerable school among the younger French thinkers, of whom Janet may be taken as a specimen. Jules Simon and Jouffroi have also been called his disciples, but the latter had much greater scientific capacity than his master, who was less a philosopher than an eloquent and learned *littérateur*, with a taste for philosophical subjects, and an unusual power of impressing his enthusiasm on his pupils. C.'s works were published in a collected edition (Par. 1846-47).

Coutances', a town in the department of La Manche, France, at the confluence of the Soulle and Bulsard, with a fine cathedral, one of the towers of which has been fitted up as a beacon to ships in the English Channel. It has manufactures of drugget, muslin, and thread, with a good trade in grain and cattle. C. is the *Civitas Constantia* of the Romans, and was the see of a bishop in the 5th c. In the vicinity are the ruins of an ancient aqueduct. Pop. 8145.

Coutar'ea, a genus of Cinchonaceous trees of Guiana, &c., the bark of one of which, *C. speciosa*, is used as a substitute for cinchona.



Couteau de Chasse.

Couteau de Chasse, or hunting knife, was in the 16th and 17th centuries an elaborate piece of workmanship. Both sheath and hilt were richly carved and ornamented, and the former was fitted with fork, bodkin, &c., which might be required by the hunter in the field.

Cou'thon, Georges, born at Orcet, Auvergne, in 1756, became an advocate in the local court at Clermont, where, by his charitable and courteous character, he grew very popular. In 1789 he was president of the tribunal, and in 1791 was sent by his fellow-citizens to the *Assemblée Législatif.* After the flight to Varennes, his opinions changed; he demanded the deposition of the King, and in 1791 became one of the most revolutionary members of the Assembly, and afterwards of the Convention, in which he gradually attached himself to Robespierre. He presided at the Lyon massacres, and established in Auvergne the system of requisitions, levy *en masse*, and revolutionary committees. At last, in 1794, he was comprehended with St. Just and Robespierre in the same decree of arrest, and was executed 28th July of that year. Although lame through paralysis, C. was a powerful speaker from the 'Mountain.' He proposed the famous test of purgation for the Jacobin Club, and passed the terrible decree of the 22nd Prairial (June, 1794), extending the law of the *suspect*.

Cou'tras, a town in the department of Gironde, France, on the left bank of the Dronne, 27 miles N.E. of Bordeaux, which it supplies with flour, and with which it is connected by railway. Henri of Navarre, subsequently Henri IV. of France, defeated the army of the League before the walls of C., 20th October, 1587. The red wine of C. is of considerable excellence. Pop. 4231.

Cov'enant (Heb. *berith*, Gr. *diathēkē*) is applied in Scripture to contracts both between man and man and between God and man, although it could only be applied properly to the former, since mutual obligations or conditions, and mutual advantages, were implied. 1. The manner in which two parties entered into a C. was by taking an oath (Gen. xxi. 31, 32), in witness whereof was set up a memorial stone or a heap of stones (Gen. xxxi. 45, 46); they feasted together; or, the most solemn ratification of all, they cut one or more beasts into halves, laid the pieces opposite each other, and passed between them, as much as to say, 'May the fate of these animals fall upon him who breaks this C.' (Jer. xxxiv. 18-20; cf. Gen. xv. 8-10). 2. According to the anthropomorphic ideas of the Old Testament, covenants are also spoken of as made between God and man, as in Gen. xv. 8-18, and xxviii. 20-22; in the first of which passages, Jehovah is represented as passing between the pieces in the form of a flame of fire. On another occasion, when making a C. with Abram, He gave him the rite of circumcision for a sign, as He gave to Noah the rainbow. 3. In the New Testament (Epistles to Galatians and Hebrews), the Old C. or testament between God and His chosen people at Sinai, with Moses as mediator, is opposed to the new C. between God and His elect people, with Jesus Christ as mediator. 4. Some theologians distinguish three covenants:—(1) The C. of works, entered into between God and Adam when the latter was in a state of innocence, and representing all his posterity; the condition on the part of man being perfect obedience—the promise, life, and the penalty, death. (2) The C. of grace, corresponding exactly with the new C. of the New Testament, to which the parties are God and—not mankind generally, but—the elect. (3) The C. of redemption (deduced from Gal. iii.) between the first and second persons of the Trinity, the former engaging to give the latter a certain number of redeemed sinners for His Church; the latter, to be their surety and substitute.

Covenant, in the law of England, is the agreement of two or more persons to do, or not to do, some specified act. It is created by Deed (q.v.). In a C. to do something, the action stipulated for must be lawful; and if the thing to be done be legally impossible, the C. is void. A man may bind himself not to exercise a special trade or profession within a particular place, but a general obligation in restraint of occupation is contrary to law, and void. Covenants for title are (1) that the vendor is seised in fee; (2) that he has power to convey; (3) quiet enjoyment (purchaser, his heirs and assigns); (4) free from incumbrances; (5) further assurance. A C. real is when a person covenants for himself and his heirs, who are bound to perform it, provided they obtain sufficient assets by descent.

Covenant, National, the name of the religious protest, binding its subscribers to support the Scottish Presbyterian Church, drawn up by the Scottish clergy in 1630. It embodied the Scottish Confession of Faith of 1581, and arose from the effort of Charles I. to introduce an episcopal liturgy into Scotland. It was signed by all ranks of the community—nobles, gentry, clergy, and commissioners from burghs and towns—in the Greyfriars' Churchyard, Edinburgh. Copies were also sent to different parts of the country for subscription. The N. C. was ratified by Parliament in 1640, the first signatures having been appended on 28th February, 1638. See Davidson's *Historical Sketch Illustrative of the National Confession of Faith* (Edinb. 1849).—**Solemn League and Covenant** was a modification of the N. C., and bound the English Parliament in alliance with the Scottish Presbyterians. It guaranteed the preservation of the Scottish Reformed Church, and was adopted by the Parliament, 15th July, 1644. Charles II. signed it, 16th August, 1650, but repudiated it in 1661, when it was ordered to be burnt. The Scottish supporters of these covenants were known as Covenanters, and were engaged in various risings against the crown in the period between the Restoration (1660) and the Revolution of 1688. In 1712 the Cameronians, a section of the Covenanters, renewed the signing of the covenants; but the Church of Scotland does not require adherence to these documents from her members.

Cov'ent Gar'den, a corruption of *Convent Garden*, so called from being formerly the garden of Westminster Abbey, is the great fruit, flower, and vegetable market of London. The most interesting days for inspecting it are Tuesdays, Thursdays, and Saturdays, and especially on summer mornings as early as three o'clock. The market had a humble origin about 1656, in a few wooden stalls. C. G. gave name to the famous theatre (opened 7th December, 1732) in the vicinity.

Coventry (the 'convent dwelling'; the termination *try* being the Cymric *tre*, 'a dwelling or town,' common in Cornwall and Wales), a town in Warwickshire, on the Sherbourne, a tributary of the Avon, about 18½ miles from Birmingham, and 6 from Kenilworth. Its churches of St. Michael's, St. John's, and Trinity are among the most beautiful in England. Many of the streets are built with oaken beams and projecting stories; in one the house is shown where Richard Baxter spent two years during the civil war. St. Mary's Hall, built by Henry VI. for the Merchants' Guild, is a marvel for quaint carving in black oak, and has one of the few pieces of historical tapestry in England. At one time C. had a great woollen manufacture of 'yarn white stuffs,' which was ruined by the French calico trade. The silk and ribbon manufacture and watchmaking then became the local industries; both suffered greatly about 1817, when the repeal of the Statute of Apprentices introduced the sweating system and half-pay apprentices, and the workmen were as yet unable to secure the observance of their 'statement lists' of wages and prices. The ribbon trade now flourishes, greatly extended by steam machinery. In 1874 new sewage works were constructed. The most interesting antiquities are the old charitable mortifications and chantries, such as Bablalie's Hospital, Ford's Hospital, Bond's School, White's Trust, &c. The ancient walls of C. were demolished by the Royalists in 1662, the town having sent 200 men to Lord Brooke. The story of Godiva, the wife of Leofric, riding through the streets, though still preserved in the wooden figure of Peeping Tom and an annual procession of people covered with ribbons, has no foundation in fact, being told for the first time by Matthew of Westminster 200 years after its alleged occurrence; it is probably a repetition of a similar Herefordshire legend. Leofric built the monastery which long formed the glory of C., its population falling from 15,000 to 3000 upon the dissolution of the monasteries. Before that, it was called the Chamber of Princes, being a favourite residence of English kings. The *Parliamentum Indoctorum* (1404), so called because lawyers were excluded, and the *Parliamentum Diabolicum* (1459), for the attainder of Yorkists, were held in C. The bishopric of C., founded in 656, was in 1121 united with the see of Lichfield. St. Katherine's, one of the oldest English guilds, belonged to C. Its purposes were to maintain a chaplain, to make loans, and to give alms in deserving cases, to help all the members generally, and to hold four feasts in the year; those committing any offence to be expelled. Many of the old trusts are quaintly expressed, as in *Bond's*, where lands, &c., are left 'for the maintenance of ten poor men, as long as the world shall endure, and a woman to look to them.' At the end of the 18th c. there was a burst of revolutionary enthusiasm at C., and a society for constitutional reformation was formed, which gave to Burke the title of 'Don Quixote of Despotism.' Pop. parl. bor. (consisting of the city of C. and par. of Stoke, and returning one member) 54,755; county bor. 52,724; and reg. dist. 53,004.

Coventry, Sir John, a member of the Long Parliament, and of Parliament in the reign of Charles II., who, having fearlessly opposed the policy of the King, and having in a speech seemed to reflect on his conduct, was assaulted by a band of bravoes from Whitehall, commissioned by the Duke of Monmouth, and had his nose cut to the bone, 21st December, 1670. This outrage led to the passing of the Coventry Act, which rendered cutting and maiming a capital crime. The Act was repealed in 1828. C. died about 1682.

Cov'erdale, Miles, one of the earliest and most distinguished English Reformers, was born at Coverham, Yorkshire, in 1488. He was educated at Cambridge, and became an Augustine monk, but adopted the Reformation doctrines, and devoted himself to translating the Bible. C.'s translation of the whole Bible was published in 1535, where, is not quite certain, but probably at Zürich. This was the first complete version of the Scriptures printed in English. He also superintended the edition known as the *Great Bible*, or *Cranmer's Bible*, produced in 1539. In 1551, C., who had been almoner to Queen Catharine, was promoted to the see of Exeter. Imprisoned on the accession of Queen Mary, but released through the intercession of the King of Denmark, he went to the Continent, where he assisted in the preparation of the celebrated Geneva translation (1557-60). (See BREECHES BIBLE.) After the accession of Elizabeth, C. was appointed to the rectory of St. Magnus, London. He died 20th May, 1567. The tricentenary of the issue of C.'s Bible was celebrated 4th October, 1835.

Cov'erture is a term of English law denoting the legal status of a woman during her marriage. The law, as regards the disabilities of a married woman in respect of property, has been materially altered; by the Married Women's Property Act, 1870, her earnings are deemed to be her own separate property, and by the M. W. P. Act, 1882, her own property was entirely freed from the control of her husband, and she became possessed of equal power over it, as her husband had over his.

Covilha', a fortified town in the district of Castello Branco, province of Beira, Portugal, with manufactures of cloth, and hot springs, and built in the form of an amphitheatre. Pop. 10,809.

Cov'ington, a town of Kentucky, U.S., on the river Ohio, opposite to Cincinnati (q.v.), with which it is connected by a suspension bridge and ferries. It has manufactures of cotton, hemp, silk, tobacco, and iron; and large establishments for packing pork, &c. Pop. 37,371.

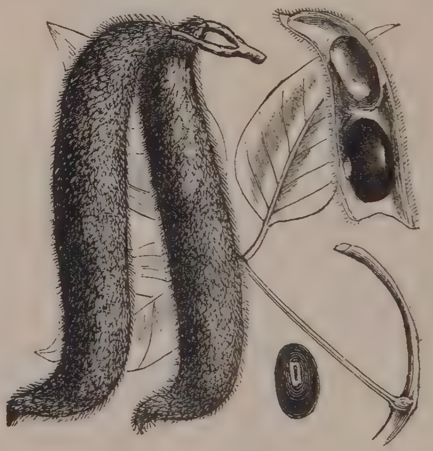
Cowbird, also called the American yellow-billed cuckoo, belongs to the family *Cuculidæ*, of the order Scansores, and gets its name from its note, which resembles the word *cow*. It is found in the United States, and migrates northwards in spring. Stragglers have been found in Britain. It feeds chiefly on caterpillars, but also eats various berries. The colour of this bird is dark brown, with green hues. The quills of its wings are cinnamon colour, and the under parts pure white. Its average length is 12 inches.

Cowbird.

Cowbridge, a borough in Glamorganshire, 11½ miles W. by S. of Cardiff, unites with Cardiff and Llantrissant in returning one member to Parliament. One gate of its ancient wall, built at the close of the 11th c., still remains. Pop. reg. sub-dist. 7456; mun. bor. and civ. par. (each) 1377.

Cowes ('coves,' Old Eng. *cofan*), **West,** a seaport in the Isle of Wight, 10½ miles S.S.E. of Southampton, attractive from its picturesque appearance, its fine houses, and its being the rendezvous of the Royal Yacht Squadron. It has brass and iron foundries, roperies, and sail-making establishments.—**East Cowes** is on the E. side of the estuary of the Medina, as W. C. is on the W. In the neighbourhood is Osborne House, a residence of Her Majesty. Pop. Cowes reg. sub-dist. 14,704; E. C. urb. san. dist. 2872; W. C. urb. san. dist. 7690.

Cowhage, Cowage, or **Cowitch,** the short brittle hairs which grow on the pods of *Mucuna*, a genus of plants of the order *Leguminosæ* (sub-order *Papilionaceæ*), natives of tropical Asia, Africa, America, and the Fiji Islands. C., when it sticks to the skin, causes great itching. The pods of M., called the ox-eye bean of the W. Indies, and of another M., a native of the E. Indies, are eaten in an unripe state. The itching M. is the chief source of C.



Mucuna Bean.

Cow'ley, Abraham, son of a London grocer, was born in 1618. He wrote verses before he was twelve years old, and published his *Poetical Blossoms* on entering Westminster School, at the age of fifteen. When an undergraduate at Cambridge, he wrote the most of his *Davideis*. On the breaking out of the great civil war, C., a devoted Royalist, was driven from England, and served for some time as secretary to the banished royal family. In 1656 he returned to England, and studied medicine. After the Restoration he was rewarded by the free lease of a farm at Chertsey, worth about £300 per annum. He died at the age of forty-nine, 28th July, 1667. Dr. Johnson considered C. the best of the 'metaphysical poets,' as he named those poets who substituted fantastic analogies, intricate conceits, and misplaced learning for genuine poetic beauties. In this class of writers, however, Donne, rather than C., deserves the first place. C. possessed considerable, although perverted, poetic powers, as is proved by his delightful translations from Anacreon. C.'s essays are pleasanter reading than his poems, being full of learning, sound reflection, wit and humour, and written in a fresh and animated style. He wrote also a comedy, *The Cutter of Coleman Street*, and a *Discourse on the Government of Cromwell*. His works were edited by Hurd (Lond. 1772). See Johnson's *Life of C.*

Cowley, Henry Richard Wellesley, first Earl, the only son of the first Baron Cowley, who was a younger brother of the great Duke of Wellington, was born 17th June, 1804. His career was entirely that of a diplomatist. Beginning as attaché at Venice in 1824, he filled various important posts until he became, first, British ambassador to the Germanic Confederation, and in 1852 ambassador at Paris. Along with Lord Clarendon, he represented Britain at the Paris Congress of 1856, and was created, in 1857, Viscount Dangan and Earl C. In 1865 he was made a K.G. Two years later he retired from his post at Paris. In 1870 C. was made D.C.L. of Oxford. Died 1884.

Cow-Parsnip, a genus of plants of the natural order *Umbelliferæ*, of which a number of species, widely diffused through India, Europe, and America, but rather difficult to distinguish, are known. Some are cultivated; but except that of Siberia, which attains a height of 10 or 12 feet, not one is in any way very remarkable. The common British species, the hogweed, or *Kiesh*, of Scotland, is used for feeding pigs, and in Scania, in Sweden, in former times at least, was used as a domestic remedy. The leaf-stalks of a Kamtchatkan species yield a sweet exudation, which is used in the preparation of a spirit. The roots and stems of another are eaten by some of the American tribes, and the young shoots of the hairy C. are valued in the Caucasus as an article of food for the sweet and aromatic juice (Dickie). Siberian species have been recommended for cultivation on account of the quantity of herbage which they yield early in the season.

Cow′pen Bird, a member of the Insessorial family *Sturnidæ*, is a native of the United States, and migrates N. and S. according to the season. Like the cuckoo, it deposits its eggs in the nests of other birds, the young C. B. being found by itself in the nest, as with the former parasite. It lives on the insects, &c., which it finds associated with cattle, and takes its name from this circumstance. The colour is dark drab, with green tints, the upper part of the breast being violet. The average length is 7 inches.

Cow′per, William, one of the most familiar English poets, was born on the 26th November, 1731, at Great Berkhampstead, in Hertford. He was of highly-connected family, his father, chaplain to George II., being nephew of the first Earl Cowper, Lord Chancellor. When six years old, C. was sent to a school at Market Street, where his shrinking sensitiveness exposed him to much suffering; but his life at Westminster School, from 1741 to 1748, proved more happy. Law having been chosen for him as his profession, C. was articled to an attorney for three years, and afterwards, in 1754, called to the Bar. He eschewed legal studies, however, and his Temple life was occupied with lighter literature. His father being dead, and his income scanty, he accepted, in 1763, the offered post of reading-clerk to the House of Lords; but nervousness prevented him from appearing at the bar of the House for examination, and so he lost it. Reduced by this to despair, even insanity, he attempted suicide, and only moral cowardice hindered his purpose. After eighteen months passed in a private asylum at St. Albans, C. went to live at Huntingdon, where he formed his friendship with the Unwins—a fortunate one for him. On the death of the Rev. Mr. Unwin (1767), his widow removed to Olney, Buckinghamshire, and C. went with her, feeling that his happiness depended on this intimacy. Less beneficial was his intercourse with John Newton, whose stern influence actually led, in 1773, to a renewal of the poet's mental trouble. Shortly before this he had begun the composition of his *Olney Hymns*. C.'s convalescence was occupied in gardening and the rearing of tame hares; while the cheerful society of Lady Austen—who suggested to him the inimitable *John Gilpin*, *The Task*, and the *Translation of Homer*—had a healthy effect on his mind. John Newton, besides, left Olney in 1779, in which year the *Olney Hymns* were published. The success of *The Task* (1785) was very great, and the *Homer* (1791) sustained its author's reputation, besides obtaining for him the sum of £1000. But his constitutional malady again returned. Seeking more cheerful scenes, he left Olney for Tuddenham, in Norfolk, accompanied by Mrs. Unwin. This lady died in 1796, and C. being attacked by dropsy, expired at Dereham, Norfolk, 25th April, 1800.

In English poetry C. was leader of a reaction against the brilliant, artificial school of Pope. He had neither deep passion nor imagination, but has won and kept his place by his purity of sentiment, his graceful and truthful handling of simple themes, his lucid and vigorous style, and especially by his earnest religious vein. Not excepting Milton, he is our truest religious poet. *The Task* is his greatest work; *Conversation* perhaps his cleverest. In one he shows exquisite feeling; in the other, polished wit. *John Gilpin* has always been and must ever remain popular; while his *Letters*, with their charming *naïveté* and sparkling clearness, display an acute and cultured intellect, and entitle him to be considered one of the most charming letter-writers in the English language.

Southey has edited C.'s works. The best Life is that by Southey (1835).

Cowplant, a native plant of Ceylon, of the natural order *Asclepiadaceæ*, gets its name from a belief that its juice supplied the place of milk to the natives; but in reality the juice is only *like* milk, not used as a substitute for it (Emerson Tennant).

Cow′ry, a genus of Gasteropodous mollusca, forming the type of the family *Cypræidæ*, in which the shell is convolute and enamelled; the spire is concealed; the shell-aperture narrow, and channelled at either end. The outer lip is thick and inflected in old shells. The foot is broad, and the mantle lobes meet over the back of the shell. The shells form typical examples of the kind of shells to which the name *Porcellanous* or 'Porcelain' is applied. A few species are British, but most are tropical. The money-C. is so named from its being used as a substitute for coins in many parts of Asia and Africa. It is of yellowish colour, and averages an inch in length. In Bengal one C. = $\frac{1}{38}$ of a farthing in value. The orange C. is found in the Friendly Islands, and is worn by the chiefs as a badge of their rank. The ring C. is found among the islands off the S. coasts of Asia, and is worn by the natives as an ornament, or is used as a net-sinker, or as money. The tiger C. is common on the American shores, and, when polished, is placed as an ornament on the tables, &c.

Tiger Cowry.

Cow′slip, a common plant in many parts of England, though rarer in Scotland, belonging to the natural order *Primulaceæ*. The flowers are believed to possess sedative and diaphoretic properties, and are therefore sometimes used as an anodyne and antispasmodic, and when fermented as *C.-wine*, employed to produce sleep. The Virginian C., a member of the same order, is cultivated in our gardens for the beauty of its flowers, which is indeed the main recommendation of its genus.

Cow-Tree, a name applied to various trees, the bland milky juice of which is used instead of milk. For instance, the Arbol de Leche, Palo de Vaca, of Caraccas and other parts of S. America, is one of the natural order *Arctocarpaceæ*. The name is also applied to the Hya-hya, one of the *Apocynaceæ*, as well as to some species of figs. The 'milk' of the Arbol de Leche is said to be of as good quality as that from the cow. The tree forms large forests on the sea-coast of Venezuela. The milk is obtained by making incisions in the trunk, and is perfectly wholesome and very nourishing, having an agreeable taste like cream, with a balsamic odour. Its composition is different from that of animal milk, containing, as it does, wax and fibrin, a little sugar, a salt of magnesia, and water. After a few days' exposure to the air it sours and putrifies. It contains upwards of 30 per cent. of the resinous substance called *Galactin*.

Cow-Tree.—Leaves and Fruit.

Cow-Wheat, a genus of plants of the order *Scrophulariaceæ*, of which several are common in English woods, pastures, cornfields, &c. They get their name from a belief that they fatten cattle, and give a yellow tinge to butter made from the milk of cattle fed on pastures in which they abound. There are four British species.

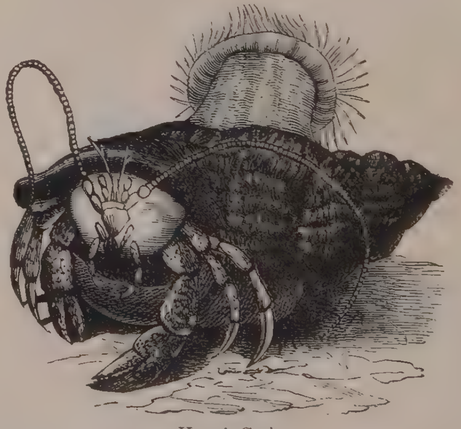
Cox, David, after Turner, the greatest of English landscape painters in water-colours, was the son of a Birmingham blacksmith, and was born in 1793. At the age of fifteen he was employed by a locket and miniature painter, afterwards became scene-painter in the theatre at Birmingham belonging to Macready, father of the tragedian. In 1811 he went to London, where he struggled along industriously, giving lessons and occasionally selling a picture for a few shillings. At the age of thirty he became a teacher of drawing at a ladies' school at Hereford, with a salary of £100 a year; but nevertheless he found leisure in a single year to send twenty-two contributions to the Old Water-Colour Society. In all he exhibited 800 works at the Society of Painters in Water Colours. At last fortune veered, and C., raised above immediate want, was at liberty to roam in search of the picturesque. He died, 7th June, 1859. Since his death there has been a rise in the price of his drawings, unequalled, perhaps, except in the single case of Turner. The strength of C. lies in his honest, downright English character. A master of space and aërial perspective, he paints the heaths and hedgerows of England under shifting aspects of shower and sunshine, wind and fog. He aims at depicting certain hours of the day, and such is his attention to atmospheric effect, that it has been said his drawings might be labelled 'stormy,' 'change,' 'fair.' If his art lacks imagination or passion, it raises no unsatisfied longings, for it fulfils its every promise. See *Life of D. C., with Selections from his Correspondence, &c.*, by N. Neal Solly (Lond. 1873).

Coxe, William, a heavy but painstaking historical writer, was born in London, 7th March, 1747; became fellow of King's College, Cambridge, 1768, curate of Denham, near Uxbridge, 1771, rector of Bemerton, 1788, and archdeacon of Wilts, 1805. He died 8th June, 1828. His best-known works are his *History of the House of Austria* (Lond. 1807), and *Memoirs of John, Duke of Marlborough* (1817-19). He also wrote *Memoirs of Sir Robert Walpole* and *Memoirs of the Pelham Administration.*

Coy′pu, or **Nu′tria,** a genus of Rodentia, included in the Beaver family, *Castoridæ*, and largely hunted for its fur. It inhabits burrows made in the banks of rivers in Chili and elsewhere in S. America. The hind-feet are webbed, the tail being long and rounded, scaly, and provided with scattered hairs. It averages the size of the beaver—that is, from 2 to 3 feet. The muzzle is pointed and the ears small. The fur is of a general yellowish tint, and known by the name 'Racoondah.' In some years 1,000,000 of C. skins have been imported into Britain from S. America.

Coypu.

Crab (Old Eng. *crabba*, Sansk. *grabh*, 'to seize or grab'). The name applied popularly as well as scientifically to many genera of *Crustacea* (q.v.), included in the order *Decapoda* (q.v.) ('ten-limbed') of that class, and for the most part in the section *Brachyura*. In the true crabs, represented thus by the edible C. or 'partan,' and the smaller or shore-C., the abdomen is rudimentary, and is tucked up under the broadened-out body, which consists of the *cephalothorax*, or united head and chest segments. The gills are contained within special cavities existing in the sides of the body. The nervous system in the crabs consists of a single large ganglion, placed ventrally, or on the floor of the body, and from which nerves radiate throughout the body. During their development, crabs undergo a metamorphosis, the first stage being free-swimming, possessing a tail, and known as *Zoea*. The second stage, named *Megalopa*, is also tailed; whilst after several moults the *Megalopa* loses its tail and assumes the form of the perfect C. The antennæ are never of great length, and the front pair of legs form *chelæ* or nipping-claws. The eggs are attached to the rudimentary tail of the female.


Hermit Crab.

The sub-order *Brachyura*, including the true crabs, are represented by the families *Canceridæ* (edible and other crabs, belonging to the genera *Cancer*, &c.), *Maiadæ*, or Spider

Crabs (q.v.), and *Oxystomidæ* (genera *Dorippe*, &c.). *Ocypodidæ* (genera *Pinno-theres*, sea-crabs, and *Gecarcinidæ*, or land-crabs, &c.) contains the representative groups of crabs. The sub-order *Anomura*, in which the abdomen is developed to a greater or less extent, but not so perfectly as in the *Macrura*, includes the well-known Hermit or Soldier Crabs (q.v.), the *Porcellanidæ*, or porcelain crabs, and other groups. The abdomen in *Anomura*, whatever its development, does not bear the *feet* seen in the *Macrura* (lobsters, shrimps, prawns, &c.). The three front pairs of feet are well developed, and the first claws are generally chelete. See also CRUSTACEA, DECAPODA, and articles (such as PEA-CRABS, SPIDER-CRABS, &c.) descriptive of the various kinds of these crustaceans.

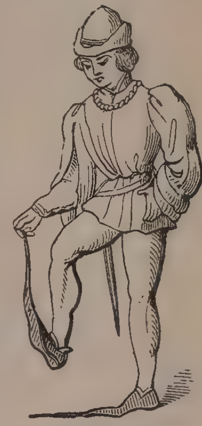
Crabbe, George, an English poet, was born at Aldborough, Suffolk, 24th December, 1754. His father, a collector of salt-duties, encouraged his early poetic proclivities, and strove to procure him a good education. When fourteen years of age C. was apprenticed to a surgeon, but finding the profession distasteful, abandoned it and went to seek his fortune as an author in London. At the end of a year, being in danger of imprisonment for debt, he wrote asking help from Burke, who extended to C. his friendship, enabled him to issue his poem, *The Library* (1781), and persuaded him to enter the Church. After being curate of Aldborough, C. received two livings in Dorsetshire, and removed in 1785 to Strathern Parsonage, where he remained until 1813. He spent the rest of his life at Trowbridge, Wiltshire, published his *Tales of the Hall* in 1819, and died 8th February, 1832. C.'s poetry describes commonplace themes with intense and sometimes painful realism. His characters belong to the humblest ranks—smugglers, poachers, paupers, vagrants—whose natures are analysed with startling, unsparing accuracy. He depicts scenes with tedious minuteness. Hazlitt said that C. described the interior of a cottage 'like a person sent there to distrain for rent.' C. has been called a Pope in worsted stockings. He has Pope's correctness without his nimble wit, fancy, and glittering delicacies of language. As he grew older, his verse became more passionate, touching, and forcible; it forms a link between the school of Pope and the school of Wordsworth. C.'s principal works are *The Library*, *The Village*, *The Borough*, *Tales in Verse*, *Tales of the Hall*, *Sir Eustace Grey*, *The Hall of Justice*. See *Life of C.*, by his son (1838).

Crab'eth, Dirk and **Wouter,** famous masters in the art of glass-painting, were brothers, and flourished during the latter half of the 16th c. They appear to have been born at Gouda, in S. Holland. Wouter died in 1581, and Dirk in 1601. The most splendid examples of their skill are the painted windows in St. Janskirche, at Gouda, of which seven were executed by Dirk and four by Wouter. Other churches in Belgium and France possess excellent examples of their art. Although friends, these brothers were so jealous of their reputation, that each concealed from the other the processes by which he achieved his effects.

Crackle.

Crackle, a term in pottery signifying a kind of ware having its enamelled surface covered with a network of irregular cracks. The Japanese C. is of much value, especially the sort which resembles the scales of the trout. The Chinese use colouring matter in much variety for filling up the interstices between the crackles.

Cra'cow (Pol. *Krakov*, Ger. *Krakan*), capital of a circle in the crown-land of Galicia, on the Vistula, about 70 miles N.E. of Vienna by rail. It contains numerous churches, four public squares, a castle called the Königsberg, and a Gothic cathedral, with the tombs of the Polish kings. The University of C., founded in 1364, and for a time a famous seat of learning, was destroyed by the influence of the Jesuits, but was re-opened in 1817, and at the present time has an attendance of 1196 students, under 122 professors, &c. It has a valuable library, a botanic garden, and a museum. C. has a theological seminary, a normal school, two gymnasia, a polytechnic school, a literary and musical association, and the national theatre. The streets are generally dark and narrow, but the thoroughfares in the suburbs—of which there are fourteen—are much wider and cleaner. The old walls have been converted into a promenade. There are no important manufactures, and the trade, formerly very extensive, became very insignificant till a transit trade with Russia, Germany, and Austria, carried on by the Jews, revived while C. was a republic. The railway, which now connects the city with Vienna, Berlin, Warsaw, and Lemberg, has increased trade. Since C. came into the possession of Austria it has been surrounded by extensive and formidable fortifications. C. was founded about 760 by Krak, Duke of Poland, whence its name; was the capital of Poland from 1320 to 1609, and in it the monarchs were crowned until 1764. It was taken by Karl XII. of Sweden in 1702, by the Russians in 1768, added to Austria in 1795, formed into a republic in 1815, and finally united to Austria in 1846. Pop. 72,472, with 5471 soldiers. At least a fourth of the inhabitants are Jews.


Cracowes.

Cracowes, so called because they were first worn at Cracow, were long-toed shoes, the tips of which turned up and were often connected with the knee by a slender chain. In England, extravagantly long toes became so much the rage that a statute was passed restricting the length within reasonable limits, whereupon the fashion rushed to the opposite extreme by reducing the length of the toe to the minimum, and increasing the breadth out of all proportion to the size of the shoe. The legislature again intervened, and, in due course, also suppressed this folly.

Craft, in naval language, is a term applied to any collection of decked vessels. It is a general designation for barges, lighters, hoys, and other keels employed in loading and unloading large ships. In the royal navy, cutters, schooners, gunboats, and other vessels commanded by lieutenants, are styled *small C.*

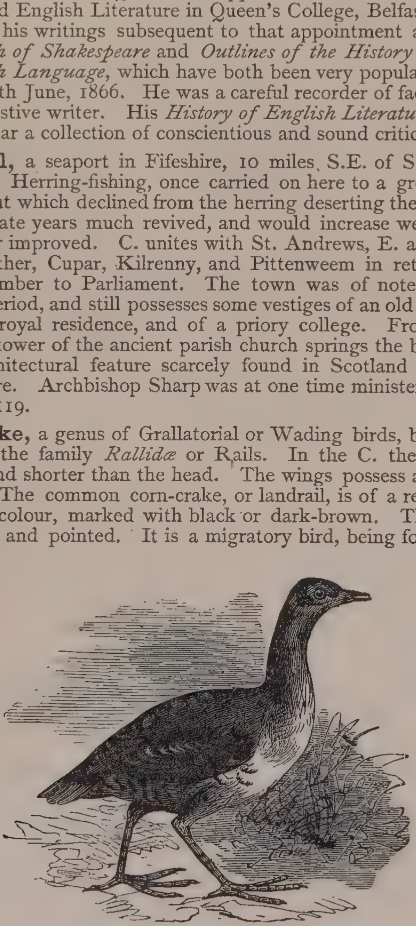
Crag, a local name given to certain Pliocene deposits in Norfolk and Suffolk, consisting of shelly sands and gravels. The Norwich or mammaliferous C. is used to fertilise soils which are poor in lime. See PLIOCENE.

Craig, John, a Scottish Reformer, was born in Scotland in 1512. Trained to be a Dominican friar, he was intrusted with the education of the novices of that order at Boulogne, when the reading of Calvin's *Institutes* converted him to Protestantism. Openly avowing his opinions, he was condemned to be burnt by the Inquisition, and was only saved by the riots consequent on the death of Pope Paul IV., in the course of which the prisons at Boulogne were thrown open. After many narrow escapes on the Continent, C. returned to Scotland, and became Knox's colleague in the parish church of Edinburgh. Even in that time and country he was distinguished for boldness of speech and action. He refused to proclaim the banns between Queen Mary and Bothwell, and when he was made minister to James VI., never refrained from saying to the 'anointed pedant' what he thought of his conduct. He aided in drawing up the *Second Book of Discipline*, and wrote the National Covenant, signed by the King in 1580. C. died 4th December, 1600.—**Thomas C.,** a Scotch advocate, was born at Edinburgh about 1548, educated at St. Andrews and Paris, filled various posts of distinction, including those of Justice-depute to Archibald Earl of Argyll, Justice-general of Scotland, and advocate for the Church of Scotland. He was at the same time a favourite of James VI., who offered him the honour of knighthood, which, however, he declined. C. is best known for his *Jus Feudale.* He also wrote respectable verses, and was an ardent champion of the claims of Scotland to be independent of England. T. C. died at Edinburgh, 26th February, 1608. See Tytler's *Life of C.* (Edinb. 1823).

Craik, George Lillie, an English author, was born in Fifeshire in 1799. Educated at St. Andrew's University for the Church, he betook himself at an early age to London and to literature. Among the works he produced at this period of his life were his *Pursuit of Knowledge under Difficulties,* his *History of British Commerce,* and, above all, his *History of Literature and Learning in England from the Norman Conquest to the Present Time* (1844). He also edited the *Pictorial History of England,* and contributed to the *Penny Cyclopædia.* In 1849 C. was appointed Professor of History and English Literature in Queen's College, Belfast, and among his writings subsequent to that appointment are his *English of Shakespeare* and *Outlines of the History of the English Language,* which have both been very popular. C. died 25th June, 1866. He was a careful recorder of facts and a suggestive writer. His *History of English Literature* is in particular a collection of conscientious and sound criticisms.

Crail, a seaport in Fifeshire, 10 miles S.E. of St. Andrews. Herring-fishing, once carried on here to a great extent, but which declined from the herring deserting the coast, has of late years much revived, and would increase were the harbour improved. C. unites with St. Andrews, E. and W. Anstruther, Cupar, Kilrenny, and Pittenweem in returning one member to Parliament. The town was of note at an early period, and still possesses some vestiges of an old castle, once a royal residence, and of a priory college. From the square tower of the ancient parish church springs the broach, an architectural feature scarcely found in Scotland out of Fifeshire. Archbishop Sharp was at one time minister of C. Pop. 1119.

Crake, a genus of Grallatorial or Wading birds, belonging to the family *Rallidæ* or Rails. In the C. the bill is thick and shorter than the head. The wings possess a small spur. The common corn-crake, or landrail, is of a reddish-brown colour, marked with black or dark-brown. The tail is short and pointed. It is a migratory bird, being found in Britain only in summer, and inhabits cornfields and marshy lands, its harsh cry of *crek, crek,* being very familiar. It winters in S. Europe, N. Africa, and Asia. An analogous species is the Carolina rail of N. America, which inhabits marshes, and migrates northwards from the Gulf of Mexico in summer. In size and colour it resembles the corn-crake, its plumage being streaked with white.



Corn-crake.

Crambe, a genus of plants of the natural order *Cruciferæ* (q.v.), of which one is well known as Sea-Kale (q.v.), found wild on our coasts, and also cultivated in gardens for use. When blanched as a potherb, it is eaten in the same way as asparagus. *C. tartarica* is the Tartar *kenyes* or Tartarian bread. It is not cultivated, but the root is eaten, either boiled or sliced, with oil, vinegar, and salt, in the countries of which it is a native. See Loudon's *Encyclopædia of Plants,* p. 557.

Cramps are a variety of spasms or hypercenisis, and are caused by the contraction or tension of a voluntary or involuntary muscular structure, independently of volition, and accompanied with pain. They are called *symptomatic* when they depend upon disease in other parts of the body than in the muscular tissues affected, as in affections of the brain and spinal marrow; and *idiopathic* when the disturbance is functional, depending on transient lesion of the nerves and their sheaths, or on hyperæmia with œdema of the neurilemma. C. are described as *tonic* when the muscular contraction is continuous, and as *clonic* when intermittent. They are caused—(1) by irritation at or near the seat of morbid action, such as from sudden change of temperature in bathing, exposure to cold, over-exertion of the muscles, or from bringing muscles long disused into action; (2) by irritation of the nerves supplying the affected muscles; (3) by irritation or lesion of the spinal marrow at or near the origin of the nerves supplying the muscles; (4) by lesion of parts of the brain; (5) by irritation of the digestive viscera, the action being transmitted to the external muscles; (6) by irritation of any of the senses, transmitted to their nervous centres, and thence reflected on parts connected with them. C. forms a prominent symptom in many diseases of infancy, in diarrhœa, dysentery, and especially in Asiatic cholera. They also occur during and after convalescence from certain acute and chronic disorders, as typhus, enteric, and malarious fevers, &c. C. are relieved by friction combined with emollient, stimulant, or opietic liniments.

Cran'ach or **Kron'ach** (originally *Sunder* or *Sünder*), **Lukas,** a famous German painter, born at Kronach, near Bamberg (Bavaria), in 1472, was appointed court-painter to Friedrich the Wise of Saxony in 1504, and was employed later by the House of Brandenburg and other great families. His versatility was shown by his buying an apothecary's business at Wittenberg, where he became Burgomaster, and afterwards engaging in the book and paper trade. C. allied himself to the cause of the Reformation, and painted with affectionate conscientiousness the portraits of his friends Luther and Melancthon. He died, 16th October, 1553, at Weimar. Of his numerous works, which nearly all remain in Germany, the principal are altarpieces. His designs were Gothic, wanting in unity of idea and effect, and in his historical pictures it was his custom to introduce his own portrait, and those of his family and acquaintances. For colour, however, power of characterisation, and laborious execution, C. was one of the greatest artists of his time, though Dürer and Holbein were among his contemporaries. His chief work is the *Crucifixion* in Weimar church. His engravings on wood and copper are much sought after by amateurs. His son, **Lukas,** known as 'the Younger C.,' an excellent colourist and famous portrait-painter, died Burgomaster of Wittenberg in 1586.

Cran'berry, a genus of plants of the natural order *Vacciniaceæ,* consisting of small, slender, or creeping evergreen shrubs. There are three species. *O. palustris,* common C., is frequent in peaty bogs and marshy ground of Britain, as well as in similar or mountainous localities in Europe, Siberia, and N. America. It is largely used in tarts, preserves, &c. Before the Lincolnshire bogs were drained, the berries were sold by the cartload in Norwich market. In the market of Langton, in Cumberland, as much as £20 to £30 worth of the fruit was sold for five or six weeks in succession, as long as the season lasted. In Sweden, silver plate is boiled in them, that the acid in the fruit may clean it.

The large-fruited or American C. is common in sandy soils from Canada to Virginia. Large quantities are used in the country and exported to Britain. It can be cultivated to advantage both in Europe and America, low coarse meadows planted with it yielding an average crop of 80 to 100 bushels of berries per acre.

A 'wine' is made from the C. in Siberia, and a beverage made from it is sold in St. Petersburg. Another C., a small shrub, is a native of the Virginian and Carolinian mountains, producing a fine fruit. The red whortleberry is sold in Aberdeen and other places under the name of 'cranberries.' The so-called Tasmanian C. is a shrub belonging to the natural order *Epacridaceæ*. The name is also given to a small Australian shrub of the same order, and in New South Wales to another Epacridaceous shrub which produces red acid berries. The name is apparently derived from the idea that the berries are eaten by *cranes*.

Cran'brook, a small town in Kent, England, on the Crane, 28 miles S.W. of Canterbury, and the principal place in the Weald. It was formerly a seat of the woollen trade, introduced by the Flemings, but that has long disappeared, and the prosperity of C. now depends on the hop trade. Pop. reg. sub-dist. 6616; and civ. par. 4046.

Crane (Old Eng. *cran*, from its *creaking* sound), a machine for raising heavy weights. In general, a chain is fixed to the object to be lifted, carried over a pulley, and brought down to, and wound upon, a barrel forming part of the C. Motion is given to this barrel by means of suitably proportioned toothed wheels ('spur gearing'), and the whole is set in motion either by men working handles or by a steam or other engine. Cranes vary much in shape and arrangement. In the common jib-C., the mechanism just described is attached to the lower part of a vertical C.-post, and the chain-pulley is suspended from the upper end of a long inclined post or jib, of which the lower end is connected with the framing of the C.-post, and the upper end secured by chains to the upper part of the same. In a complete travelling jib-C. the whole is placed upon a low truck running on rails, along with a small steam-engine and boiler. The jib and lifting apparatus can be turned round the post so as to lift an object situated on either side of the truck, while the upper end of the jib itself can be raised and lowered so as to suit the distance at which the object happens to be.

Crane (Old. Eng. *cran*, from the sound made by the bird), the representative of a family of birds—the *Gruidæ*—belonging to the order *Grallatores*, having affinities with the *Ardeidæ* or herons, and also with the *Otidæ* or bustards. The bill is strong, with sharp edges, and the nostrils lie in hollow sinuses. The legs are long and slender, with a considerable portion of the tibiæ bare, and the toes are long, except the hind one, which is also more elevated, and distinguishes the family from the herons and bitterns. The two outer toes are connected by a small web. The cranes are all large, with long necks and powerful flight, are migratory, and fly at a great height in the air, with a steady motion. The common C. breeds in Northern Europe and Asia, and migrates in the winter towards the tropics. It is of an ash-grey colour, the face and throat nearly black, and the wing-primaries black. The whooping C. is pure white in the adult state, with the tips of the wings black. The demoiselles C. and the crowned C., which are among the most beautiful of the family, inhabit the N. of Africa.

Common Crane.

Crane-Fly, a genus of Dipterous insects or flies, belonging to the *Nemocera*, which possess antennæ of long, thread-like character. The crane-flies form types of the family *Tipulidæ*, in which the proboscis is short, and terminated by two fleshy lips enclosing bristles. The common C.-F. is the typical example. Its popular name is 'Daddy longlegs.' The larvæ, living in moist ground, do great harm by attacking the roots of grasses and cereals. The Hessian fly of the United States is nearly allied to the C.-F.

Cranganore' (*Kranganúr*, *Kodungalúr*), a town on the W. coast of the district of Malabar, in the state of Cochin, province of Madras, India, on the island Chetwai, in an opening of the great Cochin backwater, and 18 miles N.N.W. from Cochin. It is said that St. Thomas visited C. in A.D. 52, but there is no proof of this. Anyhow, before the 9th c. the Syrian Christian Church was firmly established here, and also a colony of the Jews. The Roman Catholic Portuguese, with most unchristian cruelty, exterminated or drove off the Jews to Cochin; but the former received their reward, as all persecutors do, and were themselves driven out by the Dutch, who ceded it to Tippoo in 1784, and he destroyed and left it. The town, such as it is, consists of two small villages, Metthala and Lakamaleshwara.

Cra'nia. A genus of Brachiopodous mollusca, forming the type of the family *Craniadæ*, exemplified by many extinct and by some existing species. In this family, the animal is fixed to submarine objects by the ventral or lower valve of the shell. The arms are fleshy, and coiled spirally. No hinge or articulating processes exist. The upper valve is limpet-shaped. The shell may be smooth or striped or spinous. The genus C. is first represented in a fossil state in the Silurian rocks. *C. personata* is a living species, while *C. Ignabergensis*, of the Chalk rocks, is a typical fossil form.

Cra'nial Nerves. These nerves, nine in number on each side, originate in some part of the base of the brain or upper portion of the spinal cord, and pass through apertures in the floor of the skull, to be distributed to the organs of sense and other structures in the head. They are named numerically from the front backwards, but certain of them have additional names, given on account of their supposed functions. They are as follow:—1st pair. *The olfactory*, distributed to the nose, and connected with the special sense of smell. 2nd pair. *The optic*, passing to the eyeballs, and connected with the special sense of sight. 3rd pair. Sometimes termed *motores oculorum*, nerves of motion, distributed to all the muscles which move the eyeballs, with the exception of the external rectus and superior oblique muscles. 4th pair. Termed the *pathetici*, nerves of motion, distributed to the superior oblique muscles of the eyeball. When these muscles act, the eyeball is rotated upwards and outwards, so as to give a pathetic expression; hence the name. 5th pair. *Trifacial* or *trigeminal* nerves, both motor and sensory, conferring sensibility on the skin of the face and side of the head, mouth, lips, cheeks, and teeth; also sending a special branch, the *lingual* of the 5th, to the anterior part of the tongue (connected probably both with taste and tactile sensibility), and, lastly, supplying the muscles of mastication. 6th pair. *Abducens*, a motor nerve supplying the external rectus muscle of the eyeball. 7th pair. Divided into two portions—(1) *The facial* or *portio dura* of the 7th, being the motor nerve of the muscles of expression; and (2) *The auditory*, or *portio mollis* of the 7th, being the nerve of the special sense of hearing, distributed to the ear. 8th pair. This consists of three nerves—(1) *The glosso-pharyngeal*, the special nerve of taste, distributed to the posterior third of the back of the tongue. (2) *The pneumogastric*, or *par vagum*, so termed on account of its wide distribution in the neck, chest, and abdomen. This important nerve supplies both motor and sensory branches to the pharynx, motor and sensory branches to the larynx, branches to the heart, which exhibit an inhibitory or restraining action over the contractions of that organ, sensory branches to the lungs, motor and sensory branches to the œsophagus, and motor and sensory branches to the stomach. (3) *The spinal accessory*, a motor nerve, distributed to the sterno-cleido, mastoid, and trapezius muscles in the neck. 9th pair. *The hypoglossal*, a motor nerve, supplying motor power to the muscles of the tongue both intrinsic and extrinsic. Each cranial nerve has an *apparent* origin from the base of the brain, and a *deep* or real origin from grey matter in the substance of the organ. The *deep* origins of the C. N. are still imperfectly known. Details regarding these may be found in *Gray's Anatomy*, p. 495 *et seq.*

Cra'nium. Anatomists divide the skull into two portions—the C. and the face. The C. is formed of eight bones—the occipital, two parietal, frontal, two temporal, sphenoid, and ethmoid. The C. contains the brain, and the base is perforated by numerous apertures for the passage of nerves. See SKELETON.

Crank, in machinery, an arm or lever connected with a shaft, and having a rotative motion about its axis. A. C. at the end of a rotating shaft is, in general, simply an arm of wrought-iron keyed upon the shaft, and having a pin called a C.-pin at its outer end. At the centre of a length of shaft the C. becomes a pair of arms (or 'throws'), joined by the C.-pin at their outer ends. In this case the C. is formed either by bending the shaft, or (more commonly) by forging a large projection upon it, and subsequently working this into the required form by suitable tools.

Cran'mer, Thomas, an English statesman and ecclesiastic, was born at Aslacton, Nottinghamshire, 2nd July, 1489, and educated at Cambridge, where he distinguished himself in Greek and divinity, and obtained a fellowship, which was re-granted to him after the premature death of his wife in 1513. Refusing an office at Oxford which Wolsey pressed on him, he remained at Cambridge and Waltham Abbey till 1529, when his suggestion of the invalidity of the papal dispensation in the matter of the King's marriage brought him into notice. Along with other divines, he was sent to Rome to challenge the marriage as against the Scriptures, the Councils, and the Fathers, and to collect similar opinions from the foreign universities. Clement was of course unconvinced by his arguments, but gave C. the honorary title of 'Supreme Penitentiary.' C. also attended the Emperor at Bologna on the same business, wrote a book on it, and was a leading member of the Cambridge committee which considered it. Henry made him a royal chaplain, and after the marriage of Anne Boleyn, C. (in spite of his own second marriage) was consecrated Archbishop of Canterbury on 30th March, 1533, qualifying his oath of submission to Rome by an exception of his duty to God and the laws of the country. He immediately obtained from the two Houses of Convocation a declaration that the licence of Pope Julius was null as dealing with divine, not with canonical law, and that the previous marriage with Arthur had been consummated; and then, under licence from the crown, opened a court at Dunstable, which Catharine refused to attend, but in which final judgment of divorce was pronounced, 23rd May, 1533. C. assisted in the statutory abolition of papal authority in England, but generously tried to save More and Fisher when they declined to take the oath of supremacy and to acknowledge the Statute of Succession in 1534. The issue of a second edition of the *King's Primer* and the revision of *Tyndal's New Testament* were now set on foot by C., who also vigorously supported, against Latimer and the Vicar-General Cromwell, the first Act of Dissolution of the small monasteries (1536). He even said that cathedral chapters and all clerical corporations should be suppressed. The same year he was obliged to pronounce null the marriage of his friend Anne Boleyn, whom he had regarded as a support of Reformed religion, which in the Articles and the Bishop's Book he was gradually introducing into the Church. He was, however, in 1539, defeated by the conservative party on the 'Six Bloody Acts.' (See ARTICLES, THE SIX.) In 1540 he had formally to dissolve Henry's marriage with Anne of Cleves, and the next year to initiate the proceedings which led to the death of Catherine Howard. As before, he generously interceded for Cromwell. In spite of the intrigues of Gardiner, Norfolk, and the Catholic party, C. managed to keep the helm of ecclesiastical affairs till Henry's death, vigorously promoting Reformed doctrine even when, perhaps, as in the King's book, he did not personally accept it. His Litany was an important contribution to the Church, to which he afterwards added the First Communion Book, the Prayer-book of 1549, and lastly, the complete Liturgy. On the accession of Edward VI., C. continued by his Homilies and the circulation of Erasmus' Paraphrase, and through the Liturgy Commission, to press on reform. The Forty-two Articles were completed by him before Edward's death. He was unwillingly forced to sign the letters patent, extorted by Northumberland's conspiracy, and altering the succession in favour of Lady Jane Grey. Accordingly, on Mary's accession, when mass took the place of communion service, and altars and images were restored, when Gardiner became Chancellor, and a Catholic Commission was created to try Protestants for treason, heresy, and marriage, C., along with Latimer and Ridley, was thrown into the Tower. After a first trial, which was said to be irregular because the country was then unreconciled to Rome, C. was tried at Oxford in September, 1555, for 'blasphemy, incontinence, and heresy.' It was not till February, 1556, long after the execution of Latimer and Ridley, that the final sentence of Paul IV., anathematising C., degrading him and handing him over to the secular arm, arrived in England. Immediately after, C. received the celebrated letter from Cardinal Pole, and, exhausted by the anxieties of two and a half years' imprisonment, he issued his submission to the papal authority and his confession of Catholic dogma. In spite of this, he was publicly burnt at Oxford, 21st March, 1556, surprising the Catholics by recanting his recantation at the last moment. Froude strongly insists on the general purity and uprightness of C.'s character (see vol. v. of his *History of England*). There are special Lives of C. by Gilpin, Lebas, and Todd, and many documents under his hand are preserved in Strype's *Memorials* and Jenkyn's *Remains*. C. published in 1550 in Latin *A Defence of the True and Catholic Doctrine of the Sacrament of the Body and Blood of Christ*. His *Catechism* was republished at Oxford by Burton in 1829.

Crannoges, the name given in Ireland and Scotland to artificial islauds in lakes, formerly used as habitations and strongholds by the Celtic tribes. The meaning of the term is uncertain, but it is believed to refer to the timber employed in the construction of these remarkable settlements. The *Pfahlbauten* or pile-buildings of Switzerland will be treated of under LAKE DWELLINGS, and the present article is restricted to the C. proper, or *Packwerkbauten*. The difference between the two is that the former consists of dwellings on wooden platforms placed upon piles driven into the bed of a lake, and allowing the water free course beneath, while, in the latter, the huts were placed upon islands constructed in the manner described below.

Although C. are mentioned in the Irish annals so early as the 9th c., they were unnoticed by archæologists until 1839. In that year drainage operations were being carried on at the Lake of Lagore, near Dunshaughlin, County Meath, and while a trench was being cut close to a mound which had formerly been an island in the lake, great quantities of bones were discovered, no less than 150 cartloads of them being taken away. Further examination showed that the mound, whose circumference was 520 feet, was formed by posts of black oak, from 6 to 8 feet in length, mortised into beams of the same wood. These lay flat upon the marl and sand below the bog, at a depth of 16 feet from the surface. The upright posts were connected by cross-beams, and portions of a second tier of posts were resting on the lower ones. The enclosed space was subdivided by oaken beams, the sides of which were in some cases grooved or rabbeted to admit panels, driven down between them. The interior of the chambers thus formed was filled up with black moory earth and with bones, chiefly of cattle, deer, and swine, though those of goats, sheep, horses, foxes, dogs, and asses were also found. There were also many weapons, ornaments, and household utensils, made of stone, bone, wood, bronze, and iron. These remains have been fully described by their discoverer, Sir W. R. Wilde, then one of the secretaries of the Royal Irish Academy.

In succeeding years many more C. were discovered in Ireland, especially in the N. and the valley of the Shannon. As a rule, they were built upon a small islet in a lake, or on a shoal not far from the surface. The settlement was either circular or oval in shape, and was marked out by a stockade of piles. Sometimes there was a double ring of these. They were from 4 to 9 inches in diameter, and for the most part were young oak-trees, though alder-trees were also employed. They projected above the water several feet, and probably were interlaced with branches, so as to form a breastwork. The bottom of the enclosure was covered with round logs from 4 to 6 feet long, and on the top of them was piled a mass of clay, gravel, and boulders, to a height of about a foot above the surface of the water. On the island thus formed a platform was placed, covering the whole, or a portion of its area. Flat stones, which had apparently been used as hearths, were found in nearly all cases near the centre of the platform, together with at least one pair of querns. Occasionally the C. were connected with the mainland by a causeway or a bridge of planks, but more frequently they could only be reached in a boat or canoe.

From the middle of the 9th to the beginning of the 17th c. C. are mentioned in the Irish annals. They were originally intended for defence, and speedily became the strongholds of robber chiefs, who carried off to them the spoils gathered in their raids, and, favoured by the situation of their fortresses, were frequently enabled to offer a successful resistance when efforts were made to root them out.

In 1857 the existence of C. in Scotland, at Banchory, in Loch Cannor, and other places, was first brought under the notice of archæologists by Joseph Robertson. In 1863 a group of similar structures was discovered in the Loch of Dowalton, in Wigtownshire. Since then many other C. have been discovered in various parts of Scotland. Their construction is exactly similar to that of the Irish C., and a like similarity exists with respect to the antiquarian remains found in them. The Scotch C. are frequently mentioned in history down to the end of the 18th c. Several of them were fortresses of considerable importance. That of Lochindorb, in Moray, for instance, was regarded of so much importance by Edward III., that in 1336 he marched with an army to its relief; while that of Loch Cannor, or Kinord, in Aberdeenshire, was in 1648 dismantled by order of the Estates of Parliament. In September, 1875, two large canoes, in an excellent state of preservation, were drawn out of the bed of this loch.

C. have also been discovered in some of the smaller lakes of Switzerland, but in the larger lakes their place was taken by the pile-buildings, whose construction was better adapted to withstand the waves of extensive sheets of water. Remains of C. also exist in the northern island of New Zealand, and Cameron reported, in 1876, the existence of similar structures in the interior of Africa.

See Wilde's *Catalogue of the Museum of the Royal Irish Academy*; *Proceedings of the Royal Irish Academy*, vols. i. v. and vii.; *Proceedings of the Society of Antiquaries of Scotland*, vol. iii.; Keller's *Lake Dwellings of Switzerland and other Parts of Europe*, translated and arranged by J. E. Lee (Lond. 1878); and Lubbock's *Prehistoric Times* (Lond. 1872).

Crape (Fr. *crêpe*), a gauze-like fabric made of raw silk, woven without crossing, stiffened with gum, and twisted at the mill, which gives the crispy appearance when taken from the loom. It is usually dyed black, and is much used in mourning.

Cra'shaw, Richard, 'the idol of Cowley,' a minor poet, was born in London about 1616, and educated at the Charterhouse and at Cambridge, where he took his degree in 1638. He was for a time a popular preacher in the English Church, but becoming a Roman Catholic, he went to Paris, and thence to Italy, where he became canon of the Church of Loretto. He died about 1650. C.'s poems are devout and earnest, but inferior to those of Herbert, whom he imitated. His chief works are *Steps to the Temple* and *The Delights of the Muses*. Pope borrows frequently from C., especially in *Eloisa*. See Turnbull's edition (Lond. 1858).

Crassatell'a, a genus of molluscs, the shells of which are thick, solid, and bulging, attenuated behind, and with a surface concentrically furrowed. An internal ligament exists. C. is well represented by living species, and in a fossil state begins in the Cretaceous rocks. *C. ponderosa* (Tertiary Eocene) is a familiar species. The genus belongs to the family *Cyprinidæ*, of the class Lamellibranchiata.

Crassula'ceæ, the Houseleek or Stonecrop order, a natural order of Dicotyledonous succulent herbs or shrubs. There are in all about forty-six species described, included under twenty-four genera, found in dry situations in all parts of the world, but chiefly at the Cape of Good Hope. Astringent, refrigerant, and acid properties are characteristic of the whole order, none of which are of much importance. C. of the Cape of Good Hope is said to be efficacious against epilepsy. The stonecrop possesses, according to popular belief, emetic and purgative properties. It is very acrid, and hence called 'wall pepper.'

Crass'us, Lu'cius Licin'ius, one of the greatest orators that Rome ever produced, was born B.C. 140. From a very early age onwards he displayed pre-eminent oratorical ability in judicial proceedings, in senatorial orations, and in popular addresses. With Q. Scævola he became consul, B.C. 95, and during their term of office was passed the *Lex Licinia Mucia de Civibus regundis*, compelling all who were not citizens to leave Rome, a law which aided in provoking the Social War. C. was fond of luxurious living, and, in allusion to his fine house and effeminate manners, he was called by Brutus 'the Palatine Venus.' He died, B.C. 91, from a fever brought on by a violent contention in the senate with Philippus, the consul. C. is introduced by Cicero as one of the chief interlocutors in the *De Oratore*.—**Mar'cus Licinius Di'ves C.,** the triumvir, was born about 105 B.C. He escaped to Spain in dread of the enmity of Marius, for resistance to whom his father and brother had lost their lives. After various adventures C. joined Sulla, B.C. 83. At a battle in Lucania, 71 B.C., C. defeated with great slaughter Spartacus, the rebel hero of the Servile War. In 70, C. and his envied rival Pompey were elected consuls. To gain public favour during his consulship, C. gave the populace a banquet of 10,000 tables, and distributed corn sufficient to supply the family of every citizen for three months. About 60, what is known as the first *triumvirate* was formed by Cæsar, Pompey, and C., his position in which C. owed to his enormous wealth, amassed by rapacious avarice, and to a reputation among the well-to-do citizens for practical talent, which his acquisition of this wealth had obtained for him. According to the compact of the *triumvirs*, Pompey and C. were reelected consuls, B.C. 55, and on the distribution of consular provinces, C. chose Syria. From a vain ambition for military fame, he wantonly made war on the Parthians, but his insatiable cupidity proved his ruin, by leading him to neglect his military duties for the plunder of temples. He was betrayed first by Ariamnes, and afterwards by Andromachus, and after suffering defeat at Carrhæ, fell by an unknown hand in a treacherous interview with Surenas, the Parthian general, B.C. 53. In the Parthian expedition C. is said to have lost 20,000 men by slaughter and 10,000 by capture. Orodes, the Parthian king, caused melted gold to be poured into the mouth of the lifeless C., saying, 'Sate thyself now with the metal of which thou wert so greedy in life.'

Cratæ'gus (the hawthorn), a genus of Dicotyledonous plants belonging to the natural order *Rosaceæ* (sub-order *Pomeæ*), natives of Europe, N. America, and temperate Asia and Africa. The best-known species is the common Hawthorn (q.v.), so familiar a material of our hedgerows, found in nearly every part of Europe, and in N. Africa and Western Asia. It is sometimes called the 'May-tree,' from blossoming in May, a month also in which most of the other species of C. also appear in bloom. With the exception of the species named, none are natives of Britain. The cockspur thorn is a native of N. America. The Azorole and the Aronia, the 'haws' of which are sometimes used for dessert or tarts, are natives of the S. of Europe and the Levant. Among the other cultivated species may be mentioned *C. Pyracantha*, which is a native of the Caucasus and the S. of Europe, and known to gardeners, who value it as a wall-tree, as the *Pyracantha*.

Cratæ'va, a genus of tropical shrubs or trees of the Cape order (*Capparidaceæ*). *C.* of the Malabar and Society Islands is planted in burial-grounds as a sacred tree. Its leaves and other parts of the tree are aromatic, bitter, and stomachic. The bark of the root of the garlic pear, so called on account of its strong smell of garlic, blisters the skin like Spanish flies.

Cra′ter (Gr. *kratēr*, 'a bowl'), the funnel-shaped cavity on the summit of a Volcano (q.v.), through which the volcanic products are mostly ejected. The largest C. on our earth is that of Kilauea, in the island of Hawaii, forming a large lake of molten lava about 2 miles in circumference. On the surface of the moon numerous large cavities are observed, which, from their position and general appearance, are probably the craters of extinct volcanoes. Of these, the most interesting are the craters of Copernicus and Tycho, 55 and 50 miles in diameter respectively.

Crati′nus, a representative poet of the old Athenian comedy, was born at Athens, B.C. 519. He wrote twenty-one comedies, none of which are extant, and he gained nine victories, one of them over the *Clouds* of Aristophanes. He made changes in the outward form of comedy, as, for example, by fixing the number of actors at three. He was the first to introduce into comedy reproachful attacks on public men and unsparing satire of vice. C.'s imagination was fervid, and his style impetuous and somewhat grandiloquent. In the *Knights*, Aristophanes (as translated by Mitchell) says of him—

> 'His step was as the tread of a flood that leaves its bed,
> And his march it was rude desolation.'

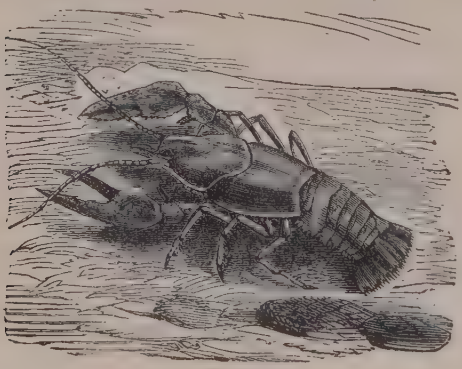
C. died, B.C. 422.—**C. the Younger**, an Athenian poet of the Middle Comedy, flourished during the middle of the 4th c. B.C.

Cratipp′us was an eminent Peripatetic philosopher of Mytilene, and an instructor of Marcellus and Cicero. For many years he lectured on philosophy in Athens, where Cicero the Younger, and subsequently Brutus, were among his auditors. Cicero entertained a very high opinion of him, and procured for him from Cæsar the Roman franchise. After the battle of Pharsalia, C. accompanied Pompey, and soothed the spirit of the defeated triumvir with the consolations of philosophy. He does not seem to have written any philosophical works.

Cratox′ylon, a genus of bushes or small trees of the St. John's wort order, natives of China, the Malaya Peninsula, Java, and neighbouring islands. About ten species are described, but only the C. of Java, which is slightly astringent and diuretic, is known to have medicinal properties.

Cray′er, Gaspar de, a Flemish historical painter, born at Antwerp, 1582, died at Ghent, 27th January, 1669. He won the admiration of Rubens and the friendship of Van Dyck, whom he rivalled in portraiture. His pictures, lofty in style and subject and large in size, are correct and vigorous in design, and full of dignity though somewhat cold. About forty of them are in the churches and the Museum of Ghent. His *Virgin and Infant Jesus Enthroned*, now at Düsseldorf, was purchased by the Elector Palatine for 80,000 frs.

Cray′fish, a species of Decapodous crustaceæ belonging to the division *Macrura*, including the lobsters, shrimps, &c., is found in British rivers. The family *Astacidæ*, to which the C. belongs, has the anterior pair of feet very large, the appendage at the base of the outer antennæ very small, and the middle segment of the tail-fin divided transversely by a suture. C. is chiefly nocturnal in habits, and, like the lobster, turns red on being boiled.



Crayfish.

Cray′on, a French word, meaning a pencil (from the Lat. *creta*, 'chalk'), is applied especially to a small cylinder employed in drawing on paper. It is usually made of fine pipe-clay, coloured with metallic pigments and carmine. Delicate softness rather than vigour generally characterises drawings in C.

Cream (lit. 'froth,' Fr. *crême*), the rich, fatty part of Milk (q.v.), which forms a yellowish-white layer on the surface of milk when suffered to remain at rest. Butter is made from it by churning.

Cream of Tartar is the acid or bitartrate of potash. It is obtained from Argol (q.v.), or crude tartar—the very impure bitartrate of potash which is deposited from the juice of the grape during fermentation. The argol is dissolved in boiling water; the solution thus obtained is digested with animal charcoal to remove the colouring matter, and then allowed to cool, when C. of T. separates in white crystals. C. of T. is comparatively insoluble in cold water, but is tolerably soluble in boiling water. It is used in medicine as a diuretic and purgative.

Cre′atine (Gr. *kreas*, 'flesh') is a crystalline substance contained in muscular fibre, and hence is found in the extract of meat. It also occurs in blood and in the substance of the brain, &c. In order to extract the C. from meat, the latter is mashed and digested for some time with cold water; the clear, aqueous extract thus obtained is boiled to coagulate albumen, filtered, mixed with baryta water, again filtered, and evaporated to a syrup, when C. crystallises out after some time.

C. has been prepared synthetically. Although neutral to test-paper, it forms crystalline salts with several acids.

Cré′billon, Prosper Jolyot de, a French dramatist, born at Dijon, 13th January, 1674, of middle-class parents, was intended for the law, which, however, he very soon left for a literary career at Paris. After a failure, he was encouraged by his master and friend, Prieur, to produce his first successful tragedy, *Idoménée*, which was played in the winter of 1705-6. In 1707 his taste for the gloomy and horrible was shown in *Atrée et Thyeste*, which was performed eighteen times. Considerable skill in dramatic situation and in striking, though often inflated, description marks this play. In the same year C. married Charlotte Péaget, and the death of his father in embarrassed circumstances compelled him to devote all his time to the drama. The tragedy of *Électre* (1709), founded on the play of Sophocles, has been bitterly criticised by Voltaire in his *Éloge de C.* (vol. lxi. of collected works), because it makes the inspired servant of destiny the subject of an insipid affection for Itys. In 1711 appeared his best tragedy, *Rhadamiste*, founded on the old romance *Bérénice*. The character of *Zénobie* is admitted, in spite of the sarcasm of Boileau, to be very powerfully drawn; the play is also peculiar from the hatred of the Roman Empire which it shows. The remaining plays of *Xerxes*, *Semiramis*, *Pyrrhus*, *Catilina*, *Le Triumvirat*, following at considerable intervals, have no lasting merit. *Catilina*, completed on the suggestion of Madame de Pompadour, and produced at the King's expense in 1748, had a brilliant success for one season. In spite of his extravagant social indulgence, followed after his bankruptcy by the most morose eccentricity, C. was elected a member of the Academy, afterwards royal censor, and finally one of the royal librarians. He died 17th June, 1762. He is still ranked among the classical tragedians of France, and has been called the French Æschylus, but he is quite singular in his want of literary education and taste. His genius resembles that of Marlowe. Besides the splendid edition of C.'s works, published by order of Louis XV. (Par. 1750), there are editions by Didot the Elder (Par. 1812 and 1818), and by Perelle (Par. 1828). He left a son, **Claude Prosper Jolyot de C.,** born at Paris, 14th February, 1707, and educated at the Jesuit College 'Louis le Grand.' C. began his literary life by writing opera-bouffe for the theatres, then formed a connection with the 'Académie de ces Messieurs,' a half-literary, half-social club of aristocrats, to whom his talent for epigrammatic versification was useful, but soon sank to the manufacture of licentious novels, with which his name is chiefly associated. In 1734 appeared *Tanzai;* in 1736 *Les Égarements du Cœur et de l'Esprit.* In 1740 he married an Englishwoman, Lady Stafford. His worst book, *Le Sopha,* was condemned by Madame de Pompadour, and C. was banished from Paris for five years. On his return, however, in 1755, he was appointed censor. C. died 12th April, 1777. There was a certain independence in his writings which made the social and political allusions very effective. His *Œuvres Complètes* appeared at Paris in 1779.

Cré'cy, or **Cress'y,** a small French town in the department of Somme, 12 miles N.N.E. of Abbeville. It is celebrated in history as the scene of the inglorious defeat suffered by Philippe VI. of France, 26th August, 1346, at the hand of Edward III. of England. Froissart numbers the English force at 16,000, which is probably under-estimated, and the French at 68,000. The flower of the French chivalry was destroyed, Philippe escaping with only four of his barons. Pop. 1614.

Cre'dence (Ital. *credenza*), is a table near the altar in churches, called also the *prothesis, oblationarium,* and *ministerium,* on which the bread and wine to be used in the eucharist are placed previously to consecration. It takes the form of a little table, sometimes of stone, of an aumbrey in the wall, or, as with the Cistercians, of a bracket or recess; and is sometimes on the N. side of the altar, sometimes on the S. When there is one on both sides, as is sometimes the case, the one on the epistle-side has a drain and a shelf to hold the basin and the cruets; the one on the gospel-side holds the books, candles, and ornaments of the altar. The first use of the C. in the Roman ritual occurs in the time of Leo X. in 1516, when the custom of personal offering fell into disuse. The name is derived from the ceremony of tasting the elements in the pontifical mass (Ital. *credenzare,* 'to taste before presenting to another'). When the Pope celebrates on Easter Day there are three credences. Of the two on the epistle-side, one holds the deacon's plate; the other, two candles and the necessaries required by the sacristan. On the third, which is on the gospel-side, the sacristan washes the sacred vessels at the end of the creed; he also drinks of the wine and water; and finally, at the offertory, tastes of the particles from which the hosts are prepared, as a precaution against poison.

Creden'tials are letters given to an ambassador or other official sent by one Government to another, to entitle him to its confidence.

Cred'it. The meanings of this word are in political economy various yet closely related, and having nearly the same import as they have in ordinary and commercial language. Suppose a retail dealer, seeing his way to selling £100 prime cost of goods during the next three months for £130, but not possessing £100 with which to make the purchase. Then, on the question of whether or not he can induce the wholesale merchant to entrust him with the goods with three months' C. depends his profit of £30, and also the wholesale dealer's profit. The principle here involved is of universal application; but that C. may work to the advantage of the community, it must rest on a solid basis of capital. In commercial ventures, the capital at command and the nature and extent of the business must be prudently regarded in taking C. The giving of C. is often the most difficult and important question which a commercial man has to consider.

Credit, Cash. See BANK, BANKING, and BOND.

Credit, Letter of.—The letter is so called by which the writer requests the person or firm which he addresses to pay money to the bearer or some other party mentioned in the letter. Business may be transacted by means of a L. of C. between any two persons or firms, but usually it only passes between bankers resident in different places. It enables a person paying in money to a bank at one place to draw it at another, and so to avoid the risk and trouble of carrying it. For the convenience so afforded, the bank issuing the letter charges a percentage on the value of the C., the rate of the percentage varying according to the rate of exchange between the places. A L. of C. is a great convenience to any one going to a foreign place. It is not necessary to draw the full value at once. You present your letter, say for £100, to the banker to whom it is addressed, and request him to give you the foreign equivalent of £20. This is endorsed on the letter, and there remains £80 at your C. Even in a place where the granter of the letter has no correspondent, little or no difficulty is usually found in drawing upon it. But any one intending to go from place to place abroad will find the best form of carrying pecuniary C. to be Circular Notes (q.v.). See also EXCHANGE.

Crédit Foncier is the French term for a loan on the security of land. Three companies have been established by the French Government with certain privileges having the title of C. F. The loans are repayable so that principal and interest are extinguished at the same time. The same system of repayment of loan has been adopted by various building and property investment companies in this country.

Cred'iton, or **Kirkton** (Old Eng. *Cridian-tun,* 'the town on the Creedy'), a town of Devonshire, 8 miles N.W. of Exeter. The church of the Holy Cross is a fine structure. Shoemaking forms its chief industry, though formerly it had manufactures of woollens and serges. Cider is also made. C. is the birthplace of St. Boniface (q.v.). Pop. reg. subdist. 6526; and civ. par. 5821.

Creeds are formal statements of the doctrines believed by the Church, concisely expressed for the purpose of being conveniently recited. 1. The Latin *credo* ('I believe,' whence the English *creed*) was not the only name given to such a production. The most usual name was Lat. *symbolum,* Gr. *sumbolon,* which was a token by which the initiated were admitted into the mysteries of the heathen gods; and when we know how much the early Christians borrowed from the heathen (see Middleton's *Letter from Rome*), and remember that the holy mysteries of the Church were also concealed from the uninitiated, we need be at no loss to account for the name, considering the use made of the C. Another usual name was Lat. *regula,* Gr. *kasiōn,* 'the rule,' so called because it was the authorised standard or rule of faith. Other names were Gr. *mathēma,* 'the lesson,' *graphē* and *gramma,* 'letters or learning,' so called from the Catechumens (q.v.) having to learn it. 2. The first use of the creed was—(*a*) in the preparations of catechumens for baptism. They had to repeat it privately to the catechist, then publicly in the church, and, lastly, to make a more solemn profession of it at the time of baptism, and to answer questions put by the minister relative to the several articles of it. From this it came naturally to be used (*b*) as a test of church-membership; then (*c*) as a test of orthodoxy, and (*d*) in a liturgical character. 3. The earliest creed made use of for the purpose was a very short and simple one, namely, 'I believe that Jesus Christ is the son of God' (Acts viii. 37); but article after article was added to this as the doctrine of the Church was gradually developed. The idea that what is called the Apostles' Creed was composed, as some say, by the apostles at a council held before leaving Jerusalem, some going so far even as to assign a particular article to each apostle, is simply absurd, as no one who knows anything about the development of Christian doctrine needs to be told; for several of the articles in it were not in any Greek or Latin creed for the first three or four centuries. It was most probably compiled from various C. used by the primitive Church, several of which are preserved in the writings of the early fathers. There are fragments in the writings of Irenæus, Origen, Tertullian, Cyprian, Gregory Thaumaturgus, and Lucian the Martyr, and in the Apostolic Constitutions, and more perfect forms under the names of the C. of Jerusalem, of Cæsarea, of Alexandria, and of

Antioch, in none of which are the articles of the Communion of Saints and Descent into Hell mentioned; nor were they originally in the Apostles' or Roman Creed. The article of the Descent into Hell was almost peculiar to the creed of Aquileia, and was only introduced into the Apostles' Creed about 600. The Nicene Creed (q.v.) was drawn up at the Council of Nicæa (325), with special reference to the Arian heresy (see ARIUS) that the Son was not equal in all respects to the Father. But the creed, as we have it, is that of the council as it was afterwards enlarged by the Council of Constantinople (381), and with the word *filioque* (‘and from the Son,’ in reference to the Procession of the Holy Spirit—q.v.), which was afterwards added by the Latin Church, and caused the inveterate schism between the Eastern and Western Churches which has continued till the present day. The so-called Athanasian Creed (q.v.), attempted to be fathered on the great opponent of Arius, is unquestionably a forgery of a much later time. These three are the C. proper of the Catholic Church, and all that existed till the Reformation. After the doctrine of the Church of Rome had been defined by the Council of Trent (q.v.), an embodiment of it was published under the name of the Creed of Pope Pius IV.

Cree′per, the type of a family (*Certhidæ*) of the Insessorial sub-order *Dentirostres*. In these birds the toes are very long and slender, the outer toe being longer than the inner one, and united to the middle toe beyond the first joint, and to the inner toe up to the latter joint. The hind-toe is long and slender, and the claws are long and curved. The bill is also curved and slender. The hinder toe is very mobile, and all the toes may be twisted so as to make the claws available for holding on to the bark of trees. The creepers occur in both Old and New Worlds. The British species is the brown C., averaging about $5\frac{1}{2}$ inches in length. It also occurs in Europe and N. America. The wall-C. of S. Europe is another species. The food consists of insects, and the tail-feathers assist in climbing the trees.

Creeper.

Creek (Old Eng. *crecca*, Dutch, *kreek*, ‘a bend or corner’) is a small inlet on a low coast. In America the word is synonymous with *brook*.

Cre′ma, a walled town in the province of Cremona, N. Italy, on the Serio, 23 miles N.W. of Cremona. It dates from the 6th c., has an old castle and cathedral, and some silk and lace manufactures. Pop. 8818.

Cremo′na (anciently *Cremonensis-ager*, a Gallic tribal name), the capital of a province of the same name in Lombardy, N. Italy, on the Po, 46 miles S.E. of Milan. It has some fine buildings, notably a splendid cathedral, which has a clock-tower (built from 754 to 1284) 357 feet high, and a great baptistery with a marble vase of the year 900. C. received a Roman colony B.C. 219; soon after it became a place of great trade, and had the largest amphitheatre in Upper Italy. Destroyed by Vespasian, it did not regain importance till the Middle Ages, and in modern times it has again declined. It has manufactures of silk, cotton, and earthenware, and was formerly famous for its violin and violin-strings. Hence the name C. became a general name for violins made at C. Pop. 30,202.

Crenel′, or **Crenelle′** (Fr. *créneler*, ‘to indent;’ from the Lat. *crena*, ‘a notch’), in the fortification of the Middle Ages, an embrasure in the battlements of a castle or other building, to shelter a man with a bow and arrows, or some other weapon of offence. Buildings so provided are said to be *crenellated*.

Crenellé or *Crenellated*, in heraldry, a term used to describe a charge embattled, or drawn like the battlements of a wall.

Cren′ic Acid is a substance occurring in certain mineral springs, and was discovered by Berzelius. Crenate of ammonia is a frequent ingredient of vegetable mould. C. A. is a pale-yellow amorphous substance.

Cre′ole (Span. *criollo*, from *criar*, Lat. *creare*, ‘to create’), a word used in S. America, Mexico, or the W. Indies, to denote one born in any of those countries but of European extraction. It is sometimes loosely applied to a mulatto or mestizo, *i.e.*, to one of mixed blood; but this is not its proper use.

Cre′osote, or **Kre′osote** (Gr. *kreas*, ‘flesh,’ and *sōtēr*, ‘a preserver’), is a substance much used as an antiseptic and preservative. It is obtained by a series of operations from wood-tar, similar to those by which Carbolic Acid (q.v.) is separated from coal-tar. Considerable doubt exists as to the true composition of C., and indeed it is not certain whether it is a distinct substance or a mixture. Much of the C. employed in commerce is simply impure carbolic acid. The smoke of burning wood owes its preservative qualities to the presence of C.

Crescen′do (Ital. ‘growing’), a mark of expression used in music to indicate a gradual increase of loudness unaccompanied by any alteration in speed.

Cres′cent (Lat. *crescere*, ‘to increase’), a representation of the moon in her first quarter, or as defined with a concave and a convex edge. The *C. montant*, that is, with the horns upwards, which is the symbol of the Turkish Empire, was originally the arms of the Byzantine Empire, and the Turks, when they overthrew that empire, adopted it as their chief bearing.

Crescent, in heraldry, is the symbol described above, and is represented as *montant*, *increscent*, or *decrescent*, as the horns are respectively towards the chief, the dexter side or the sinister. It is used both as a bearing or charge, and as a mark of cadency or difference.

Crescent, Orders of the. There have been three O. of the C. The first was instituted by Carlo I., King of Naples and Sicily, in 1268; the second, by René, Duc d'Anjou, in 1448, the badge of the latter being a gold C., with the words *Los en croissant* (‘Praise by increase’) enamelled on it; the third, which is still in existence, was established by the Sultan Selim III. in 1801, two years after the battle of Aboukir. He had sent a C. of gold, richly mounted with diamonds, to Lord Nelson, which the English admiral wore, calling himself occasionally the Knight of the C. This induced the Sultan to found the order. It can only be conferred on Christians, since Mohammedans are forbidden by the Koran to wear such decorations.

Crescent City, a small town in the central part of California, in Tuolumne county, on the banks of the Tuolumne river, a branch of the San Joaquin, and navigable for steamboats 10 miles above the town. C. C. is also the name of another small town in California, which is situated on the Pacific. It is also the popular name of New Orleans.

Crescentia′ceæ, the Calabash order, a natural order of Corollifloral Dicotyledonous plants, closely allied to the *Bignoniaceæ*, natives of tropical and sub-tropical regions, abounding in Madagascar, the Mauritius, the Seychelles, and other islands of Eastern Africa, between 30° S. and 30° N. The order is also represented in America and Asia, but is unknown in Europe and Australia. Altogether thirty-four species and eleven genera are described. The properties and uses of the order are unimportant. The fruit of one species, called Quauhxilotl, is eaten by the Mexicans, and that of another (which yields wax, and from the fruit being shaped like a candle is called the ‘candle-tree’) by cattle in the Isthmus of Panama.

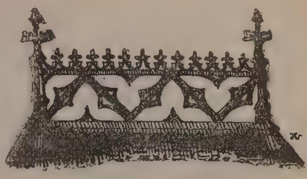
Cress, a name given to many plants, the pungent, mustard-like taste of which makes them valued as salads. The name is sometimes limited to the genus *Lepidium* (natural order

Cruciferæ). The garden-C. or town-C. is a native of Persia, but has been cultivated in this country since 1548. It is much used for giving a warm flavour to salads. It is easily raised, and, like the rest of the order, powerfully antiscorbutic. The pepper-wort, dittander, or poor man's pepper is even more pungent, and is also used as a condiment. One species is used in N. America and the W. Indies, not only as a salad, but as a diaphoretic. Another of New Zealand (the *Eketera* of the Maories) is eagerly sought by the crews of ships as an antiscorbutic. A Sandwich Island species has the property of intoxicating fishes, so that they float in helpless condition near the surface of the water, and are then easily captured. It is also pungent and antiscorbutic. The latter properties are also possessed by the winter-C., or herb St. Barbara, species of which are common in Britain and other parts of Europe and N. America, as well as the water-C., and Scurvy-Grass (q.v.).

Cress'et (Fr. *croisette*, dim. of *croix*, 'a cross'), an open lamp, filled with combustible material, and placed on a watch-tower, beacon, or lighthouse, or carried on a pole. It is so called because beacons had formerly crosses on their tops.

Crest (Lat. *crista*, 'a tuft,' perhaps connected with *crescere*, 'to grow'), the ornament which was placed highest on a helmet. Herodotus says the Carians were the first who wore tufts and feathers in this manner. In classical mythology the shield of Minerva bore an owl, that of Mars a lion or tiger, and that of Jupiter Ammon a ram's head. Diodorus Siculus asserts that the kings of Egypt bore the head of a lion, a bull, or a dragon. Homer describes the C. as made of horse-hair, in which he is followed by Virgil. Æschylus, in the *Seven against Thebes*, speaks of three crests on one helmet; and Suidas is of opinion that Geryon passed for having three heads because he wore a triple C. Alexander the Great bore a ram's head to support his pretence of descent from Jupiter Ammon, Julius Cæsar a star to indicate his relationship to Venus, and Pyrrhus a plume between the horns of a goat. In the Roman army the C. served to distinguish the various centurions. In the Middle Ages knights bore a plume of feathers, generally those of the ostrich, the peacock, or the heron. Richard I. (*Cœur de Lion*) rendered the lion renowned during his crusade. About the time of Henry III. the C. began to be used generally as a mark of distinction; hence it came to be called a *cognizance*. It was at first made of light material, frequently of boiled leather, but by-and-by wood and metal were employed, and the C. became smaller.

In mediæval heraldry the C. is a figure or device used as an adjunct to the shield, and represented as standing on a coronet, a wreath, or a cap of maintenance. Though sometimes identical with, it is generally distinct from, the principal charge on the shield. The dragon and the wyvern are among the earliest figures borne in this country. The lion crowned, now the C. of the royal family, was first assumed by King Edward III., who also bore an eagle or raven. The Panache (q.v.) alone, and with the heads of various animals, appeared early. Fantastic emblems soon began to be used as crests. That of the Duke of Hamilton is said to commemorate the escape of Sir Gilbert Hamilton, in 1323, in the disguise of a woodcutter. The C. of the Earls of Warwick of the Beauchamp family—the last of whom died in 1445—is a bear, muzzled and collared, with a ragged staff in its forepaws. In the 14th c. the coronet, the wreath, and the cap began to be emblazoned under the C; but the C.-coronet must be distinguished from one indicating princely or royal rank. The earliest wreath known to heraldists is engraved on the memorial brass to Sir Hugh Hastings at Elsyng, Norfolk, and dated 1347. The wreath which is now generally used consists of two strips of ribbon twisted into a cord, and tinctured with the principal metal and colour of the arms—the first coil being metal and the second colour. Heraldists regard the significance of a bearing on the shield as complete without the C.; and it has even been asserted that the latter is a personal bearing only, and not hereditary. Early and general usage, however, pronounce the C. to be hereditary, like the coat-of-arms; the inventions of seal-engravers and coach-painters being disregarded. See Fairbairn's *Crest of the Families of Great Britain and Ireland*.


Creste.

Creste, or **Crest**, in architecture, an ornamental finishing, such as a battlement or a row of Tudor flowers, surmounting a screen, canopy, or other similarly subordinate part of a building. The term is sometimes applied to the finial of a gable or pinnacle, or to an open-work ornament of lead placed vertically on the apex of a roof, as shown in the illustration.

Crest'ed, in heraldry, indicates that the comb of a cock, or other bird, is of a different tincture from the body. See BARBED AND CRESTED, WATTLED AND COMBED.

Cres'wick, Thomas, R.A., an English landscape-painter, was born at Sheffield, 1811, manifested in early youth a feeling for art, to gratify which he removed to London in 1828, and in the same year exhibited two landscapes in the Royal Academy, of which he was elected to the Associateship in 1842, and to the full honours in 1851. Sweetness of association and suggestion, together with an almost rigid fidelity to nature—from which he invariably painted direct—are the characteristics of his works, among the chief of which are 'The Course of the Greta,' 'The London Road a Century Ago,' 'Home by the Sands,' and 'The Weald of Kent.' C. died 28th December, 1869.

Creta'ceous or **Chalk Rocks**, a group or series of rocks belonging to the Secondary, Mesozoic or 'middle life' period, lying above the Oolite or Jurassic system, and being topped in its turn by the Eocene rocks, or earliest formations belonging to the Kainozoic or Tertiary rocks. The name 'C.' is given to these rocks from the very general occurrence of chalk in them. The following are the leading divisions of this system, as recognised in Europe and America:—

Upper C.	1. Maestricht beds.
	2. Chalk.
	3. Upper Greensand.
	4. Gault.
Lower C.	5 Lower Greensand or Neocomian.
	6. Wealden.

The Wealden beds derive their name in England from their special development in the Wealds of Surrey, Sussex, and Kent. Their lower portion is known as the Hastings Sands, and attains a thickness of from 500 to 1000 feet. The upper portion is argillaceous or clayey, with sand and limestone layers, and is from 150 to 300 feet thick. The Lower Greensand or Neocomian in Britain is about 850 feet thick, and consists of sandstones and clays, the former sometimes of green colour from the presence of iron silicate. The *fossils* of the Wealden are fluviatile in nature, and consist of fresh-water mussels, paludinæ or river snails, and the like. Those of the Greensand are of marine origin, and consist of shell and cuttlefish remains. The Gault occurs in the S.E. of England, and never exceeds 100 feet in thickness. The Upper Greensand varies in thickness from 3 to 100 feet, and consists of sands and clays. The true *Chalk*, composed of chalk-marl, white chalk without flints, and C. with flints, is well developed in the S. of England particularly, and is an extensive rock series. The Maestricht beds occur in Holland, and consist of yellowish limestone about 100 feet in thickness. In N. America the Lower C. R. are hardly represented. The Upper C. R. occur in the United States. *Foraminifera* (q.v.) are largely represented in the Chalk, the true Chalk containing those shells especially. *Corals*, *Echinoderms*, a few crustacea, many molluscs, fishes, reptiles, and birds, also occur, but no mammals whatever are found.

Crete (Gr. *Kreta*, Mod. Gr. *Kriti*, Turk. *Kirid*, Ital. *Candia*, from Arab. *Khandai*, 'a trench'), an island and vilayet of Turkey, in the Mediterranean, to the S. of the

Ægean Sea, has an area of 2949 sq. miles, and a pop. of 294,192 of whom nearly two-thirds are Greeks and Jews. It is 160 miles long from E. to W., and has a breadth of from 6 to 35 miles, while the coast, especially along the N., is indented by many deep bays. A mountain range traverses the island, culminating in the three groups of Sphakia (8100 feet) in the W., Pseloriti (8060 feet) in the centre, and Lasithi (7100 feet) in the E., and receiving in part the name *Leuci* from the ancients on account of the formation being of a whitish-tinted marble. There are few rivers of any size, but the island contains innumerable springs. The climate is mild and healthy. One-half of the soil is cultivated, yielding olives, Valonea nuts, locust beans, wine, tobacco, cotton, silk, &c. Canea (q.v.) is the capital, and the only other places of note are the seaports Candia and Retimo, the former of which had a pop. of some 15,000 previous to 1866, when it was in great part destroyed by storming. Besides the zaptiês or police, there are some 4000 regular troops, the support of which, together with the fortifying of Sudra Bay and the maintenance of a few forts, have swallowed up the public funds. The mule roads of the interior are at times almost impassable, and no attempt is now made to replace bridges destroyed by the winter torrents. Modern Greek is the prevailing language. In early times this island was called *Idæa*, and in the mythic age it was said to have been ruled by Saturn, Jupiter, Minos, &c. The birthplace and tomb of Jupiter were shown by 'the lying Cretans.' During the heroic period the island was visited by Dorian invaders, who later made it the headquarters of the worship of Apollo. The Homeric poems speak of the 'ninety cities' of C., and long subsequently the inhabitants were still gathered into independent and often hostile towns. Afterwards Cnossus, Gortyna, and Cydonia (Kanea) became centres of states. C. held aloof from Greece during the historic period, was conquered by the Romans (B.C. 67), attached to the eastern portion of the empire on its division (A.D. 364), came into the possession of the Arabs in 823, of the Byzantine Greeks once more in 961, of the Venetians, by purchase, in 1204, of the Turks, after twenty-four years' fighting, in 1668. Various unsuccessful attempts have been made to throw off the Turkish yoke and to unite C. to Greece.

Creuse, a central department of France, in the basin of the Loire, has an area of 2150 sq. miles, and a pop. of 284,660. The country is hilly in the S., where it adjoins the mountain-land of Auvergne. The chief products are rye, buckwheat, oats, potatoes; but the soil in many parts is best fitted for pasturage, and cattle rearing is the chief employment of the inhabitants, numbers of whom migrate to other parts of France in search of work. C. is divided into the arrondissements of Aubusson, Bourganeuf, Boussac, and Guéret. The chief town is Guéret.

The river C., rising in the S.E. of the department of the same name, pursues a N.W. direction for 148 miles, and joins the Vienne about 30 miles above the confluence of the latter with the Loire.

Creuz'er, Georg Friedrich, a German antiquary, born at Marburg, 10th March, 1771, and studied at Jena. He became Professor of Rhetoric at Marburg in 1802, of Philology and Ancient History at Heidelberg from 1804 to 1848, and died 15th February, 1858. His greatest work, *Symbolik und Mythologie der alten Völker, besonders der Griechen* (Leipz. 1810-12), of which an enlarged edition appeared at Leipzig (1820-23), involved him in a controversy with G. Hermann. To the grossly personal attack of Voss C. did not reply. Among his other numerous works was a complete edition of Plotinus (Oxf. 1835), a task for which he was eminently qualified by his knowledge of the Neo-Platonic philosophy. During 1837-47 he published a partial collection of his writings, the last of which contains C.'s autobiography.

Creuzot or **Creusot, Le,** a town of France, in the department of Saône-et-Loire, 20 miles W. of Châlons-sur-Saône. It lies in a district rich in coal and iron, and owes its immense prosperity to the enterprise of Schneider, President of the French Corps Législatif under the Empire. The ironworks founded by him are among the most extensive in the world; there are foundries, engineers' works, and cannon factories. Locomotives, anchors, and all the heaviest iron manufactures are produced. There is also a large glasswork. Pop. 28,635.

Crew, Ship's (Old Eng. *crudh*, 'a crowd'), the company of men belonging to a ship, vessel, or boat. The phrase may include the master and all the officers, but usually it denotes the non-commissioned officers and seamen only. The C. of a man-of-war is divided into subordinate and warrant officers, chief petty officers, first-class working petty officers, second-class working petty officers, and all below the last. Besides this fivefold classification there are smaller groups, each called a C., under the immediate orders of the boatswain, the cockswain, the carpenter, the cooper, &c. In the merchant service, the master sends a list of his C. to the customs authorities before he sails, and also within forty-eight hours after his arrival home.

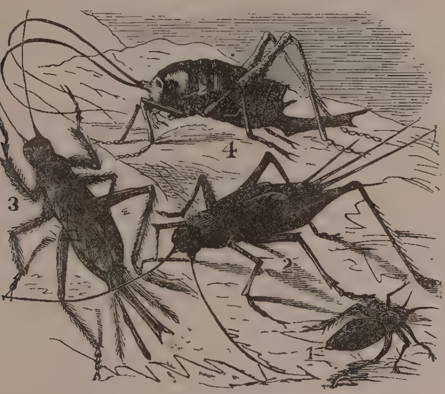
Crewe ('the cross'), a town in Cheshire which owes its existence and prosperity to its being a central station of several important railways. The London and North-Western Railway Company have here their works for the construction of carriages and locomotives, and for the repairing of plant. The Church of St. Michael is a fine Gothic structure, and there is also a Wesleyan chapel, and a good Mechanics' Institute. In 1840 C. consisted of only a few houses, but now the pop. is, mun. bor. 28,761; reg. sub-dist. 43,446; civ. par. 40; and parl. div. of county 64,434. This last consists of the mun. bor. of C. and parts of sessional divisions of Nantwich and Northwich.

Crew'kerne ('the place of the cross'), a town of Somersetshire, 15 miles S.E. of Taunton. It lies in a wooded fertile vale, not far from the river Parret, has a fine church (St. Bartholomew), and a grammar-school founded by John de Coombe in 1449, and some manufactures of sailcloth, sacking, dowlas, and stockings. Pop. reg. sub-dist. 8050; and civ. par. 4946.

Cribb'age, a popular game played with cards, in which generally two complete packs are employed, and the points made are marked with pegs which fit into holes arranged on the top of the box used for holding the C. cards. The game is interesting from the great variety of chances it offers, and at the same time it affords considerable opportunity for calculation and for the exercise of judgment.

Crichton, James, known on account of his learning and accomplishments as 'The Admirable C.,' was born at Elliock, Dumfriesshire, Scotland, 19th August, 1560. He was the son of Robert Crichton of Elliock, who for a time held the office of Lord Advocate, and on the mother's side was descended from King Robert II. C. was educated at the University of St. Andrews, where he was taught by Buchanan, and, according to the popular story, made such progress that, at the age of sixteen, he had mastered ten languages, the whole circle of the sciences, and all the accomplishments of a knight of the period. C. repaired to the Continent (1580), and, if his biographers are to be believed, vanquished in disputations at Paris, Rome, Venice, Padua, and Mantua, all who ventured to contend with him in eloquence and knowledge. He was not less successful in the tilting ring. At Mantua he killed in a duel a celebrated master of fence, who had vanquished all opponents, and in consequence of this the Duke of Mantua appointed him tutor to his son Vincenzo di Gonzago, a dissolute youth. During the Carnival of 1583, C. was assailed by a band of masked assassins at night, and, after a struggle, lost his life (3rd July). It was believed at the time that it was his own pupil's hand that slew him. Some of C.'s Latin poems remain, but possess no merit. See Tytler's *Life of C.* (Edinb. 1819 and 1823).

Crick'et, a genus of saltatorial or leaping Orthopterous insects, belonging to the family *Achetina* (or *Gryllina*). The antennæ are slender, tapering, and very long. The wings are laid flat along the back in repose. The hinder wings are very long, and project beyond the front wings (which form *elytra* or wing-cases when folded). The abdomen in both sexes is provided with two caudal bristles, and the females possess ovipositors. The tarsi are three-jointed. The hind-legs, as in all *Saltatoria*, are greatly elongated for leaping. The *chirp* of the C. is made by means of a serrated plate situated on each wing-cover, the friction of these plates producing the well-known sound. The common C., the field-C., and the Mole-C. (q.v.) (*Gryllotalpa*), are familiar members of this family. The wingless C., either brown or black in colour, is about $\frac{2}{5}$ inch long, and may be seen in meadows and at the sides of the roads.



1, Wingless Cricket; 2, Field Cricket; 3, House Cricket; 4, Spotted Cricket.

Cricket (of doubtful derivation, but perhaps connected with the Old Eng. *cric*, ‘a staff, a crook’) is one of the most thoroughly national and popular of sports. The first mention of it under its present name is towards the close of the 17th c.; but it seems to have been a modification of the more ancient ‘club-ball.’ The southern and south-eastern counties of England have long been noted for their enthusiastic attachment to the game, which was very much confined to these districts at the beginning of this century; but so rapid has been its spread of late years, that there is scarcely a town, village, or school throughout Great Britain which does not boast of its C.-club. In the colonies and United States, too, wherever the English language is spoken, it is steadily gaining ground, and is equally popular among the coloured inhabitants of the W. Indies and the Malays and Chinese in the Straits Settlements.

The requisite implements are stumps, bails, bats, and a ball. The stumps, six in number, are ‘pitched’ in two sets (wickets) of three each, the distance between the sets being 22 yards. Two bails (small pieces of wood) are placed on the top of each set of stumps, and two creases are marked, one as a boundary to the bowler, the other to the batsman. During the progress of a game the centres of interest are the batsmen, who, bat in hand, stand each before one wicket. They are the only members of their side who are at that moment engaged in the game; the members of the other side are disposed in various positions, as bowler, wicket-keeper, and fielders. From one wicket the bowler delivers the ball towards the other, with the object of hitting it; and it is the duty of the batsman to prevent this, as far as lies in his power, by stopping the ball with his bat, or, if possible, by hitting it to some vacant place in the field, thus, perhaps, gaining time to exchange places with the other batsman before the ball is returned, and scoring a ‘run.’ If, however, the ball when delivered by the bowler should strike the wicket, or if, though hit by the bat, it should be held by some fielder before it touch the ground, the batsman is ‘out,’ and must retire and give place to another. If the ball should be returned to either end of the pitch, while the batsmen are running, and should hit a wicket before a batsman has arrived there, the nearer batsman is ‘out.’ In other ways the batsman may be ‘out.’ The wicket-keeper stands behind the wicket towards which the bowler bowls, and his duty is to stop the ball if it should pass both batsman and wicket, and to receive it when returned from the field. An innovation in the method of play was the now almost universal adoption of the *round-hand* style of bowling in preference to the original *under-hand* style. In the former style the ball is delivered with the hand and arm raised above or to the same height as the shoulder; in the latter, the arm is kept close to the side, and always below the shoulder.

The much greater speed of bowling which is possible with the round-hand style, has necessitated the improvement of leg-guards (pads) and gloves for both batsmen and wicket-keeper.

The maximum dimensions of bat, stump, bail, and ball, the length of the pitch, &c., are fixed by the authority of the Marylebone C.-Club; and only by its council can any change be made. The visits of picked teams of amateur and professional players to different parts of Britain and the Colonies, have done much to popularise the game. For a detailed account of the laws, bye-laws, disposal of the field according to the nature of the bowling, the reader must refer to one of the many handbooks on the subject. The oldest existing county club is the Surrey C. Club, founded in 1844. Then come Derbyshire (1845), Sussex (1857), Kent and Notts (1859), Yorkshire (1863), Lancashire (1864), Middlesex (1868), and Gloucestershire (1870). Most of the English counties now have their C. club, and the competition, which formerly existed between only a few of the leading cricketing counties, has been thrown open to the majority of these. In 1894 and 1895 the Surrey C. Club was the most successful in the inter-county matches. The limits of this article preclude any statement as to the scores, ability, and skill of the many cricketers of repute at the present day. Dr. W. G. Grace (Gloucestershire C. Club) has now been before the public for many years as a cricketer, and by his remarkable achievements, both with the bat and with the ball, has earned for himself the title of ‘Champion.’ A very interesting sketch of his career appeared in the *Strand Magazine*, August, 1895.

Crick′lade, an ancient town of Wiltshire, on the right bank of the Thames, 40 miles N. of Salisbury, has a fine church (St. Mary) in the Norman style. It has an important monthly market for fat cattle. It returned two members to Parliament until 1885, when it was disfranchised. Pop. parl. div. of county 59,414; reg. dist. 11,835; and reg. subdist. 5932.

Cricoid Cartilage, one of the cartilages of the larynx. See LARYNX.

Crieff (Gael. *Craobh*, ‘a tree’), a town and parish in Perthshire, beautifully situated at the foot of the Grampians, on the banks of the Earn, 17 miles W. of Perth. On account of its fine climate it is much frequented by invalids. Its chief buildings are Morrison's Academy, Taylor's Institution, the hydropathic establishment, and the Masons' Hall, besides many fine mansions in the neighbourhood, of which Drummond Castle, with its curious gardens, Ochtertyre, and Ferntower, are the most noteworthy. Not far off, in the picturesque Glen Almond, is Trinity College (1847), for students of the Episcopal communion. The chief industries are the tanning of leather and the manufacture of coarse linens and worsteds. Lying as it does on the edge of the Highlands, C. was a suitable place in past times to inflict justice on the marauders from the hills. The ‘kind gallows of C.,’ where the Earls of Strathearn executed their sentences, stood on a knoll to the W. of the town. Among the places in the neighbourhood interesting from their beauty or their associations, are the ‘Sma' Glen,’ St. Fillans, and Loch Earn. Pop. of entire town 4902.

Crill′on, Louis de Berton des Balbes, known as ‘The Brave,’ a singularly chivalrous warrior, was born at Murs, Provence, in 1541. Trained to arms under the Duc de Guise, he obtained at an early age a reputation for bravery, distinguishing himself especially at the siege of Calais and the capture of Guines. He became a great favourite both with Henri II. and Henri III., and was rewarded for his services with a number of Church benefices. In the 16th c. he took the side of the Roman Catholic Church against the Huguenots, fighting against the latter at Dreux, Jarnac, and Montcontour; but he had no share in the massacre of St. Bartholomew, and was opposed to the Catholic League. After some years of devotion and penance, he died at Avignon, 2nd December, 1615. No soldier of his time has been more eulogised for his bravery than C.

Crime is a violation or disregard of public law of a certain gravity. It may be divided into three branches—Treason (q.v.), Felony (q.v.), and Misdemeanour (q.v.). Any act coming under either of these three divisions forms the subject of Indictment (q.v.) and of trial by jury. Minor offences which are not crimes are subject to the summary jurisdiction of the magistracy, without indictment or jury. There is no permanent characteristic of C.—one country and one age holding an act to be innocent, perhaps praiseworthy, which another age or another country holds to be highly criminal. Malice or evil intention is often the essence of C., and is in all cases an aggravation of it; yet C. may be committed without malice by culpable carelessness (see CULPA, DOTE), or even simply from ignorance of the law. (See BONA FIDES, IGNORANCE OF THE LAW.) Thus carelessness on the part of a railway official or the captain of a ship, if it lead to disaster, is criminal. So might it be held criminal to destroy a will, even though under the belief that so to do was of no consequence.

Infants under seven years of age, and insane persons, are legally incapable of C. The degree of insanity necessary for exculpation can never be defined. Compulsion (q.v.) is a sufficient defence, if clearly proved, against a criminal charge. Extreme want is not an exculpation, but it is good ground on which to found a recommendation to mercy.

Intention to commit a C., such intention having consequence, is criminal to the degree of the intention; thus, if A, intending to shoot B, shoots C, A commits a C. equal to killing B. Intention to commit C. is criminal, but to prove intention there must be some act. Such acts are punishable, but not necessarily to the same extent as the meditated C. But this rule of common law as to proof of criminal intention is modified under certain statutes, by which it is declared that certain circumstances, without action, shall be held to prove criminal intention against any one, who shall be punishable accordingly. For example, by 24 and 25 Vict. c. 96, it is declared that anyone having in his possession, without lawful excuse, any crowbar or other implement of housebreaking, shall be guilty of a misdemeanour; the presumption here being that there is proof of intention to commit burglary, burglary being felony.

Crime'a (anc. *Chersonesus Taurica*), a peninsula in the S. of Russia, almost wholly surrounded by the waters of the Black Sea and the Sea of Azov, and connected with the mainland by the narrow isthmus of Perekop, which varies in breadth from 7 to 12 miles. It forms part of the Government of Taurida (q.v.), and has an area of 7650 sq. miles, with a coast-line of about 650 miles. The S.E. coast is bold and precipitous; but the N.E. is low and broken, and washed by the Sea of Azov, a portion of which, almost separated from the greater mass of water by the long narrow tongue of land known as the Peninsula of Arabat, forms the stagnant Sivash (*putrid*) Sea, which gives rise to strong and offensive smells, and sometimes even dries up from the evaporation produced by the intense summer heat. The northern portion of the C. is a low, barren waste, abounding in numerous lakes and marshes of salt, which forms one of the staple exports of the country. The southern district, on the other hand, is rich, beautiful, and hilly, producing grain, olives, grapes, and even oranges, and richly adorned with the summer mansions of the Russian emperor and nobles. The highest peaks are the Kimal Agerek (5000 feet) and Tchatyr Dagh (4983 feet). The present capital is Simferopol (q.v.), in the interior. The other chief towns are Baktshi-Serai, Sevastopol, Karasubazar, Kaffa, Kertch, and Perekop. C. formed a Tartar Khanat under Turkey from 1478 to 1783, when it was subdued by Russia. Two-thirds of the inhabitants are Tartars. The place is especially interesting as the scene of the most important events of the war in 1854-55 between Russia and the allied French, English, Turkish, and Sardinian armies. See Kinglake's *History of the Invasion of the Crimea* (Lond. 1863-75). Pop. about 250,000.

Cri'men Repetundarum, a term of Roman law, indicating the crime of acceptance of a bribe by a judge.

Crim'inal, one who has been convicted of a crime. The accused is sometimes called the culprit or delinquent in England; in Scotland he is called the Panel (q.v.). See ACCESSARY OR ACCESSORY.

Criminal Courts. For England, see ASSIZE; NISI PRIUS; QUARTER SESSIONS, GENERAL; CRIMINAL COURT, CENTRAL. For Scotland, see ASSIZE; JUSTICIARY, COURT OF.

Criminal Court, Central, of the Old Bailey, is for the trial of offences committed in the City of London, county of Middlesex, and certain parts of Essex, Kent, and Surrey, all of which form one county under Statute 4 and 5 Will. IV. c. 36. The sessions are held twelve times a year at least, and oftener if required. Offences on the high seas may be tried at this court. All the judges may be commissioned for this court, but the less serious offences are usually taken before the judge of the City of London Court, the Recorder, or the Common Serjeant sitting in this court. The jurisdiction of the C. C. C. has been greatly augmented by the above statute and subsequent acts.

Criminal Conversation is the legal term in actions of Divorce (q.v.) for the C. intercourse of the person against whom the action is brought.

Criminal Information. See INFORMATION.

Criminal Law. See CRIME, with articles referred to therein; also CRIMINAL STATUTES CONSOLIDATION ACTS.

Criminal Letters.—In Scotland, a criminal may be brought before the Court of Justiciary either by indictment or by C. L., which charged offences that were tried before the inferior courts, and which were issued upon the signet of the Justiciary or from the Sheriff Court. These run in the name of the sovereign, and contain a warrant for citing the witnesses and jury.

Criminal Procedure. See ARRAIGNMENT, BAIL, COMMITMENT FOR TRIAL, INDICTMENT, INFORMATION. The accused having refused to answer, or pleaded *Not Guilty*, a jury is sworn, the indictment opened, the evidence arraigned, examined, and enforced by the counsel for the prosecution; the witnesses being cross-examined by the accused or by his counsel or attorney, if he think fit. When the case for the prosecution is closed, the counsel for the prisoner addresses the jury, and he may examine witnesses for the defence. If he do so, unless the witness be to the character of the prisoner, the prosecuting counsel has the right to reply. The counsel representing the Crown, if the Crown be a party to the case, has always a right to reply. The judge then sums up, and the jury deliberate on their Verdict (q.v.), till which be given they should not be discharged. If they find the prisoner not guilty, he is liberated. If they find him guilty, he is said to be convicted. When the charge is capital (see CAPITAL PUNISHMENT), the prisoner is then asked if he has any reason to give why judgment should not be awarded against him. If he has nothing to say in Arrest of Judgment (q.v.), the judge pronounces sentence. If there be no reversal of judgment by any proceeding in error, the only other way of avoiding execution of sentence is by a REPRIEVE or PARDON. On determined disagreement, the jury may be discharged; when the accused is tried again, before a fresh jury. The above description of C. P. applies to England. While essentially the same in Scotland, the forms in that country are somewhat different. Regarding these differences, see ADVOCATE, LORD; ARRAIGNMENT, CALLING THE DIET, CRIMINAL LETTERS, INDICTMENT, NOT PROVEN, PRECOGNITION, PROSECUTION, PROSECUTOR, PROCURATOR FISCAL, VERDICT.

Criminal Statutes Consolidation Acts.—These may be held to be the first practical result of the series of commissions appointed during the thirty years preceding their date. There are seven Acts, but one is in part a repealing Act. The new statutes are principally a re-enactment of the consolidating Acts of the late Sir Robert Peel, with some improvements by giving a more exact description of offences, with a corresponding gradation in their punishments. They also endeavour more nearly to assimilate the criminal laws of England and Ireland. It may be noticed that the fifth statute is framed in respect of the statute law of the

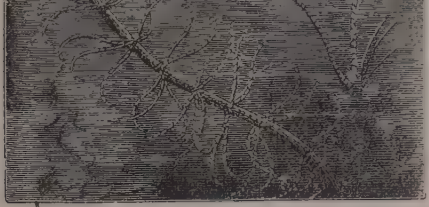
United Kingdom, while the first, second, third, fourth, and sixth, are passed to deal with that of England and Ireland; and the seventh, in its title, speaks only of the criminal law, and that as applied to no part of the United Kingdom in particular. The following is a list of the statutes, together with their titles: 24 and 25 Vict.—c. 94, to consolidate and amend the statute law of England and Ireland relating to accessories to and abettors of indictable offences—c. 96, to consolidate and amend the statute law of England and Ireland relating to larceny and other similar offences—c. 97, to consolidate and amend the statute law of England and Ireland relating to malicious injuries to property—c. 98, to consolidate and amend the statute law of England and Ireland relating to indictable offences by forgery—c. 99, to consolidate and amend the statute law of the United Kingdom against offences relating to coin—c. 100, to consolidate and amend the statute law of England and Ireland relating to offences against the person—and 34 and 35 Vict. c. 32, to amend the criminal law relating to violence, threats, and molestation, which repealed section 41 of the last-named statute, viz. that which provided for the punishment of persons combining and conspiring to raise the rate of wages, &c., and while so engaged unlawfully assaulting any person; and provided differently in respect of the offence.

Crim'son. See RED COLOURS.

Crinan Canal, The, 9 miles long, 24 feet broad, and 12 deep, with 15 locks, cut through the head of the peninsula of Cantire, between Loch Gilp and Loch Crinan, to avoid the long passage from the W. Highland coast to the Firth of Clyde round the Mull of Cantire. It cost £183,000, and can admit vessels of 200 tons. In February, 1859, the reservoirs burst, when part of the banks was washed away and more than a mile of the canal choked with debris. To repair this the Government gave £12,000. The Canal saves a distance of about 115 miles.

Crined (Lat. *crinis*, 'hair'), in heraldry, means that the hair of a man or woman, or the mane of a horse, is tinctured differently from the body.

Crin'gles (Icel. *kringr*, 'a circle'), in nautical language, are loops in the bolt-ropes of sails, formed by intertwisting the strands of which the ropes are made, and commonly confining a metal ring or thimble. A rope passed through them gathers up the bolt-ropes.


Crinoidea.

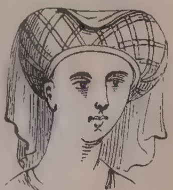
Crinoid', or **Crinoi'dea**, an order of the class *Echinodermata* (q.v.), including the so-called fossil lily-stars, the rosy-feather star, the *Pentacrini* of tropic seas, &c., all of which are distinguished primarily by the fact that they are attached during the whole or a part of their existence to the sea-bed by a jointed flexible stalk. The genus *Rhizocrinus* is a good example of a typical existing C. The body, supported on this stalk, is enclosed in a *calyx*, or cup-shaped arrangement of calcareous plates, and the mouth is central, opening upwards, whilst the vent-passage may be present or absent. The arms, from five to ten in number, are not essential parts of the body, and are provided with *pinnules* or lateral branches. The arms are grooved, and currents of water carrying nutriment run down the grooves to the mouth. The ovaries exist beneath the skin in the grooves of the arms, and the ambulacral tubes are also situated there. The embryo is free-swimming and ciliated. The rosy-feather star is fixed in the early part of its life only, living latterly as a free, starfish-like form.

Crin'oline (from Fr. *crin*, Lat. *crinis*, 'hair'), a hooped petticoat made of horse-hair, or of thin hoops of whalebone or steel held horizontally by vertical bands, revived in France by Empress Eugenie in 1855, and shortly thereafter introduced into England. This garment had its origin in the *vertugade* or *vertugale* worn by ladies in France and Spain in the 16th c., which was introduced into England from Spain, under the corrupted name *farthingale*, in the reign of Queen Mary. In the succeeding reign of Elizabeth the 'wheel' and round farthingales attained enormous dimensions, and gave the wearers the appearance of standing in a drum or in a bell-shaped cage. Capricious fashion retained the farthingale till the time of Charles II., though it became more moderate in size, after which it gradually died out, only to reappear in the hooped petticoat of the 18th c., and the later C. The C., soon after its introduction, swelled considerably in circumference, and continued to be worn as a fashionable article of dress for a number of years, notwithstanding its obvious inelegance, the frequent loss of life occasioned by coming in contact with fire, and the ridicule and satirical treatment it received in certain public prints, till its disuse about 1866. A fabric composed of horse-hair and cotton, used for ladies' bonnets, is also known by the name 'C.'

Cri'num, a genus of very handsome plants, of the natural order *Amaryllidaceæ*, comprising numerous species, natives of Asia, Australia, S. America, and W. and S. Africa, while, owing to the period during which they have been cultivated in our gardens, many fine crosses (hybrids) have been introduced by the skill of the horticulturist. About the only species known to have any marked properties is the Asiatic C., the bulbs of which are believed to be emetic, and as such are in some parts of the East employed in cases of poisoning. The C. of S. Africa is hardy enough to grow in a protected border in warm situations out of doors.

Cri'sis (Gr. 'a judgment,' from *krino*, 'I judge'), a term used by medical writers to denote a sudden change in the condition of the patient, significant of one or other of two things—death or recovery. C. is often accompanied by some marked phenomena, as intense sweating, or a severe shivering. Apart altogether from the doctrine of a *materies morbi*, the law of periodicity in many acute diseases is of great importance, and one too often neglected. In some fevers there are *critical* hours, *e.g.*, in *Ague* (q.v.), when the paroxysm occurs at a fixed hour; in others there are *critical* days, *e.g.*, in small-pox, measles, and scarlet fever. The days on which the eruptions appear are important, and constitute crises. In some Fevers (q.v.), the seventh, fourteenth, and twenty-first days are also considered critical, but there is, perhaps, an admixture of medical superstition in such notions.

Cris'pin, St., according to the legend of the Church, was of Roman extraction and of noble birth. About the middle of the 3rd c. he fled with his brother Crispianus from Rome to Gaul, where he settled in the town now called Soissons. While acting as a Christian missionary he made shoes for the poor, hence in later times, under the name of King C., he became and continues the patron saint of shoemakers. C. and his brother suffered martyrdom in 287, during the persecution of Diocletian. Their festival falls on the 25th of October.


Crispine.

Crispine, a lady's head-dress, in mediæval times, which was fastened over the head by a clasp. It hung down as a thin veil or as a net in which the hair was confined.

Cris'ta, a term used in anatomy to denote a crest or ridge. Thus we have the *C. galli*, or cockscomb of the ethmoid bone, the *C. ilii*, or ridge round the rim of the iliac or hip bones, &c., &c.

Croa'tia, a portion of the Austro-Hungarian monarchy, forming with Slavonia (q.v.) a crown-land proper; area, 16,773 sq. miles; pop. 2,200,977. It lies E. of the Adriatic Sea, and is partly bounded on the S.E. by Bosnia. The chief towns are Agram, Warasdin, Kreutz, and Fiume. The Save with its tributaries, Illova, Kulpa, and Unna, and the Drave are the chief rivers. A great part of the country is traversed by continuations of the Julian and Dinaric Alps, and deep valleys occur in the S., which have no outlet, important streams having to make their way underground. The climate varies much, and in the S. the *bora*, a boisterous wind, prevails from September to May. The soil is in many places fertile, and the vine, olive, fig, and mulberry are successfully cultivated. There are almost no manufactures. The capital is Agram. C. was at one time a separate *Banat* (q.v.). The Croatians, Slavs in blood and language, are for the most part Roman Catholics, with a sprinkling of Greek Catholics, though a considerable number belong to the Greek Church proper. The earliest historical inhabitants of C. were the Pannonians, who were subdued by Augustus. The Croats, or Horvats—*i.e.*, dwellers in the Carpathians, and after whom C. is now named—took possession of the territory in 640. At the end of the 12th c. it was incorporated with Hungary, with which it passed in 1526 into the possession of the Hapsburgs. Together with Slavonia, the *Litorale* and Fiume, it was formed into a crown-land. During the Hungarian revolution, the long-standing jealousy of the Croats towards the Magyars found expression in the hostile action of the Ban Jellachich. The result was its separation from Hungary in 1849. During 1849-60 it was, like the other non-German parts of Austria, subjected to a centralising legislation; but on the 20th of October, 1860, it obtained the right to be governed locally by its own elective assembly and municipal institutions. In the rural communes the magistrates possess executive power; in the towns, the municipal council. There is a university at Agram, at which 413 students are under the instruction of 49 teachers.

Cro'chet-Work (Fr. *crochet*, 'a hook'), the name of a simple kind of fancy needlework in cotton or wool, worked with the aid of a hooked needle. Antimacassars, doyleys, &c., are commonly made with beautiful raised flower or star patterns of C.-W. The delicate Irish crochet-lace is much esteemed.

Crocid'olite (Gr. 'woolly stone'), a silicate of iron, composed of separable flexible fibres like asbestos, found chiefly in S. Africa. It has a pale-blue, green, or yellowish-brown colour, and when cut and polished *en cabochon* it shows a chatoyant lustre.

Crock'ets (Fr. *crochet*, dim. of *croc*, 'a hook,' 'a crook'), in Gothic architecture, ornaments representing curved and bent foliage, and placed upon the angles of spires, canopies, and pinnacles, on gables, and on the weather mouldings of doors and windows. Occasionally C. are found in vertical mouldings, as at Lincoln Cathedral, but never in horizontal situations. About the time of the Renaissance, animals began to be substituted for leaves.

Croc'odile, a genus of the Reptilian order *Crocodilia*, distinguished by the fact that the fourth tooth in the lower jaw is larger than the others, and forms a canine tooth, which is received into a pit excavated in the border of the upper jaw, so that it is visible externally when the mouth is shut. The hind-legs are bordered by a fringe of serrated or toothed conformation, and the toes are completely united by membranes. The snout is long, obtuse, and flattened. The crocodiles, as types of their order, present good examples of the dermal bony plates and scales forming their chain-armour. The teeth are implanted in distinct sockets, new teeth being developed from below, and ultimately displacing the old teeth. The vertebræ are procœlous—that is, hollow in front and convex behind—as in all living *Crocodiliæ*. The heart is four-chambered. No clavicles exist. Two vertebræ compose the sacrum. The Cloaca (q.v.) opens by a longitudinal aperture. The front feet have five, and the hinder ones four toes. The nose opens by a single nostril, and the hinder nostrils open very far back in the mouth, a conformation rendering it easy for these animals to drown their prey, whilst they breathe readily themselves. The tongue is attached to the floor of the mouth. The Egyptian C. is the familiar species, attaining a length of from 20 to 30 feet. Species of true crocodiles also occur in Asia and in the New World, where the Alligators (q.v.) are also found.

Egyptian Crocodile.

Cro'cus, a genus of Iridaceous plants, mostly natives of Southern and Eastern Europe, and of Asia Minor, though a few extend as far N. as Central Europe. They have been long cultivated in most temperate or even northern parts of Europe and America for the sake of their beautiful flowers. Saffron (q.v.) is obtained from *C. sativus*, while *C. vernus*, *C. lagenæflorus* (and its variety *luteus*), *C. pyrenæus*, *C. reticulatus*, &c., are among the favourite garden species. The 'Cape C.' is *Gethyllis*, while the name Indian C. is sometimes applied to the orchideous *Pleiones*.

Crocus of An'timony is a compound of sulphide of sodium and sulphide of antimony, and is obtained during the extraction of antimony from its sulphide.

Crocus of Mars is the sesquioxide of iron.

Crœ'sus, the last King of Lydia, succeeded his father Alyattes, B.C. 560. In the early years of his reign he pursued an unbroken career of conquest, until his dominions extended from the northern and western coasts of Asia Minor to the Halys on the E. and the Taurus on the S. When at the height of his wealth and grandeur, C. (according to a story told by Herodotus) asked Solon who was the happiest man he had ever seen. Solon replied that no man was to be deemed happy till his life had been happily closed. By an accident, and as it seemed to C. in fulfilment of a dream, he lost his accomplished son Atys while hunting. C. grew jealous of the rapidly-rising power of Cyrus, and determined to attack him; but, before doing so, he elicited from the Pythia two replies, memorable instances of the ambiguity of ancient oracles—that if he marched against the Persians he would overthrow a great empire; and that he should flee along the Hermus when a mule became King of the Medes. C. encountered Cyrus in an indecisive battle in Cappadocia, and fell back on Sardis, where he was totally defeated by Cyrus, who, fourteen days thereafter, took the city. C. was condemned to be burned, and when on the pyre, remembering the words of Solon, thrice uttered his name. On receiving an explanation of this occurrence, Cyrus released C., gave him Barene, near Ecbatana, as a residence, and treated him as a friend. C. accompanied Cambyses on his expedition into Egypt. How or when he died is unknown.

Croft, William, Mus. D., one of the greatest English cathedral composers, was born in 1657, and educated under Dr. Blow, whom he afterwards succeeded (1708) in his office at the Chapel Royal, and as organist at Westminster Abbey. He received the degree of Doctor of Music from the University of Oxford in 1715, and in 1724 published *Musica Sacra*, a collection of anthems,—the first music printed from engraved plates. He died in August, 1727, and was buried in Westminster Abbey. His compositions are almost all anthems, very many of which are still sung frequently in English churches. In their own department they have seldom, if ever, been surpassed.

Cro'ia, or **Cro'ja,** the birthplace of the famous Scanderbeg, is a town in the vilayet of Scutari (Skodra), and 45 miles S.S.E. of the town of Scutari. It stands on a height, 500 feet above the plain, and is defended by a castle. Pop. 5080.

Croix, St., or **Santa Cruz,** an island in the W. Indies, E. of Porto Rico, and belonging to Denmark. Area, 74 sq. miles; pop. 19,783. It is very fertile, and almost every inch of ground is cultivated. The chief town is Christianstadt.—C. is also the name of a river which flows into the Bay of Fundy, N. America, after a course of 55 miles, and serves as the boundary between the state of Maine and the province of New Brunswick, in the Dominion of Canada.

Cro'ker, John Wilson, a politician and man of letters, who had a considerable reputation in his time, was born in Galway, Ireland, 20th December, 1780. He studied at Trinity College, Dublin, and at Lincoln's Inn, London, and was called to the Irish bar in 1802. Some clever satires, and a *Treatise on the State of Ireland, Past and Present*, brought him into prominence, and in 1807 he was elected member for Downpatrick. Two years later a defence of the Duke of York obtained for him the appointment of Secretary to the Admiralty, which he held for twenty years. C. is perhaps best known by his articles and reviews in the *Quarterly Review*, of which he was one of the founders, which were remarkable even in that day for their savage partisanship and the extreme bitterness of their personalities, by the clever caricature of him, under the name of 'Rigby,' in Disraeli's *Coningsby*, and by his annotated edition of Boswell's *Life of Johnson*, which was severely criticised by Macaulay in the *Edinburgh Review*. C. rendered, however, some really valuable services both to literature and to art, and he deserves honourable mention for his active part in the establishment of the Athenæum Club. He died at Moulsey, near Hampton Court, 10th August, 1857.

Croker, T. Crofton, a popular collector and author of Irish stories and legends, was born at Cork, 15th January, 1798, and, through the influence of his friend, though not relation, John Wilson C., obtained, at the age of twenty-one, a clerkship in the Admiralty, in which he rose till he had a salary of £800 a year. Among his collections of stories of Ireland, his *Researches in the South of Ireland* and *Fairy Legends and Traditions of the South of Ireland* (1825) are perhaps the most interesting. All his books, especially such essentially original ones as *Barney Mahoney*, are marked by humour and pathos, both genuine and both truly Irish. C., who was an enthusiastic antiquarian, retired from the Admiralty in 1850 on a good pension. He died at London, 8th August, 1854.

Cro'ly, Rev. George, D.D., a most indefatigable writer of romances, magazine articles, and poems, and an eloquent preacher, was born at Dublin in 1785, and died rector of St. Stephen's, Walbrook, London, 24th November, 1860. C. was a man of versatile talents, and, had he written less, his reputation might have been more permanent. The romance *Salathiel* is perhaps the work of his that will live longest.

Crom'arty, a burgh and seaport in Ross and C., at the N.E. extremity of the peninsula which separates the Moray from C. Firth, has an antique appearance from the houses in the older streets being built in the quaint Flemish style. The chief industry—the herring and white fishing—has declined of late, but there are manufactures of sacking, some cooperages, and a brewery. C. unites with Wick, Dingwall, Dornoch, Kirkwall, and Tain in returning a member to Parliament. Hugh Miller was a native of C. Pop. 1338.

Cromarty Firth, an inlet of the N. Sea, in the united counties of Ross and C., opening out from the Moray Firth, 18 miles long and from 3 to 5 miles broad. It is completely landlocked, and has sufficient depth of water to furnish anchorage for the largest navy. The entrance, 1½ miles wide, is between the N. and S. Sutors, two lofty wooded headlands, which have been vividly described by Hugh Miller. The towns of C., Dingwall, and Invergordon are on the shores of C. F.

Cromartyshire, in the N. of Scotland, consists of numerous detached portions scattered widely over Ross-shire. These two shires now form a single county. See ROSS AND CROMARTY.

Crom'dale (Gael. 'winding valley'), a village on the E. bank of the Spey, till 1870 included in Inverness-shire, but since that date also in Elgin, by Act 33 and 34 Vict. c. 16. Here on 1st May, 1690, the troops of William III. defeated a small body of Jacobites. This skirmish forms the subject of the song known as *The Haughs of C.* Pop. civ. par. 3463, included partly in Elgin, and partly in Inverness.

Cro'mer, a parish and fishing village on a bay of the same name, Norfolkshire, 21 miles N. of Norwich. It has a splendid beach for sea-bathing, but the bay is called by the natives the Devil's throat, so dangerous is it to navigation. C. carries on a small coasting trade. Pop. reg. sub-dist. 8419; civ. and ecc. par. 2197.

Crom'lech (Celt. 'an inclined flat stone') is the name given to one of the unsculptured stone monuments of the Celtic races, commonly called *Druidical stones*. The C. has been defined as a large stone placed like a table, but in an inclined position, upon other stones set up on end. A rude chamber is thus formed within; hence the popular names of 'giant's grave,' 'hag's bed,' &c. There is not, however, in such monuments, one unvarying type of construction; the *Logan*, or rocking-stone, and the *monolith*, or unhewn pillar standing alone, are perfectly distinct, but the C. merges into the *circle* and the *altar*, which are also found largely on the N.E. coast of Scotland, and on the diluvial plain between Loch Awe and the Crinan Canal. Stenness, in Orkney, and Callernish, in the Lewis, are the sites of the most conspicuous groups. The *dolmen* of Brittany and other parts of France is the same as C. Two of the largest cromlechs are at Plas Newydd, in Anglesea. Kit's Coty House, in Kent, and Chun Quoit, in Cornwall, may also be mentioned. The fact that cromlechs are sometimes surrounded (as 'The Broadstone,' County Antrim) by a circle of standing stones, long gave currency to the view that they were Druidical remains. Because human remains, with the usual accompaniments, have been found in churches, they have been set down as sepulchres. Hibbert regarded those of Orkney as equivalent to the Scandinavian *tings*, and it is certain that 'stannin' stanes' were frequently used for the purpose of assembling courts of justice. Astronomical meanings and serpent-worship have also been read into these remains by antiquaries. Fergusson says they are the work of partially civilised races who had come into contact with the Romans. No approximate dates are known.

Kit's Coty House.

Cromp'ton, Samuel, an English inventor, was born at

Firwood, near Bolton, Lancashire, 3rd December, 1753. His father was a farmer, but, like many farmers at that time, also a carder and spinner. C. lost his father when only five; but his mother gave him the best education which could be obtained in the district. When old enough he worked at the loom in his uncle's mansion, called the Hall-i'-th'-Wood, and at the age of twenty-one became so dissatisfied with Hargreave's machine that he turned his attention to inventing a better one. For five years he worked at this project, thus employing many of his night hours after his day's weaving was over. At last he succeeded; but his success brought him little pecuniary returns; for, unable from lack of means to patent his invention, he was at length forced to disclose the principle, under promise of a liberal subscription. The subscription amounted to £60! Latterly he received a reward of £5000, with which, however, he could not compete successfully with the wealthier manufacturers, who had largely made use of his machine. C. died 26th June, 1827. His invention was called the spinning-mule, from its partaking of two leading characters of Arkwright's machine and Hargreave's spinning-jenny. See French's *Life of C.*

Crom'well, Oliver, was born of good family at Huntingdon, 25th April, 1599. His father, Robert C., who sat as M.P. for Huntingdon in the Parliament of 1593, was a younger son of Sir Henry C., of Hinchinbrook, while through his mother, Elizabeth Steward, he was connected with the families of Hampden and St. John, and even, it is asserted, with the House of Stuart. He was educated at school at Huntingdon, and afterwards at Sidney-Sussex College, Cambridge. From the latter, however, he was recalled by the death of his father, and settled first on the family estate at Huntingdon, and subsequently on a farm at St. Ives, marrying in 1620 Elizabeth, daughter of Sir James Bourchier, a gentleman of landed property in Essex. C. soon associated himself with the Puritan party, being perhaps prompted to do so by natural melancholy, which showed itself in early years in fancies of approaching death. He was first returned to Parliament in 1628, for the borough of Huntingdon, but did not take an active part in its proceedings for a time, although he actively opposed the tyranny of King Charles, by resisting his schemes for the drainage of the Fens. In 1640 he took his seat for the burgh of Cambridge, and soon was 'much hearkened to' as a member of the Parliamentary party. He threw himself with heart and soul into the war, fought with a troop of his own raising at Edgehill, and spent his substance in equipping two companies, which, in 1642, he asked the permission of Parliament to raise; and it was he who saw the great advantage that would be derived from enlisting religious enthusiasm and stern morality on the side of the Parliament. He began with his own regiment, which became famous as 'the Ironsides,' and the experiment proving successful, his policy was extended to the whole army, henceforth known as the New Model. C., who had rapidly advanced to the position of colonel, distinguished himself greatly at the battles of Marston Moor, 2nd July, 1644, and Newbury, and when the celebrated 'self-denying ordinance' was passed, became lieutenant-general of the Parliament forces under Fairfax, and as such commanded the right wing of the Parliamentary army at the decisive battle of Naseby, 14th June, 1645. From that time to his death C.'s history is the history of his country. After the king fell into the hands of Parliament, he crushed the insurrection of the Scots in favour of the king, at Preston Moor, 17th August, 1648. After the execution of the king he was appointed lieutenant-general, and quickly and surely stamped out a rebellion in Ireland. When the young prince, afterwards Charles II., landed in Scotland, C. superseded Presbyterian and wavering Fairfax, marched into that country, and totally defeated the Scotch under Leslie at Dunbar, 3rd September, 1650. The Royalists having invaded England, C. gained a final victory at Worcester, 3rd September, 1651. C. now found himself at variance with the Rump, which had become a mere clique of crotcheteers and talkers, and dissolved it 20th April, 1653. He summoned a new Parliament, but was compelled to dissolve it also, although not before it had invested him with the title of Lord Protector. From that time to his death, although he repeatedly summoned Parliaments, he was really absolute ruler of England; and the country never was more respected and feared than during the Protectorship of C.; and although he was never popular, and was in constant danger of assassination, even his enemies admitted the wisdom of his domestic measures. After a brilliant but yet melancholy term of solitary power, he died 3rd September, 1658, on the anniversary of some of his greatest victories. In 1661 his remains were dragged by the Royalists from their resting-place in Westminster Abbey, and, along with those of Bradshaw and Ireton, hanged at Tyburn. For some time after his death C. was looked upon as a fanatic, tyrant, and hypocrite; but that shallow and ignoble hypothesis has been banished from historical literature by the industry and genius of Carlyle. He now ranks as perhaps the greatest and (circumstances considered) wisest ruler England has ever had. While his religion was emphatically a matter of heart and soul, he was no bigot, as the manner in which he protected the Jews, and even the Unitarian Biddle, showed. In his brilliant foreign policy there occurred perhaps only one mistake—his considering Spain, and not France, as the Roman Catholic power in Europe most to be feared. During the first session of 1895 a movement was set on foot towards the erection of a statue to C. on the Westminster grass plots adjoining the Houses of Parliament. The Irish Nationalist party in the House of Commons, however, objected to any such recognition of a statesman whose policy with regard to Ireland had been marked with some severity, and as the Constitutional party in the House was also adverse to the proposal, the matter was allowed to drop, to the amused surprise of the public at large. See Carlyle's *O. C.'s Letters and Speeches, with Elucidations*, Guizot's *Histoire de la Révolution d'Angleterre*, and Green's *Short History of the English People* (Lond. 1875).

RICHARD C., eldest son of the preceding, was born at Huntingdon, 4th October, 1626. When his father became Lord Protector, he made his son First Lord of Trade and Navigation and Chancellor of Oxford. Richard proved, however, a feeble, indolent, and self-indulgent man; and when, on his father's death, in 1658, he succeeded him as Lord Protector, he was unable to contend against the factions that opposed him in Parliament and in the army, and resigned his post seven months after accepting it. He went to the Continent, and returned in 1680, when he assumed the name of Clarke, and lived in retirement at Cheshunt. There he died in 1712.

Cromwell, Thomas, the real author of the great ecclesiastical and political revolution accomplished in the reign of Henry VIII., and of whom it has been well said that, 'in the whole line of English statesmen, there is no one of whom we would willingly know so much, no one of whom we really know so little,' was born about 1490 near London, and in humble circumstances, the popular story being that his father was a blacksmith at Putney. For a time he led a roving, adventurous life, was engaged when a mere boy in the service of the Marchioness of Dorset, and took part in the Italian war as a common soldier, or 'ruffian,' as he described himself on one occasion to Cranmer, obtaining, however, a knowledge both of the language and of the politics of Italy. He next appears as a commercial agent to a Venetian merchant, and clerk to a factory at Antwerp, and, probably after another visit to Italy, he returned to England about 1517. At all events, he is found about the beginning of the reign of Henry VIII. as a thriving wool merchant and scrivener in Middleborough. C. now took an active interest in political life, and became a member of the House of Commons. The turning-point in his life, however, was his becoming the confidential servant of Wolsey, who employed him in the unpopular work of suppressing some of the smaller monasteries, and transferring their revenues to Ipswich and Oxford. C. stood by his master to the last, and chivalrously and successfully defended him against the bill of impeachment in the House of Commons. Owing, perhaps, to his suggestion that the King should substitute his own supremacy in the Church for that of the Pope, Henry took him into favour, and made him his secretary and a privy councillor. He rose rapidly from post to post and from honour to honour, and when at length he was made Lord Chamberlain and Earl of Essex, he was the most powerful subject and statesman in England. He had conceived a definite policy, and carried it relentlessly through. It was to render the King the centre of all authority in England, by reducing the Church, in the language of Green (*Short History of the English People*), 'to a mere department of the State, in which all authority should flow from the sovereign alone, and in which his will should be the only law, his decision the only test of truth.' C. did not succeed to the extent he intended, but still he was so far able to accomplish his intentions, that to this day the polity of the Church of England remains substantially the same as it was created by him. It will always be remembered to his credit that, although perhaps for purely political reasons, he took a prominent part in establishing Reformation principles—he had English Bibles placed in the churches, and had the youth of the nation taught the Creed, the Ten Commandments, and the Lord's Prayer. His policy—particularly his maintaining a large army of spies, his sending to the block every one that opposed his measures, and the resolute manner in which he put down monasteries, securing for him the title of *Malleus Monachorum*—raised him up a host of enemies. Many complaints regarding him were presented to the King, who in the end deserted C. for promoting the marriage with Anne of Cleves, to whom Henry had taken a dislike. Ultimately C. was arrested and thrown into prison, and being condemned on the charges of treason and malversation, was executed on Tower Hill, 28th July, 1540.

Cronstadt. See KRONSTADT.

Crook, a lengthening tube used in brass instruments, which enables them to be played with the same fingering in different keys.

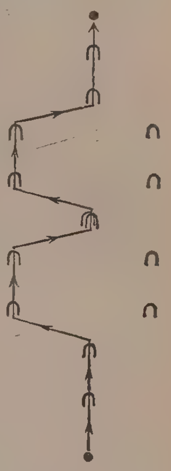
Crook'ed Island, one of the Bahamas, 27 miles E. of the S. point of Long Island, from which it is separated by C. I. Passage. Area about 80 sq. miles; pop. of C. and Long Islands 2634. Like most other islands of the group, it has a considerable export trade in salt.

Crop, or **Outcrop,** is the place where a stratum rises to the surface of the ground. It corresponds to the *strike* on a level area. See DIP AND STRIKE.

Crop. In Scotland, the landlord has a Hypothec (q.v.) over the C. for the rent of the year of which it is the C.; and the right continues in force so long as the C. remains in the tenant's possession. But, if sufficiency be left to pay the landlord, and the time of such payment be passed, then the hypothec no longer exists over any surplus crops as against a creditor's poinding. Also, if the landlord has received notice from his tenant of the latter's intention to sell his C., and if the sale then takes place by bulk in open market, or by public auction, or for a price fair in a bona-fide manner and the C. be removed, the hypothec no longer exists. Again, leases entered into on or after Martinmas, 1881, of land exceeding two acres in extent let for agriculture or pasture, give no right of hypothec to the landlord.

Cropp'ing, a term of the agricultural law of Scotland, indicating stipulated or implied conditions of farming under a lease. What is called the *clause of management* is now generally inserted in leases. It provides, among other things, for a variety or rotation of crops. This rotation varies according to the soil, climate, and other circumstance of the farm. Even in the absence of such a clause there is an implied obligation on the tenant to cultivate according to the rules of good husbandry. By common law a tenant is restrained from such gross mismanagement as will injure or overwork the soil. It is generally provided that white corn crops (*i.e.*, crops which are allowed to ripen) shall never be taken from the same land in immediate succession, and that a certain proportion shall be under turnips, or plain fallow, every year, and be sown to grass with the first corn crop after turnips or fallow. The clause is generally enforced by penalty in case of contravention, as to which the law is, that the tenant is not entitled to pay the penalty and to infringe the clause. Also, an outgoing tenant may take the way-going green crop for consumption off the land and the way-going white crop he has sown, provided there is no stipulation in the lease to the contrary. The straw of the last crop but one, as of earlier crops, must, with the manure of it, be consumed on the land, and the tenant obtains compensation only for such as need not, or, on account of date, could not, be so used.

Cro'quet, perhaps a modification of the old game of Pall-mall, is a favourite lawn amusement of modern origin, played by any number of persons up to eight, either individually or on 'sides.' The necessary implements of the game are wooden mallets, balls also of wood, a pair of pegs, and iron hoops or rings. The rings are arranged in a variety of ways, a common form being shown in the accompanying diagram, and the pegs are placed at the starting and turning points of the game respectively. The object of the game is to drive the balls with the mallets through the rings outward, in the order shown in the diagram, and after 'pegging'—*i.e.*, hitting the peg at the upper end—to return home in a corresponding order, taking the rings on the off-side. On pegging at the home-end, the player has finished, and winning is reckoned according to the order in which this is accomplished.



Croquet.

Cro'sier (Mid. Lat. *crocia*, from *crux*, 'a cross'), the pastoral staff of an archbishop, surmounted by a cross, and so distinguished from that of a bishop, the head of which is a crook. This distinction between the cross and the crook dates back to the 12th c. The C. is about 5 feet long, made of tin, hollow, generally gilt, and often richly ornamented.

Cross (Lat. *crux*, 'a pale or stake,' 'a cross'), two pieces of wood placed transversely, and anciently used in a mode of punishment which probably arose from the custom of fastening culprits or prisoners to trees, and leaving them to die by hunger or by wild beasts. The Persians, Syrians, Phœnicians, Egyptians, and Carthaginians used this mode of capital punishment, which was at Rome, under the government of the kings, inflicted on persons of all conditions in life, but later only on slaves and the vilest malefactors. According to Roman law, the sufferer was first scourged, and then compelled to carry his C. to the place of execution, outside the town in which the sentence had been passed. Here he was stripped naked, and fastened to the C. by tying or nailing. The punishment was abolished in the time of Constantine. Instances are on record of persons being taken down and surviving after remaining some time on the C. During the reign of Louis XV. of France, several women (religious enthusiasts called *convulsionaires*) voluntarily underwent crucifixion as a part of their religious services.

The C. was in form either simple or composite. The simple C. (*crux simplex*) was a mere stake on which the condemned was impaled (*infixus*), or on which he was fastened by the hands crossed above his head (*affixus*). A tree—hence Seneca's phrase, *infelix lignum*, the 'accursed tree'—was convenient for the purpose. There were several forms of the composite C. (*crux compacta*). The most common, the *crux decussata*—resembling the letter X, from *decussis*, the 'number ten'—is also called St. Andrew's C., implying that that saint was crucified on an instrument of this shape. Another form, the Tau-C. (*crux immissa*), was shaped liked the Greek letter *tau* or T. It is called St. Anthony's C., because it was said to have been embroidered on that saint's cope. A variety of this is the *crux ansata* C. with a handle—from *ansa*, 'a handle.' It has a circle at the head of the upright beam, is found on Assyrian and Egyptian sculptures, also among the Copts, Indians, and Persians, and is supposed to have been the symbol of a divinity, or an emblem of life. The most historically famous is the *crux immissa* or *crux* *capitata*—the Latin or High C.—which has the longer upright beam, or *stirpes*, projecting above the cross-piece or *patibulum*. This is held by tradition to be the form of C. on which Jesus Christ was crucified; the *titulus*, or accusation on which he suffered, being placed above his head seems to confirm this supposition; and a further confirmation is, that this C. is repeatedly found on the coins and columns of Constantine the Great. The Greek Church represents the instrument on which Jesus Christ was crucified as having the transverse beam laid across the middle of the upright one, both being equal. This shape is called the Greek C.

The C. became an object of veneration to Christians after the crucifixion of Christ. The early Christians multiplied models of it; and after Constantine's victory in 312 over Maxentius, through the influence, as he professed to believe, of the sign of the C. which he is said to have seen in the sky, it began to be set up in public places and on public buildings. Then also the custom of crossing, or making in the air with the hand the sign of the C., began to prevail. It was not till the 6th c. that the bare emblem of the C. was transformed into the image of the Crucifix (q.v.).

The festival of the 'Invention of the C.' is held on the 3rd of May, and that of the 'Elevation' on the 14th of September. The former commemorates the alleged finding of the true C., in the year 326, by the Empress Helena, mother of Constantine; the latter its re-erection, in the year 628, at Jerusalem by the Emperor Heraclius, after it had been carried away by the Persians.

The C. has been deeply impressed on all the external features of Christian civilisation. It has been extensively used as the ground-plan of churches. The plan of the Cathedral of St. Mark, Venice, is a Greek C.; that of St. Peter's is a Latin C. (q.v.). Churches commonly exhibit the C. on their gable-ends. It was early borne, as it still is, in ecclesiastical processions; an enormous C. made of wood and cardboard is carried in some of these processions at Rome, balanced in a waistband round the body of a man. The C. placed over the altar is called the *Rood* (q.v.), or *holy rood*.

As an ornament of Christian art, the C. has exercised the ingenuity of artists in all ages. The Romanesque period indulged in great luxury in this respect, a wooden C. being overlaid with gold or silver, and ornamented with jewels, gems, pearls, enamelled representations, and filigree work. In the Gothic epoch, the C. had generally the ends of its four arms trefoiled. Reliquaries of the most elaborate description were constantly made in the shape of a C.

The memorial C. has in all the ages of Christianity been a favourite mode of expressing regret for the dead. It is used for this purpose in all its shapes in places of interment. One form of it, the Norman C., is a Gothic turret, either standing on the ground or elevated a few steps. Waltham C., near London, erected by Edward I. in memory of his Queen Eleanor, and not long since restored, with questionable taste, is a good specimen. The Runic C., said to be of Scandinavian origin, and named after the Runes (q.v.), in which its inscriptions are written, seems to have been frequently set up in memory of some hero of the state or of the Church—some king, warrior, or bishop. There were formerly many of these in the Island of Iona, but now only one remains—St. Martin's, in the cathedral grounds. They were common in Ireland—St. Luke's, which still stands in the county of Louth, being of huge dimensions.

The sanctuary or boundary C. marked off Church lands, and showed the people on their way to church where to kneel when they were entering sacred grounds. One of these latter is still to be seen on a field near the parish church of Kilhoman, Islay.

The market-C. has left its name where it stood in many towns of England and Scotland. It is noticeable that in some towns of Ireland the market-place is called the *diamond*—probably owing to its diagonals being a Greek C. Some of the most famous of English market-crosses, as at Salisbury, Chichester, Bristol, and Winchester, are designed with niches, and vaulted, leaving an open chamber. These crosses seem to have been used as *preaching stations*; notably St. Paul's C., London, of which we read as early as the middle of the 13th c. The neighbouring cathedral, St. Paul's, is surmounted by one of the largest constructed crosses in the world, a rival to that on St. Peter's at Rome.

Cross, in heraldry, one of the honourable ordinaries, may be regarded as a combination of a fesse with a pale. It was usual for the Christian warriors in the crusades and for pilgrims to the holy Land to wear it as a badge. The varieties of the C. are very numerous; but when the blazon is a simple St. George's C., it is always understood as meaning the honourable ordinary. There are two classes of the ornamental C.—those in which the extremities reach to the outer edge of the shield, and those which are Couped (q.v.).

Cross, Order of the, an ecclesiastical order of knighthood which arose in Palestine during the crusades, as the Bethlehemite Order, but now has its chief seat in Bohemia, where Church dignitaries and professors of the University of Prague are among its members. In the 13th c. the knights of this order became monks, and in 1328 were confirmed by Pope Gregory IX. as a monastic community. They settled chiefly in Poland, Austria, Moravia, Silesia, and Bohemia. Their badge is a C. of red satin, with a six-pointed star under it; hence they are sometimes called *stelliferi* or star-bearers.

Cross, The Southern, a bright constellation of the southern hemisphere, consisting of four stars, the line joining two of which points to the S. pole, forming with the line joining the other two a very perfect C. The brightest star is nearest the pole, and is between the first and second magnitudes.

Cross, Victoria, a British order, or naval and military decoration, as it is called in the Gazette of 5th February, 1856, instituted for eminent personal valour, in the presence of the enemy, at the close of the Crimean War. A single act of valour may win this decoration, and it is granted to a soldier of any rank, as in the cases of Lieutenant Marsham Havelock, son of the famous general Sir Henry Havelock, at the battle of Cawnpore, and Lieutenants Salkeld and Home, Sergeant Smith, and Bugler Hawthorne, at the blowing-in of the Cashmere Gate in 1857, during the suppression of the Indian Mutiny. The order is said to have been founded in imitation of the French C. of the Legion of Honour; but it resembles the ancient English decoration of the partially-created baron, called a Banneret (q.v.). The badge is a bronze Maltese C., charged with the royal crown and lion crest, below which is inscribed the motto, 'For Valour.' On the clasp, from which the letter 'V' hooks the C., there are two branches of laurel; and the ribbon is red for the army, blue for the navy. The performance of another act or other acts of bravery in the field by a holder of the V. C. entitles him to a *bar* or *bars*, on the ribbon. The pension accompanying this decoration is £10 a year, in the case of every warrant, or petty officer, seaman, marine, non-commissioned officer, or soldier, and for every *bar* £5 additional pension, paid annually. Down to the commencement of the present year 174 heroes had received the distinguishing badge. On 16th July, 1895, Surgeon-Captain H. F. Whitchurch was gazetted as a recipient of the V. C. for his gallant behaviour during a sortie from Chitral fort on 3rd March, 1895.

Cross-Bill in Chancery was a bill filed in the Court of Chancery by a defendant against his co-defendants or the plaintiff, and had for its object either one of two things; discovery of facts for defence in the former bill, or full relief to every one concerned. The same object is now attained by means of a *Counterclaim*. See regarding Scotch law, CONJOINING OF PROCESSES.

Cross'bill, a genus of Conirostral (*Insessorial*) birds, of the sub-family *Loxinæ*, in which the mandibles of the bill are hooked or crossed, and compressed at their tips. The head is large and the bill strong. These birds feed on the seeds of pine-cones, and their bills are well adapted for extracting the seeds and for crushing the cones. The common C., the parrot C., and the white-winged C., occur in Britain.

The first species is common in Europe and in N. America, where the last species is also found. The common species rarely breeds in Britain. The nest is of grass and twigs and placed at the top of pine-trees.

Crossbill.

Cross′bow. See Arbalest.

Cross-Buns, Good-Friday cakes with a cross upon them, long popular in England, where they are hawked about the streets of many towns with the cry, 'Hot cross-buns.' The origin of this practice is not known; it is perhaps a relic of a heathen custom adopted by the early Christian Church.

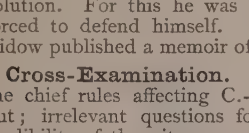
Crosse, Andrew, an eminent electrician, was born at Fyne Court, Broomfield, Somersetshire, 17th June, 1784. After studying at Oxford, he returned to his family seat in 1805, where he devoted himself to electricity. C. made many successful experiments regarding the formation of crystals, and formed numerous artificial minerals through the agency of voltaic currents. He communicated his discoveries of thirty years' labour to the British Association in 1836, and was highly commended by many scientific men. His most wonderful discovery was the apparent generation of certain *acari* between the electrodes immersed in a highly caustic solution. For this he was charged with impiety, and was forced to defend himself. C. died 6th July, 1855. His widow published a memoir of his life and labours (1857).

Cross-Examination. The following are, in England, the chief rules affecting C.-E. Leading questions may be put; irrelevant questions for the purpose of injuring the credibility of the witness are inadmissible; when not put for this purpose, some latitude in questioning is usually allowed. The witness may be asked if he has been guilty of a specified crime, but he is not bound to answer. If a witness under examination be hostile, from interest and any other cause, to the side which calls him, his examination may, by leave of the court, take the form of C.-E. See Evidence.

Crossopo′dia, the name given to certain kinds of *worm-markings* or *tracts* occurring in the Silurian and other rocks, and formerly, but erroneously, described as consisting of the *body* or actual fossil of the worm itself. *C. Scotica,* of the Silurian rocks, is a good example of these appearances, which are similar to those produced on modern coasts by marine-worms burrowing in or trailing across the sand.

Crossopteryg′idæ, a division of Ganoid (q.v.) fishes, so named from the fin-rays of the pectoral and ventral fins being arranged so as to form a *fringe* around a central lobe. The living Barramunda (q.v.), or *Ceratodus* of Australian rivers, shows this arrangement of the fins; whilst the *Polypterus* of the Nile, and the extinct genera *Osteolepis, Megalichthys, Holoptychius,* &c., are good fossil illustrations of the 'fringe-finned' ganoids.

Crotala, wooden castanets which were in use at a very early date. Some of the worshippers performed on C. while celebrating the mysterious rites of Cybele; and dancers on any ordinary occasion beat time with them.



Crotala.

Crotal′idæ, a family of Viperine snakes, represented by the Rattlesnake (q.v.) of N. America, and distinguished by the presence of a deep pit on each side of the nose behind the nostril. The head is broad and flat, scaly on the crown, and scutellated on its sides and on the nose. The teeth are small; no teeth, save the fangs, existing in the upper jaw. The belly is covered with broad shields. The tail may be provided with a rattle or with a spine.

Cro′taphite, the name given by the older anatomists to the temporal muscle on the side of the head, from *krotaphos,* 'the temple.' The term was also applied to the temporal bones and arteries.

Crotch, William, an English musician, born at Norwich in 1775. In 1797 he obtained the degree of Doctor of Music at Oxford, when he became Professor of Music, and in 1822 became Principal of the Royal Academy of Music. His anthems are his best-known compositions, but he wrote also for the organ and piano. He was the author also of some good theoretical works. He died, 29th December, 1847.

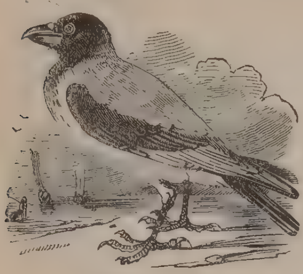
Cro′ton, a genus of Euphorbiaceous plants. The seeds of *C. Tiglium* yield Croton Oil (q.v.). Most of the species are aromatic. Among these may be ranked C. of the island of Eleuthera, one of the Bahamas, which yields cascarilla bark. The *Eau de Mantes,* a spirituous liquor, is made from West Indian C. *C. lacciferum* and *C. Draco* yield a resin used in varnish-making. Other aromatic, fragrant, and balsamic species are found at the Cape of Good Hope, &c. The aromatic tonic Malambo bark, or Matias bark, is the produce of *C. Malambo,* and is used in Colombia as a vermifuge, &c. See also Copalche Bark.

Croton Oil is expressed from the seeds of *Croton Tiglium* (see Croton), is viscid, of a yellowish-brown colour, an acrid taste, and a nauseous odour. It is an exceedingly powerful purgative. Dose, one-third to one drop. Externally it is used as a liniment, one of C. O. to seven of olive oil, or some other oil, and produces pustules on the skin. It is good for counter-irritation, as in internal inflammations.

Crotoph′aga ('tick-eaters'), a genus of Scansorial birds, known as the Anis or sub-family *Crotophaginæ,* the typical genus C. being confined to S. America, and possessing a much-compressed bill, with the edge of the upper mandible sharply keeled. One C., called the Savannah blackbird, is a familiar species, and is found in the W. Indies, feeding on insects such as ticks, which it picks out of the hides of horses or cattle.

Croup is an inflammatory affection of the windpipe, accompanied by the formation of a membranous exudation on the mucous surfaces attacked. The symptoms at first are those of a common cold, but they soon become alarming. The patient, generally in the night-time, awakens with a sense of suffocation—with a peculiar cough, called by physicians '*brassy.*' The breathing is quick, and there is a peculiar *crowing* noise as the air enters the lungs. There are occasional spasms of the muscles of the windpipe. C. is always worse during the night. The sufferer is very restless, and is frequently seen tearing at his mouth or throat as if to clear the windpipe of the obstruction causing impending suffocation. If relief be not obtained in the course of a day or two, death ensues from exhaustion, suffocation, or convulsions. C. is specially a disease of infancy, being most frequent during the second year. It is rare after five years of age, and is more common among boys than girls. It occurs chiefly in cold, damp climates, and is very fatal: one-half of those attacked die, and generally within two or three days. The proper treatment is to give emetics and purgatives at the outset, to apply hot sponges to the throat, to keep the child warm in bed, and to allow it to inhale moist warm air. In extreme cases Tracheotomy (q.v.) sometimes does good.

Crow, a genus of Insessores belonging to the sub-order Conirostres (q.v.). The true crows, forming the sub-family *Corvinæ,* are known by their want of toothed processes at the tip of the upper mandible, the ridge of which is curved, by the long and rounded wings, by the scaly tarsi, and by the two lateral toes being of equal size. Of the British crows, the raven (q.v.), the common carrion C., the rook, and jackdaw are the best known. The Royston or hooded C. is another species found in Britain. Variations in colour between these forms constitute the chief grounds of specific distinction. Other species of crows are the N. American C., the fishing C. of the United States, the jabbering C. of Jamaica, the smaller ebony C. of Ceylon, or Indian C., &c. The Choughs (q.v.) are nearly related to the crows, but are usually included in a separate sub-family (*Pyrrhocoracinæ*). The Alpine C. is one of the latter birds.



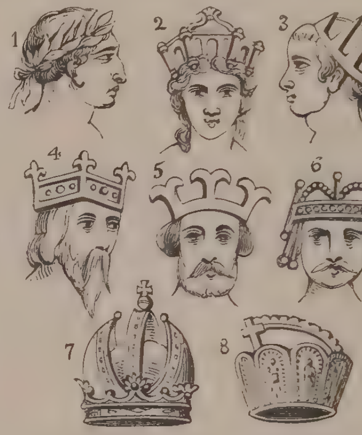
Hooded Crow.

Crow'berry, or **Crake'berry,** a genus of dwarf, creeping, heath-like shrubs, belonging to the natural order *Empetraceæ*, found in high latitudes, and on high, bleak moorlands and mountains in Scotland, the N. of England, and similar parts of Europe and America. The name is, however, generally applied to the black C., the black berries of which are eaten by game-birds and also by crows, which in regions where this berry is common leave the fields and resort to the hill-sides to live on it till harvest-time: hence the name C. Its berries are eaten by the Highlanders, the Russian peasants, and by the Greenlanders mixed with train-oil. Boiled in alum, they yield a purple dye, and are used by the Laplanders for dyeing sable and otter skins black. The red C., of the vicinity of Cape Horn, has edible red berries. The Portuguese Camarinheira is closely allied to the C., and is used in the preparation of an acidulous liquor used as a drink in fevers.

Crow'land, or **Croy'land,** an ancient town in the 'Fens' of Lincolnshire, 48 miles S.S.W. of Lincoln. It consists of four streets separated by watercourses with willows on their margin, and connected by a triangular bridge of three segments of a circle springing from three piers, but meeting in a point, across the Welland, the Nen, and a large drain called the Catwater. It is supposed to be as old as the time of Edward II. C. has also the ruins of an abbey said to have been founded in the 8th c. It was frequently destroyed and as frequently rebuilt, and part of it is still used as the parish church. Ingulphus was one of its abbots. Pop. civ. and ecc. par. 2800.

Crown, an ornament worn on the head as a symbol of regal or imperial station and dignity. In its derivation the modern C. comes from the *corona* which, among the ancient Greeks and Romans, was bestowed as an honorary reward to victors in athletics and public games; but in its real significance it represents the diadem or circlet which was worn by Oriental and early Roman kings. Crowns mentioned in Scripture were wreaths similar in nature and signification to the honorary crowns of the ancient Romans. Originally crowns were of plaited or twisted grass, leaves, twigs, flowers, or other inexpensive materials; but gradually they began, for certain purposes, to be made of precious metals and stones, and some of them were of very great value. Among the Romans, who bestowed crowns with a very lavish hand, the classes and varieties of such decorations were very numerous. Crowns of various descriptions and materials were conferred for distinguished conduct or service in military or naval undertakings; of which type the *corona triumphalis* may be noted as an example. This was bestowed on a victorious general to whom a public triumph was decreed, and consisted, first, of a wreath of laurel or bay leaves; second, a golden C., presented by the army which he had led to glory; and third, another C. of gold contributed by the various provinces. Emblematical crowns were worn by special classes, as, for example, the priests; and on particular occasions, such as funerals, weddings, and social festivities. The radiated C., which was originally reserved for deities and deified mortals, was adopted by several of the Roman emperors, Nero having been the first to use it as an imperial badge.

The crowns of monarchs at the present day are called *closed* crowns, because the diadem or circlet is overarched by a series of bands or arches, and the use of closed crowns is exclusively reserved to certain members of reigning houses. The first monarch who adopted the closed C. was Charlemagne, and his example was gradually followed by European rulers till the fashion became general. In England, the closed or arched C. was not introduced till the accession to the throne of Henry V., who had made for himself a simple C. with two arches. Since that period the royal C. of England has undergone many changes. That of Her Majesty Queen Victoria has two arches, which rise almost perpendicularly from behind the four crosses patées which heighten the circlet. Set alternately with the crosses are four fleurs-de-lys, and surmounting the whole at the intersection of the arches are a mound and a cross patée. The cap is of purple velvet lined with ermine, and the whole C. is richly studded with pearls, diamonds, and other precious stones. The crosses on the C. point to the title, 'Defender of the Faith,' and the fleurs-de-lys are relics of the English claim to the sovereignty of France. The state C. differs from the preceding mainly in superior richness.



1, Roman crown of bay leaves; 2, Mural crown (Cybele); 3, Radiated crown; 4, Square crown of Saxon kings; 5, Crown of King Eadgar (A.D. 966); 6, Crown of William the Conqueror; 7, Imperial crown of Germany; 8, Crown of Charlemagne.

The famous iron C. of Lombardy, now preserved in the Imperial Schatzkammer at Vienna, was originally all gold, but in the 6th c. it was strengthened with a ring of iron made 'of a nail of the Cross,' whence it received its appellation. The signification of the triple C. or tiara of the Pope has been variously explained, but the commonly received interpretation is that it indicated the sovereign pontiff's threefold royalty—spiritual over souls, temporal over the states of the Church, and mixed over all kings. The Vatican treasury contains several tiaras which have been presented to the Pope at various periods, one of the latest being that given to Pius IX. in 1855 by Queen Isabella of Spain, which weighs 3 lbs. and cost £12,000.

The Prince of Wales, as heir-apparent to the British throne, has a coronet closed with only one arch, surmounted with a mound and cross. Other members of the royal family, dukes, marquesses, earls, viscounts, and barons, have open coronets, which are heightened for their various grades according to strict heraldic order. See CORONET.

Crown Agent is the agent or solicitor in Scotland who, under the Lord Advocate, takes charge of criminal proceedings. The appointment lies with the Lord Advocate, and is not held *ad vitam aut culpam*. C. A. also means the agent of our Crown Colonies; the office is in Downing Street, London.

Crown Debts. By English law, debts due to the crown have a preference over all debts due to a subject. They are recoverable by a summary process, called an Extent (q.v.). Statute 28 and 29 Vict. c. 104, provided that debts due to the Crown shall not affect lands until writ of execution has been issued and registered. In Scotland the rule only holds with regard to personal or moveable property: and in a competition affecting heritage the crown has no privilege. The crown privilege is, however, good against the landlord's

Hypothec (q.v.). It is also effectual against mercantile sequestration; consequently a discharge under the Scotch Bankruptcy Act is not effectual against a crown debt.

Crown Lands. Under various statutes all grants or leases, exceeding thirty-one years, of lands belonging to the crown are void. The superintendence of C. L. is now vested in the Commissioners of Woods, Forests, and Land Revenues (q.v.), the demesne lands of the crown, which the sovereign hands over to the country in exchange for the Civil List being settled on him or her for the whole of the reign. The revenue derived from these C. L. is paid to the account of the Consolidated Fund. (Under Statutes 1 & 2 Vict. c. 2, 29 & 30 Vict. c. 62, and 36 & 37 Vict. c. 36.)

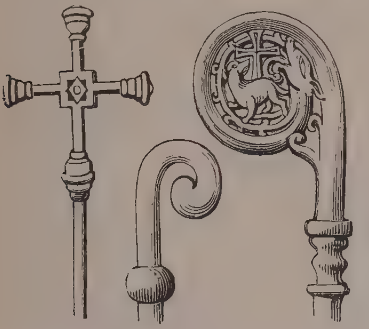
Crown Point, a fort famous in the French, Indian, and Revolutionary wars, stands on the W. side of Lake Champlain, and on the long narrow reach of the upper or southern end of the lake. Along with Ticonderoga, it guarded the pass of the great military route between New York and Montreal which nature has made by the Hudson River and Lake Champlain. It was taken from the English in 1775 by Ethan Allen, and is now a ruin. The village of C. P. is 90 miles N. of Albany. Pop. of township 1907.

Crown Solicitor is a solicitor to the Treasury who, by Statute 47 and 48 Vict. c. 54, is constituted the Director of Public Prosecutions in England. In Ireland a C. S. is attached to each circuit, to attend to every criminal prosecution by the crown. His duties are analogous to those of the Procurator-Fiscal (q.v.) and Crown Agent (q.v.) in Scotland. See PROSECUTOR, PROSECUTION.

Croy'don (Fr. *Croie dune*, 'chalk hill,' from its situation on the edge of the Thames chalk basin), a town of Surrey, 10 miles S.W. of Greenwich. Its main street extends along the London and Brighton road for more than a mile and a quarter, and is flanked on both sides with respectable shops and several handsome buildings. The fine old parish church was entirely destroyed by fire in 1867, with the exception of the tower; but it has since been restored. It has several other good Gothic churches, a large new public hall, and numerous mansions and villas in the neighbourhood. The chief trade is in corn and butter. Two annual fairs are held —the one on 5th July, the other on 2nd October. Pop. county bor., which is co-extensive with parl. bor., 102,659; reg. sub-dist. 128,699; and civ. par. 102,695.

Crozet' Islands, an uninhabited volcanic group in the Indian Ocean, 385 miles S.W. by W. of the Cape of Good Hope. The western extremity of the largest (Possession Island) is in lat. 46° 22′ S. and long. 51° 30′ E. Area about 200 sq. miles.

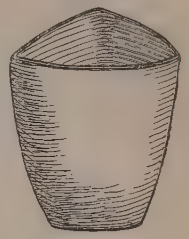
Crozier, the crooked staff of an abbot or bishop. The early croziers were made of wood or ivory, and shaped like the letter T. In the 13th c. gold or silver croziers were used and were highly ornamented. These were also longer than the early ones. For three hundred years and more they were still more richly adorned. In the 17th c. they ceased to be rectangular in shape, and the present fashion of the crook was adopted.


Crozier.

Crozoph'ora, a genus of annual or perennial low-growing plants (natural order *Euphorbiaceæ*), found in tropical and Northern Africa, and extending as far as India. *C. tinctoria*, a native of the Mediterranean countries, is cultivated for the sake of the dye called *Turnsole*, which is obtained from it by grinding the plants (little herbs seldom more than a foot high) to a pulp in a mill, when they yield about half their weight of a dark-green juice, which becomes purple by exposure to the air or under the influence of ammonia. It is chiefly exported to Holland, and is prepared for exportation by soaking coarse linen rags or sacking with it, the rags being previously washed clean. After soaking they are allowed to dry, and are exposed to the influence of ammonia. They are then packed in sacks, and ready for shipping to Holland. Not much is known of the use the Dutch put the dye to, but it is supposed to be chiefly employed as a colouring matter for cheese, and perhaps confectionery, wine, &c. (Black in *Treas. of Botany*). It has been confounded with Litmus (q.v.).

Cru'cian or **German Carp,** a species of *Cyprinidæ* (q.v.) or Carps (q.v.), possessing no tentacles or *barbules* at the mouth. The tail is square. This fish inhabits lakes and rivers of N. Europe and Asia. It has been found in the Thames. Its flesh is palatable.

Cru'cibles are vessels employed in fusing metals, glass, &c. They are made of refractory materials, and are generally of a conical shape. The substances used in their composition are various—platinum, fireclay, a mixture of graphite and fire-clay (Plumbago C.), porcelain, iron, &c.


Crucible.

Crucif'eræ, a natural order of Dicotyledonous herbaceous plants (rarely shrubs), belonging to the subdivision *Thalamifloræ*, so called because the four petals are placed in the form of a cross ('cross-bearing'). With the exception of a few plants of the natural order *Capparidaceæ*, this is the only order having *tetradynamous* stamens (*i.e.*, four long and two short). About 1730 species and over 205 genera, distributed chiefly in temperate climates, are known; a large number inhabit high latitudes, and a few are found in the tropics, chiefly on the side of mountains. The wallflower, Dame's violet, shepherd's purse, &c., are examples. Antiscorbutic and pungent properties, frequently combined with acridity, characterise this order. The seeds generally contain a pungent fixed oil. Many of them contain sulphur, and the watercress contains iodine (Mülder). The order comprises many of our most common culinary vegetables, but not a single poisonous plant. All the plants popularly known as Cress (q.v.), Kale (see BRASSICA), Mustard (q.v.), &c., belong to this order. Woad, which yields the blue dye with which it is said the ancient Britons stained their skins, wallflower, stock, candytuft, honesty, and other favourite garden flowers, are also members of this order. It has various subdivisions, according to the nature of the fruit and the way the embryo is folded.

Cru'cifix (Lat. *crux*, *crucis*, and *figo*, 'I fix'), is a figure of Christ on the cross. It was several centuries till Christian art chose to represent Christ in this way as a suffering Saviour; its aim at first being to inspire faith more than pity, by reminding men of his having died for them, without reference to the agonies of his death. The earliest existing crucifixes are supposed to belong to the 9th c.; the first mention of them is perhaps in the writings of Gregory, Bishop of Tours (544-595). For the same reason, in some of the earliest Christ is represented as erect and robed, with no nails, wounds, or crown of thorns, and without any sign of pain. Besides the figure of Christ, there are also usually many minor figures on the C. The ends of the transverse beam of the cross are occupied with figures of the Virgin and St. John, or of the sun and moon; at the upper end is the hand of the Father blessing Christ or holding a wreath; at the foot is the serpent and a skull; or the four ends are occupied by the attributes of the four Evangelists, &c.

Cru'den, Alexander, to whose labours British divines are much indebted, was born at Aberdeen, 31st May, 1700. He was educated at Marischal College in that city, and but for a tendency to insanity would have entered the Church.

In 1722 he went to London, where he was in succession, a private tutor, a bookseller, and a corrector for the press. In 1737 appeared the work with which his name will always be associated, his *Complete Concordance of the Holy Scriptures of the Old and New Testament*, which stands still the first of its kind. Many editions have been published, that of Chalmers being still the most popular. C. was frequently deranged, and on one occasion he was confined in a private lunatic asylum, where, according to his own statements, he was harshly treated. His delusion that he was divinely commissioned to reform the people resulted in his taking to himself the title of 'Alexander the Corrector.' He was, however, a virtuous and benevolent man. C. died at Islington, 1st November, 1770.

Cruik'shank, George, an eminent caricaturist, was born in London, 27th September, 1792. His artistic powers showed themselves at an early age, and after the death of his father, who was a native of Aberdeenshire, he began to illustrate books for children. He subsequently illustrated two satirical publications, *The Scourge* and *The Meteor*, while his illustrations of the political squibs of William Hone attracted much attention. Turning to worthier and more ambitious work, he illustrated various books of fiction, including some by Dickens, such as *Oliver Twist*, and produced pieces like *The Bottle* (eight large plates), depicting the vice of intemperance, of which he was a vigorous assailant, being personally a total abstainer. He attained the highest success as an illustrator, and a position not unlike that held by Hogarth as a teacher of morality by means of satirical sketches. C. in his later years turned his attention to oil-painting. Among his best paintings are 'Tam o' Shanter,' 'Disturbing a Congregation' (painted for the late Prince Consort), and 'The Worship of Bacchus.' He died 1st February, 1878. C. was a man of great physical vigour, and in his character artistic genius was seen in beautiful alliance with simplicity of heart and genuine benevolence.

Crui'ser (Dut. *kruisen*, 'to move crosswise,' from *kruis*, 'a cross'), a Government ship chiefly employed in watching an enemy or pirates.

Cruithne', Cruithneach (Lat. *Crutheni*), the name given by Irish writers to that branch of the Celtic race which, at the dawn of history, inhabited both the N. of Ireland and the N. of Scotland, and which by the Latin chroniclers is denominated *Picti*. No satisfactory explanation of the meaning of the term has yet been given, and it is needless to refer to the various fables which bring the C. from distant countries—some of them to Ireland, thence to Scotland, while others reverse the process. But it deserves notice that almost all these accounts represent them as soldiers from a distance, who obtained wives from the Irish, and whose children consequently spoke the Irish language; and this probably represents the fact of their being intruders on some older branch of Celts, settling among them and intermarrying with them. It appears that as far back as history goes the C. possessed Ulster and a portion of Meath, while at the same time they held the whole N. of Scotland—then known as Alba, the name Scotia being applied to Ireland, or Erin. The *Pictish Chronicle*, written in the 11th c., says that Cruithne, the son of Cirge, had seven sons—Fib, Fidach, Fodla, Fortren, Cait, Ce, Circin—and that they divided Alba into seven portions. This means that the territory occupied by the C. consisted of seven provinces bearing the above names. Fib represents Fife; Fortren, the western parts of Perthshire; Fodla, Athole, written At-Fodla; Circin, in old writings, Magh-circin, now Mearns; Cait, Caithness. The remaining two have not been hitherto identified; but Dalkeith, in Celtic, *Dail-Cé*, 'the portion or field of Cé,' may represent one of them, while Fidach must meantime be left landless. The Scots, another Celtic branch, encroached on the C. in Ireland, and in the beginning of the 6th c. established themselves in Argyllshire, eventually extending their sway over the whole kingdom, to which they gave their own name of Scotland; but, as the name *Picts* is much better known than that of C., the circumstances of this change of name and dynasty, as far as they can be known, will be given under that heading. The only thing necessary to state here is, that the common idea of the extinction of the Picts, or C., by the Scots, is altogether a fable. The King of the Scots, Kenneth M'Alpine, obtained in the 9th c. the throne of Northern Pictland (*Cruithnetuaith*) by inheritance. Through the aid of its inhabitants he subdued other portions of the kingdom, and united Scotland, as it finally came to be called, under one head. The C. or Picts represent the old Caledonians, who so long and so manfully resisted the Romans. A remnant of their descendants, it cannot be doubted, still occupy the ancestral mountains.

For a full account of the early history of Scotland see Skene's various writings on the subject, particularly his introduction to the *Chronicles of the Picts and Scots* and his *Celtic Scotland* (1st vol. Edinb. 1876), a work which entitles him to be regarded as the greatest authority on the Celtic antiquities of Scotland.

Cruive (perhaps connected with the Old Swed. *krubba*), the Scottish name for a trap, consisting of a sparred chamber or enclosure placed in a dike or dam across a river, for catching salmon. Last century cruives were common in the salmon-fishing rivers of Scotland. Their use in Great Britain is now illegal.

Cru'orine, the colouring matter of the blood. The name usually employed is Hæmoglobin (q.v.).

Cru'ra, a term used in anatomy to designate the roots or peduncles or supports of any structure. Thus we have the *C. cerebri*, or peduncles of the brain, the *C. cerebelli*, or peduncles of the cerebellum, the C. of the diaphragm, &c.

Crusæ'us. The great muscle in front of the thigh, which extends the leg on the knee-joint, called the *quadriceps extensor*, is a large fleshy mass which covers the front and sides of the femur, and is usually divided by anatomists into four parts: (1) occupying the middle of the thigh, the *rectus fermoris*; (2) occupying the outer side of the femur, *vastus externus*; (3) covering the inner aspect of the femur, *vastus internus*; and (4) covering the middle of the femur, between the two last named.

Crusades' (Fr. *croisades*, from *croix*, Lat. *crux*, 'a cross') were the military expeditions of European nations during the 11th, 12th, and 13th centuries to vindicate the right of Christian pilgrimage to Jerusalem, and latterly to seize and hold Jerusalem against the Turks. From the capture of Jerusalem by Omar in A.D. 637 till the reign of Hakem, the third Fatimite Caliph, the Christian inhabitants and pilgrims merely paid a tax to the Mohammedan governor—Harun al Rashid having delivered the city keys to Charlemagne. Hakem, however, persecuted the Christians, and mutilated the rock of the Sepulchre and the Church of the Resurrection. As the Catholic Church commuted penances for pilgrimages, many Europeans of all classes continued to encounter the risks of travel and persecution. This the excitement of the year 1000 favoured. After the capture of Jerusalem by the Turk Togul Beg in 1076, pilgrims were systematically plundered and insulted, but it was not till the Turks seriously threatened the Byzantine Empire that a crusade was formally proposed. Gregory VII. had seen in this only an opportunity for extending the Papal power, but Urban II. was roused by the French hermit, Peter of Picardy, into real enthusiasm, and at the general Council of Clermont (November, 1095) invoked Western Europe to defend the Holy Land. *First Crusade.*—In March, 1096, popular expeditions, without discipline or equipment, began to beg and plunder their way to Jerusalem. The first, led by a Burgundian, Gualtier *Sans-Avoir* (Walter the Penniless), was destroyed in Bulgaria; the second, under Peter the Hermit, was cut to pieces on the plain of Nice by the forces of the Sultan of Rûm; the third, consisting of German peasants, led by a monk, Godeschal, perished before Belgrade through the treachery of the Hungarian king; the fourth, amounting probably to 200,000 persons, after massacring the Jews in Mainz and other episcopal cities, was exterminated by the Hungarian army. The military crusade of 1096 divided itself into four expeditions, organised by the nobles without the help of any monarch. The first division, from the Rhine and N. Germany, was led by Godfrey de Bouillon, Duc de Brabant, and his brothers Eustace and Baldwin; the second, from Central France, Normandy, and Britain, was led by Hugh, Comte de Vermandois, Stephen, Comte de Chartres, Robert, Duc de Normandie, Robert, Comte de Flandres, and Eustace, Comte de Boulogne; the third, from S. Italy, was led by Prince Bohemond of Tarento and his cousin Tancred; the fourth, consisting of Provençals, Spaniards, and Lombards, was led by Raymond, Comte de Toulouse, with whom was Adhemar, the Pope's legate. After collisions between these armies and the Greeks of the Eastern Empire, and much fighting and intriguing at Constantinople, the Emperor Alexius obtained an oath of fealty from a majority of the leaders, and added a small contingent to their forces. On the 20th June, 1097, the crusaders captured Nicæa, and at Dorylæum decisively defeated Solyman, Sultan of Rûm. While the main body crossed the Taurus, Tancred and Baldwin penetrated Cilicia. The unjust claim of the latter to the capture of Tarsus led to his desertion of the general crusade and his Armenian expedition, which resulted in the establishment of the principality of Edessa. The crusaders took Antioch, 3rd June, 1098, but were besieged there by a host of Persian Turks under Kerboga, whom they defeated mainly through the enthusiasm which the clever imposture of the Marseille priest, Peter Barthelemy, had excited. Bohemond became ruler of the new Christian principality of Antioch. Greatly reduced by famine and pestilence which visited them at Antioch, the army, led by Godfrey, Raymond, &c., in 1099 marched S. to Jerusalem, now in the hands of the Fatimite Caliph of Egypt. In spite of the gallant defence of Istahar, the crusaders, after a siege of five weeks, entered the Holy City, and massacred the Mussulman and Jewish inhabitants. On the 23rd July, 1099, the Latin kingdom of Jerusalem was founded, Godfrey de Bouillon becoming king under the title of Advocate or Defender of the Tomb of Christ. By Godfrey's victory at Ascalon (12th August, 1099), by the energy of his successor, Baldwin I., in reducing Acre (1104), &c., and in founding the county of Tripoli (1109), and by reinforcements from Europe, the new kingdom was strengthened and extended. (See BOUILLON, GODFREY DE.)—*The Second Crusade*, provoked by the reconquest of Edessa by the Emir of Mosul in 1144, was preached by St. Bernard (q.v.), under the auspices of Pope Eugenius III., and undertaken by Louis VII. of France and the Emperor Konrad III. After the German army had been almost entirely destroyed by the Sultan of Iconium, Louis, who had been detained at Constantinople by the treacherous Manuel, joined the Emperor, and both reached Antioch with a fragment of their original forces. An abortive attack on Damascus in 1149 was the only fruit of this crusade. The conquests of Noureddin, Sultan of Damascus, the blunders of the weak Almeric (who succeeded Baldwin III. at Jerusalem) in meddling with the affairs of Egypt, and the dissensions which the election of Guy de Lusignan as king excited, prepared the way for the sudden rise of Saladin, who crushed the Christian army at Tiberias in 1187, seized Jerusalem, put Antioch under tribute, but failed to reduce Tyre, which Konrad of Montferrat defended. This led to the *Third Crusade*, marked by the first imposition by European monarchs of the Saladine tithe on rents and moveables. The siege of Acre began in 1189; in 1190 the Emperor Friedrich Barbarossa led his army to Cilicia, where he died; the Duke of Swabia proceeding to Acre, which was regained in 1191, on the arrival of Philippe Auguste and Richard Cœur de Lion. Philippe having returned home, Richard won the victory of Azotus, and captured Jaffa and Cæsarea; but when, in 1192, Jerusalem was reached, the crusade was suddenly abandoned, Saladin agreeing to leave the coast-fortresses in the hands of the Christians, and to give pilgrims free access to the Holy Sepulchre. This truce expiring, and the crusade proclaimed by Pope Celestin III. failing to place Almeric de Lusignan in possession of the Holy City, Pope Innocent III., seconded by the preaching of the French priest Foulques, set in motion the *Fourth Crusade* in 1200. Its leaders, the Marquis Boniface of Montferrat and the Comtes de Flandres and Blois, arranged for the transport of their troops by the Venetian fleet, and joined the Doge Dandolo in storming Zara, a city subject to Hungary. This having placed the crusaders in opposition to the wishes of the Pope, they agreed to espouse the cause of Alexius, son of the deposed Isaac Angelus, who promised that, if successful against his usurping uncle Alexius, he would unite the Eastern and Western Churches and assist the crusade. After the double siege of Constantinople (1203-5), which resulted first in the restoration of Isaac, next in the usurpation of Ducas Murzuphlos and the murder of Alexius, lastly in the coronation of Baldwin, Comte de Flandres, as first Latin Emperor of the East, and the division of the Empire between Venice and the barons, nothing further was heard of this crusade. Montferrat obtained Macedonia and the republic of Venice, Crete and three-eighths of the Asiatic provinces.—*The Fifth Crusade*, to assist Jean de Brienne, titular King of Jerusalem, against the Sultan Saphadin, who had succeeded to Saladin's power, was agreed to at the Lateran Council of 1216, called by Innocent III. The preliminary campaign of Louis of Hungary came to nothing, and although the Germans under the Duke of Austria, assisted by the French following of Comtes Nevers and La Marche, and the English under the Earl of Salisbury, in 1219 took Damietta after a siege of seventeen months, the folly of Cardinal Pelagius and the religious orders in declining the proffered cession of Jerusalem, led in 1229 to the disastrous advance on Cairo. In 1228 the Emperor Friedrich II. (q.v.) obtained a ten years' treaty, guaranteeing the occupation of Bethlehem, Nazareth, &c., and free access to the Holy City, where he was himself crowned despite the protest of the Patriarch. In 1238, the Christians having been driven out of Jerusalem, two distinct expeditions were organised, together known as the *Sixth Crusade;* the first, consisting of French knights led by Thibaud of Champagne and the Comte de Bretagne, was victorious at Ascalon, but routed at Gaza; the second, arranged at the Council of Northampton, was headed by Richard, Earl of Cornwall, brother of Henry III., who in 1240 drew the courts of Damascus and Cairo into a treaty for the cession of Jerusalem and a large territory, and the release of Christian prisoners. The invasion of Palestine by the Kharizmian tribes, expelled from Persia by the Mongols, and assisted by the Sultan of Egypt, crushed the Latin state; and when the Kharizmians were expelled by the Syrians and Egyptians, the Christians did not regain their rights. At the Council of Lyon (1245), accordingly, Pope Innocent IV. proclaimed a *Seventh Crusade*, in which Louis IX. of France, William Longsword of Salisbury, and others from France and England, set out from the rendezvous, Cyprus, in the year 1248. Egypt was the scene of battle. Damietta fell easily, but the Mameluke forces of Nejmeddin, the Sultan, checked the invaders at Mansura, cut off their communication with the sea, and destroyed the crusading army, taking Louis prisoner in 1250. Louis, after being ransomed, spent four years in fortifying the coast-fortresses of Palestine, and then withdrew to France. In 1265-68, Bondocdar, the Mameluke usurper, attacked Palestine, almost defenceless from the feuds of the military orders. The capture of Antioch, after a series of victories, led Clement IV. to proclaim the *Eighth Crusade*. This consisted of the fatal expedition of Louis IX. to Tunis (1270), and the energetic campaign of Prince Edward of England in the neighbourhood of Acre (then the capital) and Nazareth (1271-72), which forced from Bondocdar a ten years' peace. The reign of Hugues de Lusignan was marked by the reduction of Tripoli and Acre, and the final destruction of the kingdom of Jerusalem (1291). The Popes sought in vain to raise another crusade. Enthusiasm for the cross had been killed by the growing sense of failure, and by disgust with the selfish dealing of Rome. Many theories have been framed of the religious, political, and intellectual effects of the C. It would appear that aristocratic power was nowhere directly weakened by them, nor were the geographical outlines of religious and civil power altered. On the other hand, the C. extended the commerce of the maritime republics, who often obtained, for transporting troops, grants of streets and privileges of trade in towns they would not otherwise have reached so soon. To this increased importance of trade, and to the general enlargement of ideas which contact with new nations always begets, may be partly attributed the rise of municipal liberties, which marked the 12th and 13th centuries. The chief histories of the C. are those of Mills, Richaud, and Cox. Of the fourth and seventh C., contemporary accounts have been left by Villehardouin and Joinville. See also Heeren, *Sur l'Influence des Croisades*. A most interesting, original, and valuable contribution to one aspect of the C. seldom reflected on—viz., how were the financial arrangements for them carried through—has been made by Henri Lavoix of the *Bibliothèque Nationale* in his *Monnaies à Légendes Arabes frappées en Syrie par les Croisés* (Par. 1877).

Crusta'cea, a class of *Arthropoda* or *Higher Annulosa*, distinguished primarily by the fact that in its members the head and chest segments are united to form one piece, known as the *cephalothorax*. The breathing is conducted by *branchiæ* or *gills*, but may also be effected by the general surface of the body. Two pairs of antennæ exist. The limbs are more than eight in number, and are borne by the segments of the abdomen, as well as by those of the thorax. The name C. is derived from the general presence of an outer *crust* or skin of calcareous or horny matter, forming an *exoskeleton*, and represented by the 'shell' of the crab or lobster. A *Metamorphosis* (q.v.), or series of changes similar to that seen in insects, &c., occurs in those forms during their development from the young to the adult state. As in the Crabs (q.v.), the young appear first as free-swimming, tailed organisms named *Zoëæ*, and afterwards as *Megalopæ ;* assuming the perfect or tailless form in the next stage. The lower C. may pass, in some cases, through a very complicated metamorphosis, as exemplified in Barnacles (q.v.), &c. In typical C. the body consists of twenty-one joints or segments—seven segments going to the head, chest, and abdomen respectively; and a general plan of structure or homology, as a rule, exists between the various segments of the body of a crustacean—such a homology being especially demonstrable in the Lobster (q.v.). These forms moult or cast their shells periodically; growth taking place in the body only when the body is soft and shell-less, and before the new shell is secreted. Reproduction of lost or injured limbs take place in most C. The mouth is complicated, consisting of a series of jaws, which in higher C. gradually merge into the type of feet. A stomach, liver, and intestine exist. The heart may be wanting, but when present it lies dorsally, and consists of a tubular contractile organ provided with valves. Blood-vessels exist in higher forms. The gills, when present, may be situated on the feet or enclosed within the body. The nervous system consists of a ganglionated chain of nerves lying vertically or on the floor of the body. The C. are divided and classified as follows. They inhabit both fresh and salt water, and some genera (*e.g.* Brine Shrimps, q.v.) inhabit brine solutions :—

CLASS CRUSTACEA.
Sub-Class I.—EPIZOA.
Order 1. *Ichthyophthira*, Achtheres, &c.
,, 2. *Rhizocephala*, Lernæ, &c.
Sub-Class II.—CIRRIPEDIA.
Order 3. *Thoracica*, Balani, Barnacles, &c.
,, 4. *Abdominalia*.
,, 5. *Apoda*.
Sub-Class III.—ENTOMOSTRACA.
Order 6. *Ostracoda*,
,, 7. *Copepoda*, Water-fleas.
,, 8. *Cladocera*,
,, 9. *Phyllopoda*, Brine-shrimps, &c.
,, 10. *Trilobita* (Extinct), Trilobites.
,, 11. *Merostomata*, King-crabs, &c.
Sub-Class IV.—MALACOSTRACA.
Order 12. *Læmodipoda*, Caprella, &c.
,, 13. *Isopoda*, Woodlice.
,, 14. *Amphipoda*, Sandhoppers.
,, 15. *Stomapoda*, Locust-shrimps.
,, 16. *Decapoda*, Crabs, Lobsters, Shrimps, and Prawns.

Crus'ta Petro'sa, a substance found covering the fangs of human teeth, and forming layers in some examples of more complicated teeth, as those of the elephant or horse. It is identical in structure with bone, except that in C. P. we find no Haversian canals. See BONE, TEETH.

Crust of the Earth, the name given by geologists to that portion of our earth's surface accessible to human inquiry, and corresponding to the outer rind of our planet, into which, for several thousand feet, we have been able to penetrate. This 'C.' is made up of *rocks*, variously formed and arranged, and it is the province of geology to determine their relations, formation, and fossil contents.

Cru'ys, Corne'lis, a Dutch naval commander, born 14th June, 1657, whom Peter the Great induced to join the Russian service. He superintended the making of dockyards, canals, and ships of war in Russia, which through his exertions first became a naval power. C. died in 1727.

Cry'ing, Physiol'ogy of. This is a modification of the ordinary movements of respiration excited by a mental emotion. Though excited by a contrary emotion, it is nearly related physiologically to the act of laughing. Frequently an individual may be between a 'laugh' and a 'cry.' In both, the muscles of expiration are convulsed, and the breath is sent out in a series of jerks through the open glottis. (See LARYNX.) C., unlike yawning, coughing, sneezing, never originates in the respiratory system, but is always an expression of an emotional state, though it must be confessed that in states of great general weakness, C. may sometimes occur without any very definite emotional antecedent.

Cry'olite, a native fluoride of sodium and aluminum, occurring in large deposits at Evigtok, Greenland, and also found in the Urals. It is a source of Aluminum (q.v.).

Cryoph'orus (Gr. *kruos*, 'cold;' *phero*, 'I carry'), a glass tube with a bulb at each end. The one bulb contains a little water, the other only water-vapour. When the latter is placed in a freezing liquid, the condensation of the vapour produces evaporation of the water, which, being accompanied by abstraction of heat, transforms the water into ice.

Crypt, a term used in anatomy to denote a pit or tubular depression in a mucous membrane. Thus there are the crypts of Lieberkühn, in the intestinal mucous membrane. See INTESTINE.

Crypt (Gr. *kruphe*, 'a covered place,' 'a vault,' from *kruptō*, 'I hide'), in ecclesiastical architecture, a hollow vault, partly or wholly underground, used as a church by the early Christians for safety during their services, and also as a place of sepulture. The largest C. does not generally extend beyond the limits of the choir or chancel and its aisles, and is often much smaller than these. It is carefully constructed and plainly finished. York Minster and Worcester and Rochester Cathedrals have each a C. older than the present building. That under Canterbury Cathedral is the finest and largest in England: there is also a fine C. under Glasgow Cathedral.

Cryptogam'ia, Cryptogams, or **Cryptogamous Plants** (Gr. *kruptos*, 'hidden,' and *game*, 'marriage'), the name applied to ferns, and their allies the horse-tails, club-mosses, mosses, liver-worts, lichens, fungi, *Characeæ*, and *Algæ*, which do not produce flowers like the phanerogamous or flowering plants, and accordingly have no seeds, and therefore no Cotyledons (q.v.); hence they are sometimes called *Acotyledonous Plants* (q.v.). They reproduce in various ways by *spores* or single cells without embryos. Many of the C. are parasitic, and the lower orders of them are entirely cellular; hence they are sometimes called *Cellulares* (q.v.).

Cryptog'raphy (Gr. *kruptos*, 'secret,' and *graphein*, 'to write') is the art of communicating by signs or letters unintelligible except to the possessor of a key to the cryptograph. Various methods of C. were practised by the ancients. Thus Ovid recommends love-letters to be written in milk, and afterwards to be made legible by applying soot. C. was very generally used by diplomatists in the 17th c., and is still employed, especially in telegraphic dispatches. One method of

C. is to write with metallic solutions, the characters being afterwards disclosed by the action of certain gases, but more commonly a different sign or letter is used for each letter of the alphabet—a system of C. known as *chiffre*, *i.e.*, cipher. A cryptographic machine for transmitting secret correspondence was patented in 1860. In political diplomacy the art is less used than formerly.

Crystall'ine Lens, the principal refractive structure of the eye. See EYE.

Crystalline Rocks are highly metamorphosed rocks, in which the original texture has disappeared, and a new chemical arrangement, completely altering the mineralogical structure, has rendered the texture crystalline, and indistinguishable from that of igneous rocks. The chief of these are granite, syenite, diorite, and diallage rock; and this connecting of the igneous with the true metamorphic, and so with the aqueous, seems to warrant the conclusion that all rocks forming the crust of the earth were at one time aqueous, and have been and are being transformed, through the agency of pressure and heat, into rocks metamorphic and igneous, which, gradually worn away by atmospheric and other causes, form new aqueous rocks, thus completing the cycle of geological operations.

Crystallog'raphy, the science which treats of crystalline forms and their classification. Most minerals assume, in virtue of their molecular constitution, a regular form, which is called a crystal—a form which is symmetrically arranged with respect to three or more definite axes. The most perfect crystals are obtained, not from natural minerals, but from the pure salt formed artificially in the chemical laboratory. The usual method is by cooling or evaporating a saturated solution of the salt, by which means the crystals gradually separate out, the size depending chiefly upon the rate of evaporation. Fusion and slow cooling may be employed in many cases; for instance, in the case of sulphur and some metals; and very often substances such as iodine assume a crystalline form when passing directly from the gaseous to the solid state. Most crystals tend to split in particular directions, parallel to the axis of symmetry; and they very frequently have different co-efficients of elasticity, expansion, and conductivity along these different axes. Their optical properties also point out their structural character.

With regard to their classification, crystals are usually arranged in six classes or systems, which are as follow:—1. *Monometric*, *Regular*, or *Cubic System*, which has three mutually rectangular and equal axes. The most important forms are the *cube*, *regular octohedron*, and *rhombic dodecahedron*, which are met with, under various modifications, among the metals, in common salt, the alums, fluor-spar, diamond, garnet, spinede, &c. 2. *Dimetric*, *Square Prismatic*, or *Pyramidal System*, which has also three rectangular axes, two of which only are equal. These forms occur in zircon, apophylite, yellow potassium, ferrocyanide, &c. 3. *Rhombohedral* or *Hexagonal System*, which has four axes, three of which are equal, co-planar, and inclined to each other at angles of 60°, while the fourth and principal axis is perpendicular to them all. The principal forms are the *regular six-sided prism*, the *rhombohedron*, the *scalenohedron*, and are met with in ice, calcspar, beryl, quartz, arsenic, antimony, &c. 4. *Trimetric* or *Rhombic System*, which has three rectangular but unequal axes. The perspective forms of these crystals are very like those of the dimetric system. They are found in sulphur crystallised at a low temperature, nitrate and sulphate of potassium, sulphate of barium. 5. *Monoclinic* or *Oblique Prismatic System*, which has three equal or unequal axes, two at right angles to each other, while the third is oblique to the one and perpendicular to the other. Such crystals are exemplified by sulphur crystallised by fusion and cooling, by realgar, sulphate, carbonate and phosphate of sodium, borax, &c. 6. *Triclinic* or *Doubly Oblique Prismatic System*, which has three oblique equal or unequal axes, being therefore of great variety of form and exceedingly difficult of study. Such forms are assumed by sulphate of copper and nitrate of bismuth.

Crystals which grow by equal additions all round retain the original form; if the additions take place unequally, but still following some definite law, a new but connected form arises. Thus a cube, which increases except at the solid angles, will become in time an octohedron, the old angles being now the central points of the new planes. These planes are called the *secondary* planes, and the modifications thus produced from the *primary* form are termed *secondary* forms.

Crystall'omancy, a once popular mode of divination by means of crystals, especially of the beryl. The diviner having in a low voice spoken the appropriate formulæ, handed the crystal to a youth or maiden, who read on it, or obtained by inquiry from spirits who appeared in it, what was desired to be known.

Csa'ba, a market-town in the county of Békés, Hungary, and till 1846 the largest village in Europe. It then purchased for 800,000 florins the right to hold markets of its own. It is also the largest Protestant community in Hungary. C. has a trade in cattle, grain, hemp, and wine. It is now joined to Békés, and together with B. (pop. 24,561) has a pop. of 32,244.

Csanad' Palo'ta, the name of a town in Hungary, on the Marös, with a pop. of 5610. It became the seat of a bishop in 1096.

Cso'ma de Körös, Alexander (properly *Körösi Csoma Sandor*), a Hungarian traveller and orientalist, born at Körös (Transylvania) in 1790—according to some in 1798—was carefully educated, and devoted himself to philosophical studies at the college of Nagy-Enyed from 1812 to 1815, after which he studied Oriental languages in Germany. The dream of his youth had been to travel in Central Asia, and discover, if possible, the original seat of the Hungarian race. With this object, he assiduously studied geography, ethnology, philology, and history at Göttingen, and afterwards at Temesvar, Agram, and Bucharest. In 1820 he travelled through Bulgaria and Rumili to the port of Enos, where he shipped for Egypt. Driven out of Alexandria by the plague, he set out on his travels to the East, passed by Aleppo and Mosul to Bagdad, and thence, assisted by the English consul, proceeded by Kermanshah and Hamadan to Teheran, where he arrived in October, 1820. Here he remained four months, studying the Persian language. In March, 1821, C., disguised as an Armenian, set out from Teheran, and after many adventures and hardships arrived on the 18th November at Bokhara, whence, joining a caravan, he travelled by Cabul and the Bamian Pass to Lahore in the Punjab. He subsequently spent some time travelling in Cashmere and Ladakh, making himself acquainted with the Tibetan tongue. The study of this language, hitherto almost unknown in Europe, although its literature deserves attention, engaged C. for several years, first with the Lama of Tsanskar, and afterwards in the Lamaist convent of Kanum on the Upper Sutlej. After mastering the language, C. repaired to Calcutta, where his labours and accomplishments met with a cordial acknowledgment from the Asiatic Society, who appointed him their librarian. While thus engaged he produced his two great works, *A Grammar of the Tibetan Language* and *An Essay towards a Dictionary, Tibetan and English*, both of which were published at Calcutta (1834) at the cost of the British Government. For the *Asiatic Researches* (vol. xx.) he also wrote a synopsis of the holy books of Lamaism. In further prosecution of his researches he resolved to visit Lhassa, the capital of Tibet; but while on the route he was seized with illness, and died at Darjeeling, in Sikkim, 11th April, 1842. If C. failed to discover in Tibetan the origin of his native Magyar, he at least merits the credit of having been the first to bring that language and its literature within the scope of European scholarship. See a most interesting autobiographical sketch, read before the Royal Asiatic Society, Calcutta, 19th April, 1834, and printed in vol. i. of the *Journal* of that Society.

Csongrad', a market-town of Hungary, on a tongue of land opposite the mouth of the Körös, 35 miles N. of Szegedin. It has a trade in cattle, timber, and tobacco. Pop. 20,802.

Ctenoi'dei, or **Ctenoid' Fishes,** the name proposed by Agassiz, not generally used in zoology, to indicate fishes such as the flounders, perches, &c., in which the scales have their hinder margins divided into 'comb-like' structures, or set with spines so as to resemble combs. New spines appear to be developed with the growth of the scales.

Ctenoph'ora, the highest order of the class *Actinozoa*, represented by delicate, free-swimming organisms, such as *Cydippe* (*Beroë*), &c., and distinguished by possessing *ctenophores*, or parallel rows of *Cilia* (vibratile filaments), arranged in comb-like plates. No coral structure is developed in these organisms. There are eight bands of ctenophores, arranged meridionally in *Cydippe*, a familiar member of the group, which may be found in summer floating on the sea in the form of a clear, jelly-like ball of lemon shape. The mouth is at the oral or lower pole of the body, and a stomach and complex system of canals exist, the latter representing a circulatory system. A *ctenocyst* exists at the apical or upper pole of the body, this latter consisting of a small cyst or sac, containing fluid and limy particles, and supplied with nerve filaments from a small nervous mass. This is the first definite appearance of a nervous system in the animal series as we proceed upwards. *Cestum Veneris*, or 'Venus' girdle,' another of the C., is a long band-like organism of 3 or 4 feet long, and at night shines in the sea with a phosphorescent flame.

Ctesib'ius, a Greek mathematician of Alexandria, who flourished in the 3rd c. B.C. He is famous for his mechanical inventions, such as the pump, the water-clock, the bent syphon, and for utilising, along with his pupil Hero Alexandrinus, the elasticity of the air as a motive power.

Ctes'iphon, a city in the southern part of Assyria, on the eastern bank of the Tigris. It rose into importance on the decay of Seleucia, and was the winter residence of the Parthian kings. The site of C. has been identified with the modern *Al Madain*, 'the two cities.'

Cuba, 'the Pearl of the Antilles,' and a colony of importance still belonging to Spain, is the largest and wealthiest island of the W. Indies, and is situated between the Mexican Gulf on the W., the Caribbean Sea on the S., and the Nicolas and Old Bahama Channels on the N. It is about 150 miles distant from the two great peninsulas of Florida and Yucatan. It is 740 miles long, 70 miles in average breadth, extends from E. to W. lat. 19° 43′—23° 12′ N., long. 74° 5′—85° W. Area, 41,655 sq. miles; pop. 1,631,687, of whom 35 per cent. are of African descent. The island is divided into six provinces, and the chief towns are Habana, the capital, Matanzas, Santiago de C., Puerto Principe, Cardenas, Holguin, Sancti Spiritu, and Cienfuegos. The coast, which is encircled by sandbanks, coral reefs, and small islands, is for the most part low, and broken by inlets which form excellent harbours. Habana, the key to the Mexican Gulf, is one of the finest harbours in the world; along the northern coast, at Matanzas, Nuevitas, Nipe, and on the southern coast, at Cienfuegos, Santiago, Guantanamo, and Trinidad, there are also fine natural harbours.

The island is traversed in the direction of its length by a range of hills, comparatively low in the W., but gradually rising towards the E. Above Trinidad, on the S. coast, the rugged mountain masses are not without grandeur, while the rare beauty of the coast and inland scenery is unsurpassed by that of the most renowned of the Mediterranean lands. The western portion of the island, is for the most part level, and contains almost all the great sugar factories and tobacco plantations, which constitute the enormous wealth of the island. In the centre the population is massed in Trinidad, Puerto Principe, and a few small towns; the rural districts are chiefly forests and unpeopled savannahs. The eastern part of C., where the first colonists settled, was previously well cultivated in certain districts. Much of the interior, however, was left in a state of nature, and many tracts are still described as 'waste.' The soil is so fertile that when neglected for a short time it becomes rapidly over-run with vegetation. The principal productions are sugar, tobacco, coffee, rice, and cotton. Many of the most flourishing coffee plantations have been converted into sugar estates. Since the civil war and the abolition of slave-labour in America, that country, which previously grew its own sugar, has become dependent upon C. for that article. Of the whole amount of sugar annually produced in C., 75 per cent. is exported to the United States, and only 15 per cent. to Spain. The amount of sugar exported in 1893 was 718,204 tons. Large quantities of honey, rum, wax, tobacco, and cigars are also exported from Habana. The imports of C. consist principally of rice, olive oil, flour, jerked beef, shooks (boards and staves for hogsheads and sugar-boxes), lard, and coals. Over 1000 miles of railway are in operation, besides the private lines belonging to the plantations.

History.—C. was discovered by Columbus, 28th October, 1492, and was occupied by the Spaniards under Diego Velasquez in 1511. The native Indians were rooted out about 1560. In 1584 Habana was fortified, and in 1777 the government of the island was reconstituted under a Captain-General. From 1773 Habana continued to be the centre of the slave-trade of the whole of Spanish America. The island suffered from insurrections of the slaves in 1844 and 1848. Lopez landed on the island at the head of an American filibustering expedition in 1851, but was captured and executed. In 1868 broke out the insurrection which continued intermittently until April, 1884, when the insurgents were defeated. This movement had its origin in the hostile relations and conflicting interests of the two great classes of the free population—the Peninsulars or Spanish immigrants, and the Creoles or native Cubans. The Peninsulars maintained a volunteer force of 60,000 men throughout the island, and practically overruled the Captain-General and the authorities. The Cubans were anxious for the abolition of slavery; the Peninsulars, embracing all the great sugar-planters, were determined to maintain slavery by force. In 1870 the Moreb law was promulgated, declaring every slave free on reaching the age of sixty, and decreeing the liberty of all children of slaves born after that date. In December, 1879, a bill for the gradual emancipation of the slaves in Cuba and other colonial possessions was passed by the Spanish Senate, and on 6th October, 1886, the last vestige of slavery was abolished by the Queen's decree. It is estimated that during the years from 1868 to 1894 the struggle in Cuba has cost nearly 400,000 lives. The struggle still continues, and in May, 1895, the Cubans were in full revolt. The rebels obtained many advantages over the Government troops and the outlook became so serious that Marshal Campos telegraphed from C. for reinforcements. In August, arrangements were made to send out 41,850 fresh troops, by which the number in the field should be raised to 70,000. Ten years since, in connection with the rebellion in C., a most dastardly act was committed and a gross insult was offered to Great Britain, which to this day remains unpunished. Two of the revolutionist leaders were living in Gibraltar under the protection of the British flag. One day they were seized by officials in the pay of the British Government and were hurried across the lines into Spanish territory, where the Spaniards, according to a pre-arranged plan, at once pounced upon them and refused to give them their liberty. To the lasting disgrace of Great Britain and of the Government in power at the time the matter was hushed up, and the men, who had trusted in the hitherto supposed security of their domicile, found out the mistake they had made.

Cubag'ua, an island between Venezuela and Margarita, in the Caribbean Sea. It is about 9 miles long, and has considerable pearl-fisheries. C. was discovered by Columbus in 1498.

Cube, a solid, all of whose six sides are squares which are necessarily all equal. The volume is found by multiplying the area of the base by the height, *i.e.*, by multiplying the edge twice in succession by itself. Hence we have the expression *to C.* a given number, the C. of a being $a \times a \times a = a^3$. To extract the C.-root of a number is to find that number which when cubed will produce the original number. The C.-root of a^3 is a.

Cu'bebs, or **Cubeb Pepper,** the fruit of *Piper Cubeba*

(*Cubeba officinalis* of other botanists), a climbing shrub of Java and other Indian islands, belonging to the *Piperaceæ*. C. are about the size of black pepper, globular, wrinkled, and supported on a stalk. They have a peculiar odour and a warm taste like that of Camphor (q.v.). C. are distinguished from pepper by their lighter colour and the stalks—hence often called 'stalked pepper.' They contain a volatile oil (oil of C.), constituting about 10 per cent. of C.; also a *resin* and a crystalline principle, *cubebin*, very analogous to *piperin*, found in pepper. African C. is the fruit of *Piper Clusii*.

Cubebs.

Cu′bic Equa′tion, an equation involving the cube of the unknown quantity with either, neither, or both of the lower powers. The most general form can be reduced to the form $x^3 + ax + b = 0$; but the further reduction by Cardan's rule, given in all the more advanced text-books of algebra, evolves a result which is the sum of two impossible quantities, except when two of the roots are impossible or equal. Accordingly, when the three roots are possible and different, ordinary algebraic methods fail, and recourse must be had to trigonometry for the general solution; but in this instance the roots are usually easily obtained by mere inspection. For details the reader is referred to Todhunter's *Theory of Equations*.

Cu′bical Nitre, or **Chili Saltpetre,** is the nitrate of soda, and is imported in large quantities from Chili and Peru, as a manure, and for the manufacture of gunpowder and nitric acid. See SODIUM.

Cu′bit (Lat. *cubitus*), an ancient linear measure, being the length of the arm from the elbow to the tip of the middle finger. The Hebrew C. has been variously estimated from 19 to 22 inches; the Roman C. was about $17\frac{1}{2}$ inches, but it is generally taken as equivalent to a foot and a half.

Cu′boid Bone, one of the bones forming the arch of the foot. It is placed on the outer side of the foot, in front of the *os calcis*, and behind the fourth and fifth metatarsal bones. Its name indicates its shape. See FOOT, TARSUS.

Cuck′oo, a genus of Scansorial birds, of the family *Cuculidæ*, distinguished by the compressed bill, by the ridge of the arched upper mandible, by the membranous nostrils, by the long and pointed wings, and by the short tarsi, which are partly clothed with feathers. The outer toe can be directed backwards or forwards at will. These birds inhabit Europe, Africa, and America, and their name is derived from their song-note. The common C. averages a small pigeon in size. It is of a greyish colour, the breast being marked with brownish-black, and the tail black. It is migratory, arriving in Britain in April, and flying southwards in July. The food consists of insects. It has the habit of laying its eggs in the nests of other birds, so that its young may be, as it were, hatched by foster-parents. The Great Spotted C. inhabits S. Europe and Africa. The yellow-billed C. is a native of the U.S. of America. Its back is of a light greenish brown, as are its wing coverts and central tail-feathers; while the rest of the tail is black or white. The breast is whitish. Length of body is about 1 foot.

Yellow-billed Cuckoo.

Cu′cumber, a tender annual, with rough trailing stems, a native of Asia and Egypt. It was cultivated in England as early as 1327, but it is only since Henry VIII.'s reign that it has become a common table-vegetable. Though accounted by some cold and unwholesome, it is now much used as a salad, or when young (*gherkins*) as pickles; and the village of Sandy in Bedfordshire is said to sometimes furnish in one week 10,000 bushels for the London market for pickling. In the N. a hotbed is required for its growth, but in southern Britain and equally warm localities it is grown in the open air. The Indian C., the American one-seeded star C., the snake C., and the squirting C. are members of other families. The last-named is found in waste places in S. Europe. When the fruit is almost ripe, it comes away from the stalk and spirts out its seed and juice, from which a powerful drug is prepared.

Squirting Cucumber.

Cucurbita′ceæ—the Gourd or Cucumber order—a natural order of Calycifloral Dicotyledonous herbaceous plants, climbers in which tendrils take the place of stipules, chiefly natives of hot countries, and specially of the E. Indies and S. America, though some are found in the N. of Europe, N. America, the Cape of Good Hope, and Australia. The White Bryony Mandrake (q.v.) is the only British species of the order. About 350 species, distributed over seventy genera, are known. The various species of Gourd (q.v.), Melon (q.v.), squirting cucumber (see ELATERIUM), pumpkin, squash, vegetable marrow, &c., belong to this order. In addition to the use of the white bryony mandrake already given, the root is employed as an external application to bruises, and the young shoots are eaten as a substitute for asparagus. The roots of *Momordica dioica* and *Bryonia umbellata* (of the E. Indies) contain starch, and are used as food. The seeds of *Telfairia pedata*, an African plant, and other species, are eaten like almonds, and yield oil by expression. The order is divided into three subdivisions, viz.—(1) *Nhandirobeæ*, (2) *Cucurbiteæ*, and (3) *Sicyeæ*.

Cud'bear, a purple dyeing substance prepared from various lichens, but chiefly from *Lecanora tartarea*, by a process similar to that for making *archil*, from which C. only differs by being prepared in the form of a dry powder. The manufacture was commenced by Mackintosh and Cuthbert Gordon at Leith about 1777, and the name of the dye is a corruption of *Cuthbert*. Formerly the collection of lichens, called *crottals*, for the preparation of C., was an important industry in the Highlands of Scotland, but the supply now comes from Sweden, Norway, &c., and, except for domestic dyeing, no lichens are now collected in the Scotch Highlands. C., as a dye, imparts a brilliant bloom, but of itself is fugitive, and is therefore never so employed.

Cuddalore' (*Kúdalúr*, 'the town at the meeting of the waters'), the chief town of a sub-division of the same name in the district of S. Arcot, Madras, British India, 127 miles by rail S. of Madras city. The harbour has now silted up, and admits only native craft, but large ships can anchor in the roads. Pop. 47,355, of whom 43,389 are Hindus, 2104 are Mohammedans, 1785 are Christians, and 77 are Jains. A considerable amount of weaving is carried on here. Large quantities of grain, indigo, oils, and sugar are sent by rail to Madras. During the latter half of the 18th c. it was a place of great strength and importance, and on the capture of Madras its factories were transferred thither. It was taken by the French in 1758, recovered by the British in 1760, retaken by the French in 1782, and finally ceded to England in 1785. Little remains of the fort, which must have been a very redoubtable place at one time.

Cudd'apah (*Kadapa*, a 'gate' or 'mercy'), a town in a district of C. in the province of Madras, near the right bank of the Upper Pennár, 80 miles W. of Nellore. The military cantonment, with ample accommodation for European and native troops, was the principal feature; but in 1868 the troops were withdrawn and the place has not been used since then as a garrison town. The former palace of the nawabs is now a courthouse and prison. The diamond mines of C., about 7 miles from the town, are celebrated. Pop. 17,379.—The *district* of C., with an area of 8722 sq. miles, contains 1,272,072 inhabitants, of whom 1,142,727 are Hindus, 119,564 are Mohammedans, and 9,725 are Christians. The people are careful and successful farmers, &c., and the soil is rendered most fertile. The chief crops are rice, grains, cotton, indigo, and sugar-cane. The weaving of cloth is an important industry.

Cudd'y (Dut. *kajuit*, Fr. *cahute*, 'a hut, a ship's cabin'), in small vessels, the cabin where the men's rations are cooked.

Cudra'nia, a genus of climbing spiny shrubs of the natural order *Artocarpaceæ*, natives of the Moluccas, Philippines, India, and tropical E. Africa. The heartwood of an E. African species yields a light-yellow dye.

Cud'weed, a popular name for various plants of the genera of *Gnaphalium*, *Filago*, and *Antennaria*, belonging to the natural order *Compositæ*, which, from the heads of the flowers being chiefly composed of involucral scales, preserve an apparently unchanged condition, so that they are generally known as Everlasting Plants (q.v.). *A. dioica* (catsfoot) was at one time employed in chest diseases. The golden C. is *Pterocaulon virgatum*.

Cud'worth, Ralph, D.D., an eminent divine and philosopher, was the son of the rector of Aller, in Somersetshire, where he was born in 1617. He was educated at Cambridge, where he became a tutor, held the livings of N. Cadbury and Ashton, the Regius Professorship of Hebrew, and the masterships of Clare Hall and Christ's College, and was a prebend of Gloucester. He died at Cambridge, 26th June, 1688. C.'s *chef d'œuvre* is *The True Intellectual System of the Universe*, published in 1678 (new ed. by Birch, 1830), in which he defended revealed religion against materialists and atheists, and maintained the doctrine of a rational system of knowledge founded on innate ideas. His philosophy may be considered as a system of Christian Platonism. C.'s work brought him much fame, and, on account of the fulness with which he stated the views of opponents, not a little odium. He left behind him various MSS., which are now in the British Museum. One of these, a *Treatise concerning Eternal and Immutable Morality*, published in 1731, was intended to form the second part of his *Intellectual System*. Principal Tulloch's work on *The Rational Philosophers and Philosophy* (1874) of the 17th c. contains a lucid criticism on C.'s position and mode of thought.

Cuen'ca (Lat. *concha*, 'a shell,' so called from its form), a fine old city of Spain, in the province of the same name, romantically situated amid a girdle of hills at the height of 3400 feet above sea-level, about 90 miles E. by S. of Madrid. It has fifteen churches, twelve convents, and a fine Gothic cathedral, is the see of a bishop, and was once celebrated in arts, literature, and manufactures. The bridge and convent of San Paolo are interesting. C. was thrice sacked by the French in 1808, 1810, and 1811. Pop. 9744.

Cuen'ca, the capital of the province of Azua in the republic of Ecuador, S. America, lies on a plateau 8640 feet above the level of the sea, is a bishop's see, and has extensive sugar-refineries, with a trade in grain and Peruvian bark. Pop. 39,280.—The *province* of Azua has an area of 11,308 sq. miles, and a pop. of 132,400. It produces sugar, cotton, and cochineal, and has gold, silver, copper, and sulphur mines.

Cuirass' (Fr. *cuir*, 'leather,' from Lat. *corium*, 'a hide'), a piece of plate-armour, which covered both breast and back, from the neck to the girdle. It consisted of breastplate and backplate, which were fastened to each other by straps, hooks, or buckles. The earliest C. was made of leather, or quilted linen or cloth, so thick as to be proof against pistol or musket shot. The C. was used by the Greeks and Romans, became common in Europe about the middle of the 14th c., and was discontinued in England after the reign of Charles II.; in France a little later.

Cuirassiers, heavy cavalry wearing the cuirass, which Napoleon I. reintroduced after it had been for about a century disused, and his regiments of C. were prominent in his wars. C. still form a portion of the French cavalry. Germany, Austria, and Russia have also regiments of C. Great Britain has no regiment so named, but the Household Brigade—that is, the Life-Guards and Royal Horse-Guards or 'Blues'—wear a cuirass.

Cuissarts', or **Cuissots'** (Fr. *cuisse*, 'the thigh'), thighpieces in plate-armour, made of small strips of metal riveted over each other.

Cuja'cius, the Latinised surname of **Jacques Cujas,** originally **Cujaus,** a distinguished French jurist, born at Toulouse in 1522. He became Professor of Law successively at Bourges and Valence, and died at Bourges, 4th October, 1590. C. applied himself to the study of Roman law, and completed what Alciat had begun, viz., he restored the body of Roman jurisprudence to its historical sincerity, and is the true founder of the historical school of Roman law, since further developed in Germany. Of the numerous writings of C., the excellent edition of Fabrot (Par. 1658-59; new ed. by Prato, 1859 *et seq.*) merits notice for having a chronological table of the several works.

Cul'dees, or **Kyl'dees.** Among many others, the following derivations of this name have been suggested:—*Céle-dé*, 'servant of God' (*céle* appearing in modern Celtic as *gilly*); *Cultores Dei* ('worshippers of God'), abbreviated; *kill*, 'a cell.' The name is applied to a class of ecclesiastics who appeared in Scotland and Ireland about the middle of the 9th c., but who were merged in the general Church after the close of the 12th c. They did not belong to any of the great regular orders, nor were they secular priests, nor did their often wealthy communities follow any invariable monastic rule. Some indeed were hermits, but most of them conventuals, among whom marriage was not forbidden and poverty not enjoined. Their history shows that at the time the Scottish

C. were neither nationally organised nor habitually subject to Rome; they were not governed by the bishops of the seculars, but they had their grades of office; the *scoloch*, or scholar, who assisted in the services, being the lowest. On baptism, one became a brother or sister; on ordination (which included tonsure of the fore part of the head), one became a presbyter. They had also deacons, who superintended works of charity, and *præpositi*, or teachers of schools. New settlements (*cœnobia*) were founded by a chief presbyter, or *abbas*, and twelve *socii*. The church (*oratorium*) was of plain wood with a stone belfry. Families of catechumens probably gathered round such institutions; land was cultivated, malt-kilns and meal-mills were built, and a spiritual territory was formed, over which the *abbas*, or an *episcopus*, presided. It was at one time thought that the early Church of Columba and the Culdee communities were historically continuous, subordination to Rome being introduced for the first time by the Saint-Queen Margaret and her sons. The lands of the C. were not exempt from the gradual secularisation which overtook the more important pious gifts, the 'abbot' and the 'parson' frequently being laymen. In the Catholic revival (1107-24) many fraternities became canons-regular of the Augustine rule. At St. Andrews, Lochleven, and Dunkeld, the regular canons and the remaining *keledei* (a prior and twelve brethren who performed service, had official residences, and drew the minor dues) lived for some time alongside each other. But gradually, as the parochial and cathedral system was developed, the earlier institutions were absorbed by cathedral-chapter or parish church, and occasional traces of their existence are not found later than the 14th c. In some cases the C. handed over everything, retaining life-interests; in others, the transfer was confined to parochial fees and oblations, the tithes being preserved entire, along with the right to vote in the election of the bishop. Even where the name is lost, the corporation is found subsisting in the form of ten prebendaries governed by a provost. Monymusk (Aberdeenshire), Brechin, Lismore, Dornoch, and Dunblane are also known as the sites of Culdee communities in Scotland. In Ireland the C. also appeared about the 9th c. In Dublin, Armagh, and other places, they seem, as colleges of seculars performing certain functions in the cathedrals, to have maintained a distinct existence much longer than in Scotland. In England and Wales, although the name of *cultores clerici* occurs, and the name of Culdees is once used by Giraldus Cambrensis as equivalent to *cœlebes* ('bachelors'), there is no trace of the Scotch institutions. They have been likened to the minsters, or colleges of missionaries in S.W. England; also to the Austin Canons, and to the followers of St. Chrodogang of Metz. See Walcott's *Ancient Church in Scotland;* Burton's *Hist. of Scotland;* Reeves' *C.; Proceedings of the Royal Irish Academy*, 1860; Grub's *Ecclesiastical History of Scotland* (Aberdeen, 1861).

Cul-de-sac, a term used in anatomy to denote a pouch formed by the unfolding of a membrane. Thus we have the *cul-de-sac* of the pleura, or the pouch formed by the membrane projecting into the root of the neck, so as to cover the apex of the lung in that region.

Culiacan', the capital of the Mexican state Sinaloa, on the river C., which flows into the Gulf of California, a little to the S. of the 25th parallel of N. lat. It was founded in 1532. Pop. 11,950.

Cull'en, a coast town and royal burgh of Banffshire, Scotland, 11 miles W. by N. of Banff, at the mouth of the C. Burn. It has some linen manufactures and distilleries, and important cod, salmon, ling, and herring fisheries. Cullen House, in the vicinity, is the seat of the Earl of Seafield. Pop. 2100.

Cull'en, William, a celebrated Scottish physician, was born at Hamilton, in Lanarkshire, 15th April, 1710. He studied at the grammar school of Hamilton, and was then apprenticed to a surgeon in Glasgow, where he attended some of the classes in the university. In 1729 he was appointed surgeon in a W. India merchantman, and after having made several voyages, he settled in the parish of Shotts, where he was introduced to the Duke of Argyll. Leaving Shotts, he studied medicine for two winters at Edinburgh, and in 1736 commenced to practise at Hamilton. Here he secured the friendship and patronage of the Duke of Hamilton, and became acquainted with William Hunter, the anatomist. In 1740 he graduated as M.D. at Glasgow, where he lived after the death of the Duke of Hamilton, and where in 1746 he delivered a course of lectures on the theory and practice of medicine in the university. Next year he added a course on botany and materia medica, and in the session following a course on chemistry, 'directed chiefly to the improvement of arts and manufactures.' This seems to have been the practical foundation of the medical school of Glasgow. The celebrated Dr. Black (q.v.) was one of his pupils in chemistry, and by directing his attention to the doctrine of heat, and employing him as his assistant in his experiments, C. contributed to his future fame. On the 2nd January, 1751, C. was made Professor of Medicine in the University of Glasgow, by the influence of the Duke of Argyll, at the instance of Henry Home, afterwards Lord Kames, who further influenced the Duke to have C. appointed Professor of Chemistry in Edinburgh University, in room of Dr. Plummer. He began to lecture there, not without opposition from the senatus, in January, 1756, and was formally elected professor in the following July. In 1757 he delivered a course of clinical lectures in the Royal Infirmary; in January, 1761, he began a course on materia medica; on 1st November, 1766, he was appointed Professor of the Institutes of Medicine, his old pupil, Black, succeeding him in the chair of Chemistry; and in 1773 he succeeded Gregory in the chair of the Practice of Physic. For many years before his death, on the 5th February, 1790, he alternated the duties of his chair with those of a practical agriculturist, having in 1778 purchased a small estate near Edinburgh. C. was an original investigator and eloquent expounder of medical science. He delivered his lectures *vivâ voce*, with only a few notes to guide him, and discouraged, amongst his students, the use of text-books, previously in use. He combated the doctrines of Boerhaave, then currently accepted, and encouraged independent investigation. By his originality and enthusiasm he gave an impetus to medical science in the Scottish universities, and his nosological method still forms the groundwork of the classification of disease. His chief works are *First Lines of the Practice of Physic* (Edinb. 1775); *Synopsis Nosologiæ Methodicæ* (1785); a *Treatise of the Materia Medica* (1789). His collected works were published at Edinburgh in 1827 by Thomson. See *Life of C.*, commenced by Thomson in 1832, and finished by Craigie in 1859.

Culle'ra, a town of Spain, in the province of Valencia, about 2 miles from the mouth of the Jucar, on its left bank, and about 23 miles S.S.E. of the city of Valencia. It is fortified, and has an old castle and extensive barracks. The industries of the neighbourhood are farming, fishing, vine-culture, and the production of wine and oil. There is a considerable trade in cattle, and a busy coasting trade, extending to France. Pop. 12,475.

Cullo'den (Gael. *Cuil-eŏdir*, probably *Cul-oitir*, 'the back of the low promontory'), also called **Drummoss'ie Moor,** formerly a desolate moor, near the shores of Beauly Firth, 5 miles N.E. of Inverness. Here the Highlanders under Prince Charles Stuart were defeated by the royal troops under the Duke of Cumberland, and the cause of the Stuarts was crushed, 16th April, 1746. Much of the original moor is now under cultivation.

Culm (Welsh, *cwlm*), a provincial term for an inferior kind of anthracite, used chiefly in the making of lime. The anthracite shales of N. Devon are sometimes called the *C. measures*.

Culm, in botany, is the peculiar, jointed, hollow, cylindrical stem of grasses.

Culmina'tion of a star is the moment at which it passes the meridian, being then at its highest elevation above the horizon.

Cul'na, or **Kalná,** a town of India, in the executive district of Bardwan, province of Bengal, and on the right bank of the Bhagirathi, a tributary of the Ganges, about 50 miles above Calcutta. There is a trade in rice, grain, cotton, and silk, C. being a convenient station for steamers plying between Calcutta and the upper districts. The Maharajah has a palace here, and there are numerous Hindu temples, and a mission-station of the Free Church. The place has suffered much owing to the continued prevalence of a fever epidemic during past years in succession. Pop. 9680.

Cul′pa (Lat. 'fault'), is a term of Scotch law, the doctrine regarding which it has taken from the Roman. There are held to be three degrees of C.—*lata*, *levis*, and *levissima*. The first is gross carelessness or omission, which may be criminal (see Crime), and equivalent to Dole (q.v.). The second is that degree of carelessness which one generally attentive to his affairs may fall into. The last is that slighter degree of neglect which must occasionally be shown even by the most circumspect. *C. levis* and *C. levissima* are often of legal importance in contracts whether constituted by implication or otherwise. They are points in a case which often are left for the jury to decide. See Borrowing, Commodate.

Cul′prit, in English law is a prisoner accused of, and indicted for, a criminal offence, but not convicted. The equivalent term in Scotland is *panel*.

Culross (Gael. *cul*, 'the back,' and *ross*, 'a peninsula,' 'the *back* or *neck* of the peninsula'), an old royal burgh and seaport of Perthshire, on the N. shore of the Firth of Forth, about 22 miles N.N.W. of Edinburgh. It stands on the side of a hill, and possesses the ruins of a chapel, dedicated to St. Kentigern (q.v.), and of a Cistercian abbey, founded in 1217. The chief manufacture now is of linen. There was a considerable trade in coal and iron at C. during the 16th and 17th centuries. C. received its charter from James VI. in 1588, and, along with Stirling, Dunfermline, Inverkeithing, and Queensferry, returns one member to Parliament. Pop. 370.

Cultiros′tres (Lat. 'knife-billed' or 'ploughshare-billed'), a family of Grallatorial or Wading birds, with elongated bills, which are compressed from side to side. The legs are long and slender, the tibiæ being unfeathered for a considerable portion of their extent. The feet have four toes each, and the bases of the toes are webbed. The Crane (q.v.), Stork (q.v.), Heron (q.v.), Ibis (q.v.), &c., are included in this family.

Crowned Crane.

Cultiva′tor, an implement with six or seven tines, or curved, broad-pointed pieces of iron for penetrating the soil. Unlike the plough, the C. does not turn up the land in furrows, but tears it up, leaving it in clods through which air has free access. The tines can be set to any depth required, according to the quality of the ground and the crop it is intended to bear.

Cul′verin (Fr. *couleuvrine*, from *couleuvre*, Lat. *colubra*, 'a snake'), a long cannon of the 16th c., which weighed about two tons and a half, and carried a shot of about 18 lbs. A *demi-C.* carried half the weight of shot, and weighed about a ton and a half.

Cul′vert (Fr. *couvert*, 'covered'), an arched channel built under a canal for purposes of drainage, also the arched drain under a railway.

Cu′mæ, a coast city of Campania, near C. Misenum, was founded jointly by the Chalcidians of Eubœa and the Cymæans of Æolis, and was one of the most ancient and most famous of the Greek colonies in Italy. Its wealth and prosperity rapidly increased, and from 700-500 B.C. it was the foremost city of Southern Italy. C. first appears in history as successfully repelling an invasion of Etruscans. During the reign of the despot Aristodemus (B.C. 505-485), Tarquinius Superbus, when banished from Rome, fled to C., where he died, B.C. 496. C. was completely overthrown by the Sabines, B.C. 420. It was admitted to the Roman franchise in 388 B.C., and in the second Punic War Sempronius Gracchus repulsed Hannibal from its walls. From this time C. appears chiefly as a place of luxurious retirement for wealthy Romans. Under the Empire it was noted for the manufacture of red earthenware and of nets. According to tradition C. was the abode of the Sibyl (q.v.). Her cave was destroyed by Narses in the siege of C., but an artificial excavation on the banks of Lake Avernus is still popularly called *Grotta della Sibilla*.

Remains of a Greek Tomb, Cumæ.

Cuma′na, a town in the state of Bermudez, Venezuela, lies at the mouth of the Manzanares, on the Gulf of Cariaco. It is the oldest European city in America, having been founded in 1521, under the name of New Toledo, and has a capacious port, defended by Fort Antonio. There is a considerable export trade in mules, cattle, smoked meat, and dried fish. C. has on several occasions been almost entirely destroyed by earthquakes. Pop. 12,057.

Cum′berland ('the land of the *Cumbrians*, or perhaps the *land of coombes*,' *i.e.*, valleys), the most north-westerly county of England, bounded N. by Scotland and the Solway Firth, W. by the Irish Sea, S. by Lancashire, E. by Westmoreland, Durham, and Northumberland. Greatest length, 75 miles; average breadth, 22 miles; area, 1516 sq. miles. Much of the surface is rugged and mountainous, with deep narrow valleys or dales, in which are the C. lakes and waterfalls, or 'forces,' celebrated for their picturesque beauty. Several of the mountains are above 3000 feet, as Scawfell, Helvellyn, and Skiddaw. The largest of the lakes, Keswick, Derwentwater (q.v.), Ulleswater (q.v.), and Wastwater (q.v.), attract numerous visitors—the first two by their smiling beauty, the last by its gloomy grandeur. The chief rivers are the Eden, the Esk, and the Derwent. Geologically the Lake District is Silurian, and contains numerous slate quarries;

there is, however, much granite and trap, and new red sandstone crops out boldly at St. Bee's Head. C. is rich in minerals, including coal, iron (especially a very rich hæmatite ore), plumbago, silver, copper, lead, gypsum, and marl, and there are large quarries of limestone, marble, and slate. Corn crops are grown over 89,428 acres (oats 81,199); green crops 46,119 (potatoes 9,150); clover, &c., 115,483. Permanent pasture and unbroken grass account for 329,378; 328 are devoted to small fruit; and 3 to flax. Mountain and heath cover 209,013 acres, and woods, &c., 32,737; while 217 are laid out as nursery grounds. The chief manufactures are iron, pottery, paper, and flax. The principal towns are Carlisle, Whitehaven, Workington, and Cockermouth. Pop. anc. county, adm. county, and reg. county (each) 266,549. C. contains four parl. divisions, each of which returns one member:—Cockermouth 63,590; Mid C. or Penrith 45,643; N. C. or Eskdale 46,364; and W. C. or Egremont 53,604.

Cum'berland, a town in Maryland, capital of Alleghany county, on the N. bank of the Potomac, in the Alleghany Mountains, 179 miles W. of Baltimore. It is contiguous to the C. bituminous coal region, and has a large trade. Pop. 12,729.

Cum'berland, a manufacturing town in Rhode Island, on the Blackstone river, 10 miles N. of Providence. It has trade in iron, cotton, and shoes. Pop. 8090.

Cum'berland, Richard, D.D., a scholar, archæologist, and theologian, was born in London, 13th July, 1632. After holding subordinate livings, he was in 1691 appointed Bishop of Peterborough, the duties of which he discharged with perfect fidelity till his death, 9th October, 1718. C. wrote several works, the chief of which is his treatise, *De Legibus Naturæ*, in answer to Hobbes. His thirst for knowledge and the activity of his mind are shown by his learning Coptic after he had reached the age of eighty-three, and in his celebrated saying, 'It is better to wear out than rust out.'—**Richard C.,** dramatist and miscellaneous writer, great-grandson of the preceding, and grandson, on the mother's side, of Richard Bentley, was born at Cambridge 19th February, 1732. He was educated chiefly at Westminster School and Trinity College, Cambridge, of which he became a fellow. Having been appointed private secretary to the Marquess of Halifax, he filled various offices, and was sent on a special mission to Madrid and Lisbon. Finally, he was made secretary to the Board of Trade, and held the office till the suppression of the Board in 1782, when he retired with a compensation allowance. C. then lived at Tunbridge Wells, where he devoted himself to literature, producing novels, essays, pamphlets, and dramas. He died at London, 7th May, 1811. Many of his plays, especially *The West Indian*, *The Jew*, and *The Wheel of Fortune*, were popular at the time of their production, and considerable talent is undoubtedly displayed in his miscellaneous essays under the title of *The Observer*. C. was a vain man, and Sheridan caricatured him in his farce of *The Critic* under the character of Sir Fretful Plagiary. He wrote *Memoirs of His Own Life*, which were published at London in 1806-7 (new ed. Lond. and Philad. 1856).

Cum'berland, William Augustus, Duke of, second son of George II., was born in 1721. He entered the army, was wounded at Dettingen in 1743, and defeated by Marshal Saxe at Fontenoy in 1745. In 1746 he ended the second rebellion by the victory of Culloden, but treated the conquered Highlanders with great severity. He was beaten by Saxe at Lawfield in 1747, and had to surrender his army at Kloster-Zeven to the Duc de Richelieu in 1757. C. died 31st October, 1765. See *Life of the Duke of C.* (Lond. 1766). He repeatedly figures in Carlyle's *History of Friedrich II.*, and is touched off with good-natured mockery as a military failure. His 'General Orders' of 1745-47 (Henry S. King & Co., Lond. 1876) show that the popular notion of his cruelty after Culloden is at least exaggerated.

Cum'berland Island, a large island between Davis' Strait on the E., the mouth of Hudson's Bay on the W., and Hudson's Strait on the S., and separated by a narrow channel from Cockburn Island on the N.

Cum'berland Presbyte'rians, an American sect which arose about the year 1810, in a time of revival and excitement in Kentucky. The Presbytery of Cumberland, thinking that the times required it, ordained some men who had not gone through the usual course of education, and hence arose a secession from the Presbyterian Church. The C. P. hold the usual evangelical doctrines, with an Arminian interpretation. They are most numerous in the S. W. States, but there are not altogether more than 120,000 members of the sect at the present day in America.

Cum'berland River, in Kentucky, U.S., rises in the Cumberland Mountains, and flows in a generally westerly direction for nearly 600 miles, till it joins the Ohio, about 50 miles above the confluence of the latter with the Mississippi.

Cumb'rae, Great and **Little** ('islands of the Cumbrians or Cymri'), two islands in the Firth of Clyde, between the Ayrshire coast and the island of Bute, and forming part of Buteshire. G. C. is 2½ miles by 1½. Pop. 1784. The village of Millport in G. C. is a favourite sea-bathing resort of the inhabitants of Glasgow. L. C. is about a mile in length by half a mile in breadth. It is in the parish of W. Kilbride, Ayrshire. Pop. 17. The name is a relic of a remote historical period. See CUMBRIA.

Cumbré Pass, an important pass across the Andes, on the high road between Santiago, in Chili, and Mendoza, in the Argentine Republic, a little to the S. of Aconcagua. Its greatest height is 12,178 feet above the sea-level. The railway which is being constructed so as to connect Chili and the Argentine Republic, will take this route. Already over 90 miles of line are completed on the E. side, and 18 on the W.; about 40 miles of road are thus still to be laid.

Cum'bria, or **Strathcluyd',** the kingdom of the Northern Britons, stretched in the 6th c. from the Clyde to the Dee, from Dumbarton to Chester. Strathcluyd was the earlier name of the country; that of C. not having been given till the 10th c. 'It was the last retreat of the Romanised Britons' (Burton). Its history is very obscure; and it is chiefly memorable as the scene of the labours of St. Kentigern. C. was ruled from an early date by kings of Scottish family, but was independent both of the Dalriadic Scots and of the West Saxon kingdom, until, in 924, it submitted to Eadmund the Elder. When the English overran and occupied the district which is now Lancashire and Yorkshire, the Cumbrian kingdom divided into two states; there was 'a gap between the Southern Britons and those of Scotland' (Burton's *History of Scotland*). The northern division was then known as the Strathcluyd kingdom proper, its capital being *Alcluyd* (now Dumbarton), and Whithern the seat of its metropolitan church. It comprised the modern counties of Dumbarton, Renfrew, Ayr, Lanark, together with the whole of Galloway. The southern division of the ancient Strathcluyd, known as English C., was granted by Eadmund, King of England, to Malcolm I., King of Scotland, in 945, to be held on tenure of military service. From that time it remained an appanage of the Scottish crown, but was distinctly regarded as an English territorial fief. Its capital under David I. was Carlisle, and its ecclesiastical centre Glasgow. See Freeman's *Norman Conquest*, i. p. 135 *et seq.*; and in his *Historical Essays*, that 'On the Relations between the Crowns of England and Scotland;' also Palgrave's *English Commonwealth*, i. p. 440 *et seq.*

Cumin, Oil of. This is an oily liquid obtained from the seeds of *Cyminum cymenum*. It has a pleasant aromatic odour, and consists of a mixture of a hydrocarbon called *cymole* and an oxygenated body called *cuminol*.

Cumm'in, or **Cum'in,** a genus of plants belonging to the natural order *Umbelliferæ*, not unlike Fennel (q.v.) in appearance. C.-seeds are the fruits of *C. Cyminum*. They are larger than the Caraway (q.v.), but are not so agreeable or efficacious as these, though used for the same purposes, viz., as a carminative and spice. In Holland, and even in this country, they are sometimes put into cheese, and in

Germany into bread. The volatile oil which they contain is known as *oil of C.* The seeds are chiefly brought to Britain from Sicily and Malta, and are to some extent used in Sweden, Norway, and Denmark to flavour corn-spirit (*aquavit*).

Cumin.—Seeds and Stalk.

The fruits of *Lagöecia cuminoides*, a native of the Levant, and also belonging to the *Umbelliferæ*, have similar qualities. The C. of the Scriptures probably included not only this species but also the *black C.*, a species of *Nigella* (q.v.). The ancients considered that its smoked seeds produced pallor of the countenance.

Cum'nock ('the meeting of the waters,' from the Celt. *cumar*, 'meeting,' and *oich*, 'water'), the name of two places.—**Old C.** is in the S.E. of Ayrshire, on the left bank of the Lugar, near to where it is joined by the Glasnock, 16 miles E. of Ayr, and a station on the Glasgow and South-Western Railway, which crosses the Lugar about a quarter of a mile from the town by a magnificent viaduct 170 feet in height. Pop. ecc. par. 4712. The manufacture of wooden snuff-boxes, for which C. was once noted, has much declined. There are rich coal and iron mines in the district, and manufactures of coarse pottery and agricultural implements.—**New C.** lies 5 miles to the S., and is also a station on the Glasgow and South-Western Railway. Pop. ecc. par. 4419. The district is rich in minerals, including coal, iron, plumbago, and antimony.

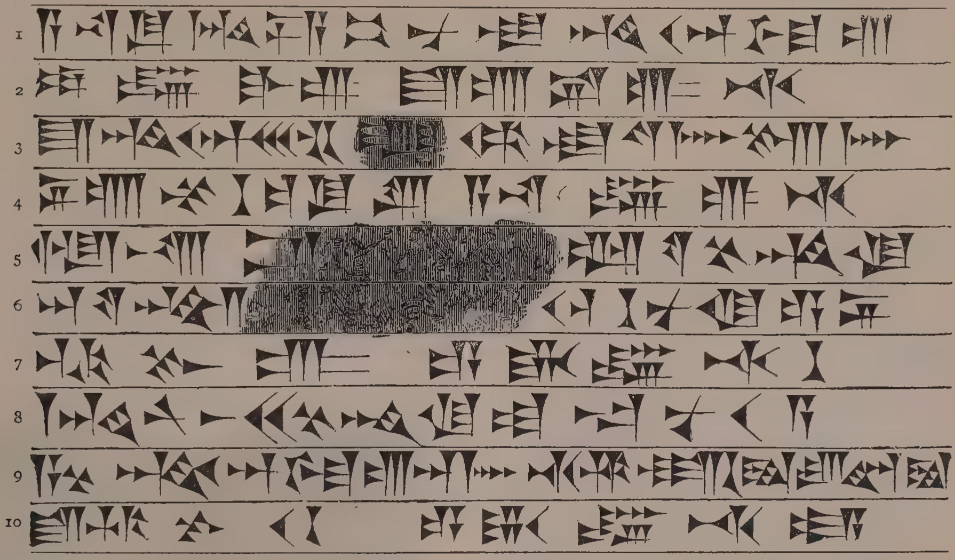
Cum'yn, Com'yn, or **Cumm'ing,** a Scoto-Norman family deriving its name from the town of *Comines* in the N.E. of France, and descended from an ancient family in that country.—**Robertus de C.,** who came to England at the Norman conquest, is supposed to be the ancestor of all of that name in Scotland, where his nephew William became chancellor. The grand-nephew of the chancellor married Hexilda, grand-daughter of the King, Donald Bane, and niece of Malcolm Canmore. His great-grandson by this marriage, **John the Black C.,** Lord of Badenoch, was a competitor for the Scottish crown in 1292.—**John the Red C.,** a son of the competitor, was the rival of Bruce. The two rivals met privately, February, 1306, before the altar of the convent of the Minorite Friars, Dumfries. High words arose about treachery and falsehood, and Bruce stabbed C. and fled. The Comyns, who had by alliances acquired immense power in Scotland, were almost swept away in the war of independence. The male line of the family, however, still survives, and is represented by Sir William Gordon Gordon-Cumming of Altyre. See *The Records of the Bruces and the Cummings*, by M. E. Cumming-Bruce.

Cunax'a, the scene of the battle described by Xenophon, in which Cyrus the Younger was defeated and slain by his brother Artaxerxes Mnemon (B.C. 401). The exact spot is not known; but most authorities agree in placing it on the left bank of the Euphrates, nearly 60 miles N. by W. of Babylon.

Cundinamar'ca, one of the departments of the United States of Colombia, obtaining its name from an American goddess, who, among other divinities, was worshipped before the Mexicans conquered the country. Ruins of temples, broken statues, and monuments, are now the sole relics of a forgotten religion. The chief town is Bogotá. There are extensive iron mines at Pradera, to the E. of Bogotá, which produce about 70 tons of pig iron daily, and this is forthwith manufactured into hardware and cutlery. At Zipaguira, which lies in the N. of the department, very considerable salt mines are worked by the government as a monopoly, and from this a large portion of the revenue is acquired, since the mines supply nearly the whole of the confederation with the necessary commodity. Area, 79,810 sq. miles; pop. 571,200.

Cu'neiform (Fr. *tête-à-clou*, Ger. *keil-förmig*), or wedge-shaped, is the name given to the wedge-shaped or arrowhead writing used in the trilingual public inscriptions of the Persian monarchy (the three languages being Persian, Median or Scythic, and Assyrian or Babylonian) and in an immense variety of inscriptions on cylinders, tablets, bricks, both public and private, which have been discovered chiefly on, or near, the sites of Nineveh, Babylon, Asshur, &c., and in Egypt, and from which many interesting fragments of ancient Assyrian and Chaldean history has been constructed. The characteristic example of the later C. is the Behistun inscription, which contains a valuable history of the conquests of Darius. (See BEHISTUN.) The deciphering of C. began properly in the 19th c. Previously various baseless theories were held. It was said to be the work of worms (who must certainly have had geometrical instincts); the remains of a primitive digital alphabet; a system of arbitrary sacred talismans, of which the key had been lost. Niebuhr first suggested that the inscriptions were repeated in three languages, and in 1802 Grotefend of Göttingen deciphered the names of Cyrus, Darius, Xerxes, and Hystaspes, or eight letters out of thirty to which he assigned equivalents. He did so not from any laborious comparison of individual signs, but by a shrewd historical guess as to the probable form and subject of the inscription. Grotefend wrote chiefly in the *Mines de l'Orient* (vols. iv., v., vi.), but his results are given in *Heeren's Researches*, by Talboys, vol. ii. Little was added by St. Martin, whose studies on the subject, from 1823 to 1832, are preserved in the *Aperçu de l'Origine des Diverses Écritures* by the learned Klaproth. The important characters representing *m* and *n* were discovered by Rask (*Ueber das Alter und die Echtheit der Zend-sprache*, Berl. 1826). In 1836 Burnouf published an elaborate *Mémoire sur Deux Inscriptions Cunéiformes trouvés près d'Hamadan*, to which we owe the verification of the characters for *k*, *gh*, *b*, and *z*. In the same year Lassen of Bonn discovered twelve characters (including *i*, *g*, *w*, and several aspirates), which he published in *Die Alt. Persischen Keil-Inschriften von Persepolis*. Rawlinson in 1835, from personal examination of the sculptured tablets at Hamadan, deciphered independently the Achæmenian proper names, as Grotefend had done from the inscriptions at Persepolis, copied by Niebuhr. The collation of the Behistun with the Elwend further supplied the native names of Arsames, Ariaramnes, Teispes, Achæmenes, and Persia. Greatly assisted by the philological suggestions of Burnouf's work on the Zend-Avesta, the language of which is supposed, with the exception of Vedic Sanskrit, most nearly to approach the language of the Persian C., and by the further discoveries in the C. alphabet of Lassen, Jacquet, and Beer, Rawlinson completed an alphabet which was substantially original, and proceeded to his work of translation of the Behistun inscription, which was wholly original. By translation here is meant, not the mere deciphering of particular names, but the rendering of the different members of a sentence according to their etymologies and grammatical relations. With regard to the origin of C., Rawlinson thinks it possible that pictorial representations, and not mere arbitrary arrangement, may have led to the formation of the primitive phonetic character; that the three kinds of C. do not belong to one type of alphabet and language, as has been maintained by Botta and others, but that the Babylonian is the oldest, and has probably been largely derived from the Egyptian written character. The Babylonian C. of the third column in the Persian inscriptions is, however, different from that which appears on cylinders and bricks at Shinar, Birs Nimrúd, &c., and also as a lapidary character on Sir Harford Jones' stone, on the naked rock at Sheikhan, between the ancient capitals of Resin and Calah, &c. The latter form Rawlinson considers to be the primitive C., or Babylonian proper; the former he calls the Achæmenian-Babylonian.

The early Chaldean brick inscriptions at Warka (ancient *Erech*) sometimes pass into a character formed entirely by straight lines of uniform thickness, apparently impressed by a single stamp, which has been called *hieratic*. The hieratic is said to be pictorial, a 'god' being represented by an eight-rayed star, a 'hand' by four shorter and one longer parallels connected by a perpendicular, a 'house' by what resembles the rectangular ground-plan of a house. A singular character, used for the feminine of *one* (Fr. *une*), has been traced to the likeness of the double-toothed comb used by Chaldean women. So also the early ideograph for 'king' has been said to resemble the figure of a bee, an Egyptian emblem of sovereignty. From this C. gradually developed, as clay took the place of stone, a tool with a triangular point in ivory being used. From the variety of dialects the C. signs came to have different phonetic values. The Chaldean characters are of three kinds—letters proper, monograms, and determinatives. The public writings are chiefly on bricks; those on the sealed tablets under clay envelopes chiefly contain private contracts, wills, &c. In the same way the Assyrian branch of the complicated C. writing is divided into (1) the Medo-Assyrian alphabet, which (with the exception of the trilingual inscription of Xerxes) is exclusively found on the rocks at Van and in the neighbourhood, and which occurs at Dash Tappek in the plain of Mujandab, and on the stone pillars at the Pass of Kel-i-shin; (2) the true Assyrian, which is found on the marbles of Khorsabad and in the ruins of Nineveh and Calah. As might be expected from the national history, the Babylonian and Assyrian characters sometimes overlap. The Assyrian C. is much less archaic than the Chaldean. Only a few straight lines are seen, and the wedge often appears very much elongated, or contracted to a triangle, or broadened out, or doubled so as to form an arrowhead, all these forms assuming various directions. The 366 chief characters represent syllables rather than letters, each of the sixteen consonants forming six syllables by means of the three vowels. A second class of syllables is formed by two consonants and a vowel. The determinative stroke before or after merely announces what class of noun is to follow. In 1871 Mr. George Smith, of the British Museum, gave the translation of the principal Assyrian inscription (found on a ten-sided prism) in the British Museum. The lines chiefly refer to the success of Esarhaddon over Egypt and the most important events in the reign of his son. The first ten lines of the cuneiform character are here given and their meaning in English is appended. The Median C., used for translation in all the Achæmenian trilingual inscriptions, even in Egypt, as on the Suez stone, has been called Scythic and Turanian by Norris, who treats it very fully in the *Journal* of the Asiatic Society, vol. xv. 1855. It is not certain whether this syllabarium of 100 characters was invented or adopted by the Turanian people of Zagros. It comes much nearer the idea of an alphabet than the other forms of C. The forms are simpler, five wedges being the maximum. The only diagonal sign is the single wedge which separates words. Lastly, there is the Elymean C., which is found in the vicinity of Mal Amir, the ancient city of the Uxii, and which has been copied by Layard. The Babylonian C. varies from all other Semitic writing in being written from left to right. Each consonant apparently possesses a mute and a sonant sign, so that in expressing a dissyllable in which such a consonant was medial, either or both of the alternative forms might be used. The vowel sounds are inherent in the sonant consonants (perhaps also at the beginning of the mutes), but for greater clearness it was permitted to represent the vowels by definite signs.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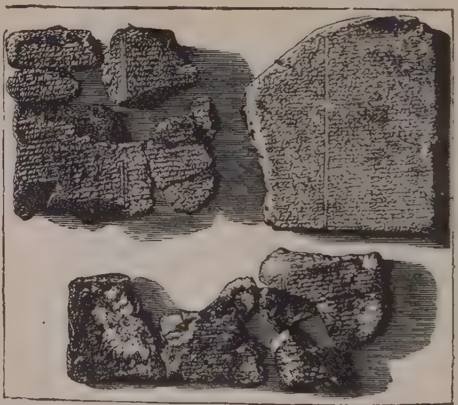
1. I am Asshurbanipal, descendant of Asshur and Beltis,
2. son of the great King of Bitriduti (or Eriduti),*
3. whom Asshur and Sin, the lord of crowns, from distant days,
4. the account of his name prophesied to the kingdom,
5. and in the body (of his mother was made to) rule Assyria,
6. Shamas, Vul (and Ishtar in), their supreme power
7. commanded the establishment of his kingdom.
8. Asshur-ah-iddina (or Esarhaddon), King of Assyria, the father my begetter,
9. the will of Asshur and Beltis, the gods his protectors, fulfilled,
10. who commanded him to form my kingdom.

* Supposed to be the name of the harem of the palace at Nineveh.

Copy and Translation of the first ten lines of Cylinder A, in the British Museum.

Redundant consonants are introduced for euphony. These are among the causes of the great diversity in the orthography of C. Another feature is the constant occurrence of compound vowel articulations in the interior of words, of which, owing to the inherence of the *a* in the preceding consonant, the second element only is expressed. Generally, it varies from Sanskrit in possessing no aspirated sonant; it only has the surd, the aspirated surd, and the sonant.

Besides the great Behistun inscription, there are many of less importance scattered through the Persian Empire, and especially at Persepolis, Hamadan, and Van. Many of these, however, consist simply of a formula of invocation to Ormazd and a repetition of royal titles. Thus, on the ruined pilasters of Murghab or Pasargadæ appears this legend, the oldest of the Persian C.—'Adam Kurush, Khshaya thiya, Hakhamanishiya: I am Cyrus the King, the Achæmenian.' The trilingual legends of Darius at Persepolis are chiefly on the platform, the pillared colonnade, and the palace marked G on Niebuhr's plan. One of them, which has been copied by Porter and Westergaard, is found on a huge slab, 26 feet long and 6 feet high, in the southern wall of the platform. It appeals to Ormazd to save the province of Persia from war, slavery, decrepitude, and lying. The titles often suggest questions of history and geography. Thus Darius puts 'Sparda' among the list of countries who are afraid of him, and bring him tribute. Does this mean Lacedæmon, or merely the Dorian colonies in Asia Minor? Another tablet at the foot of the mountain Alwand, near the town of Hamadan, probably commemorates a royal visit to the Median capital. Ormazd appears in the amiable character of *dadar*, or giver of justice. The Median and Persian inscription of Naksh-i-kustam on the rock-hewn sepulchre of Darius near Persepolis was for long a riddle to travellers. Fryer, quoted in Ouseley's *Travels* (ii. 296), was content 'to stare on them from beneath, they being fit only for atlases or winged folk to look into, there being no passage into them.' A French artist, more ambitious, was drawn up by a rope, but Westergaard's copy was taken by means of a powerful telescope. The writing is probably subsequent to the expedition of Mardonius (B.C. 492), and refers to the Greeks and Scythians beyond the sea. Other members of the Darius series of C. writings were found on a Babylonian cylinder in the British Museum, on the Suez stone near the embouchure of the old canal leading from the Nile to the Red Sea, and on the window-frames of the palace of Darius at Persepolis. There is also a considerable number of Xerxes inscriptions. Those at Hamadan, as they relate no history, contain no admonition, and do not even solicit the protection of *Auramazda*, are probably memorials of the annual journeys made from Babylon to Ecbatana by the old 'road of Semiramis,' across Mount Orontes, by the Ganj Namek, a route coinciding with that of Isidore from Kangawar to Artaman. At Persepolis the Xerxes inscriptions consist of (1) the statements of title in the doorways (both over the king's head and on the folds of his robe), and as a border to the false windows of the palace; (2) more elaborate, but quite formal, statements (including a reference to the building of the palace), which appear on the interior pilasters and on the sculptured staircase leading to the terrace of the Hall of Columns. The twelve small tablets over the colossal animals on the two great portals long remained inaccessible to travellers, although their existence was observed by Gemelli Carreri, who visited Persepolis towards the end of the 17th c., and by Tavernier (1663). The name of *Parsa* for the palace, or metropolitan building, as distinguished from the country, province, or state, occurs here. Another pilaster legend at the S.W. corner of the palace indicates that both Darius and Xerxes took a part in its construction. All these inscriptions are contained in Lassen's *Treatise of C. Inscriptions*, in Rawlinson's *Memoirs on Persian C.*, in *Zeitschrift für die Kunde des Morgenlandes*, vol. vi., and the *Journal* of the Asiatic Society, vol. x. Plates will be found in Morier's *Travels*, Ouseley's *Travels*, Rich's *Babylon and Persepolis*, Porter's *Travels in Georgia*, &c. See also Heeren's *Researches*, by Talboys, vol. ii. There is a trilingual C. writing relating to Xerxes on the vase of the Comte de Caylus, of which there is a duplicate on the vase found at Halicarnassus by Newton. It has a hieroglyphic translation, to which Champollion and Grotefend attached the greatest importance as a source of phonetic values before the C. writing was properly understood. Loftus recovered at Susa some fragments of vases with a Xerxes legend. After the time of Xerxes the C. seems to have fallen into disuse. No record of Artaxerxes Longimanus or of Artaxerxes Mnemon has been discovered, and the attribution of the cylinder and Suez stone to the intervening reign of Darius Nothus depends on mere conjecture. The buildings at Persepolis ascribed to this period of the Achæmenian dynasty, though elaborately sculptured, have no writings. After the lapse of a century Artaxerxes Ochus, fourth in descent from Xerxes, resumed the ancient art of composition. We have of this monarch two inscriptions at Persepolis—one on the northern face of the platform, marked H on Niebuhr's plan, the other on the western staircase added to the palace by Artaxerxes. In these he traces his descent from Hystaspes (whom, however, he does not call 'royal,' thus differing from the Behistun inscription of Darius), explains that he has made this well-sculptured piece of masonry *for his own convenience*, and calls on Ormazd and Mithra (the sun) to protect him. Both inscriptions are marked by bad grammar, which has been the despair of decipherers. The words 'for his own convenience' are supposed to refer to a private entrance from a pavilion to the palace. There is another C. writing relative to Artaxerxes Ochus on an Egyptian vase of grey porphyry in the treasury of St. Mark's at Venice. It has a very singular hieroglyphic equivalent, deciphered by Sir Gardner Wilkinson, and the royal name is degraded into *Ardakhchasche*. In these strictly Persian inscriptions there are thirty-six or thirty-seven forms, expressing twenty-three distinct sounds. The size of the character varies from two inches to one-sixth of an inch. In 1872, Mr. George Smith, of the British Museum, gave the translation of the cuneiform characters on a tablet which had remained in a very fair state of preservation. This tablet narrates in detail the story of the Deluge, and tells how the wickedness of mankind was punished by a great flood, and how Sisit was warned beforehand to build a large ship and betake himself on board with some chosen friends and certain other living creatures. The flood arose and afterwards retired; the ship was left high and dry on a mountain. Sisit sent out birds twice and each time they returned to the ship; again he let one go and this did not return. Sisit and his companions disembarked and builded an altar and there sacrificed. So far these agree with the facts given in the Bible, but further details present the story in quite a different light.



Fragment of the Tablet from which the account of the Deluge was deciphered.

Cun'eiform Bones. These are three bones in the tarsus or arch of the foot, so named on account of their wedge-like shape. With the cuboid bone they form the anterior row of the tarsal bones. They are termed from their position, internal, middle, and external. See Foot, Tarsus.

Cunn'ingham, Allan, a Scottish poet and man of letters, was born 7th December, 1784, at Blackwood, near Dumfries. His parents were humble, and at an early age he was apprenticed to a stonemason. He worked hard at his business in Dumfries, while he gave his leisure to the Muses. He first (1810) became known beyond his native country in connection with Cromek's *Remains of Nithsdale and Galloway Song*, to which he gave what purported to be old ballads, but were really his own composition. After this he was acknowledged to be among Scottish poets next in power to Hogg, and gained the high esteem of Sir Walter Scott, who called him 'Honest Allan.' He removed to London, where, after being for a short time a parliamentary reporter, he became manager in Chantrey's studio. Meanwhile he wrote steadily, his works including novels, poems, a drama, and such books as a *Life of Burns*, a *Life of Sir David Wilkie*, *Lives of British Painters*, &c. Yet he always considered literature as his staff, not his crutch. C. died 29th October, 1842. He will be best remembered for his poems and songs, which, though somewhat florid, are genuine and thoroughly Scottish. The best biography is that containing extracts from his correspondence and works by the Rev. David Hogg of Kirkmahoe (1875).—**Peter C.,** son of the preceding, was born at Pimlico, 7th April, 1816. In 1834 he received a Government situation, and devoted his spare time to literary work, the varied character of which may be judged from the titles of some of his books—*Handbook of London*, *Life of Inigo Jones*, *Life of Drummond of Hawthornden*, editions of Johnson's *Lives of the Poets*, Goldsmith's *Works*, Horace Walpole's *Letters*, &c. C., who contributed largely to magazines, died 8th May, 1869.

Cunningham'ia, a genus of lofty and graceful Coniferous trees, of which only one species, *C. sinensis*, a native of Southern China, is known. It can, however, only be grown in conservatories.

Cunonia'ceæ, a natural order of Dicotyledonous plants closely allied to the saxifrages. About a hundred species and twenty genera, natives chiefly of tropical regions and of the southern hemisphere, and especially of Australia, are known. They have astringent properties, and some have been used for tanning, while others exude a gummy excretion.

Cup, Divination by, a mode of divining still practised by some persons, by examining the arrangement of the sediment in the bottom of a teacup. The practice has been borrowed from the ancient Egyptians, who, after throwing pieces of the precious metals into a C. of water, in which engraved gems had been placed, invoked the infernal gods to furnish the information desired.

Cupa'nia, a genus of trees or shrubs of the natural order *Sapindaceæ*, numbering about fifty species, found in most tropical countries, but most abundantly in S. America. The edible C. is the Akee tree of the W. Indies, where the negro women use the distilled water of the flowers as a cosmetic. The seeds are surrounded by a succulent, slightly acid aril, which is much esteemed as an article of food. A decoction of the seeds is said to be efficacious medicinally. The lofty tulip-tree of eastern tropical Australia is a C. and has a light-coloured wood, interspersed with darker-coloured patches, and is valued by the cabinetmaker from its being susceptible of a high degree of polish. Spruce mentions the curious fact that the embryos of a Peruvian species of C. 'fall out of the seeds, while the outer coating or husk of the seeds, with their aril contained in the burst capsules, still remain on the trees.' The 'Loblolly woods' of Jamaica also belong to this genus.

Cu'par or **Cou'par-An'gus,** a town partly in Perthshire and partly in Forfarshire, on the Isla, about 13 miles N.E. of Perth. It has bleachfields, manufactures of coarse linen fabrics, and a trade in timber. From its occupying the centre of Strathmore ('the great valley'), it is sometimes called the capital of the 'How' of Mearns. The remains of two Roman camps are in the neighbourhood of the town, on the site of one of which Malcolm IV. erected a monastery, now in ruins. Pop. 2106.

Cu'par, the county town of Fifeshire, on the Eden, 27 miles N. by E. of Edinburgh. The principal manufactures are linens and bricks, and there are breweries, tanneries, and flour-mills. C. was erected into a royal burgh by David II. in 1363. Sir David Lyndsay's satiric interlude of *The Three Estatis* was acted in 1555 on a mound at the E. end of the town, on which stood an ancient castle of the Macduffs, Thanes of Fife. C. is one of the parishes constituting the E. division of the county, which returns one member to Parliament. Pop. 4729.

Cu'pid (Lat. *cupido*, from *cupio*, 'I desire'), a modification of the Greek Eros, when his worship was transferred from Greece to Rome. He is generally described as a son of Venus, either by Mercury, Mars, or even by Jupiter. C. was the god of love, who swayed alike gods, men, and all living creatures. His attributes are the bow, arrows, quiver, and golden wings, and from the blindness of his action he is often represented with bandaged eyes. Originally conceived of as a model of perfect youthful beauty, he gradually came to be represented as a chubby boy.

Cu'pola (Ital. from the same root as the Eng. *cup*) is the concave ceiling or vault forming the roof of a building. See Dome.

Cu'pola, a small blast furnace used for the re-melting of raw pig-iron in order that it may be cast into suitable forms in the Foundry (q.v.).

Cupp'ing, a surgical operation now somewhat rare, but at one time so frequent that it was generally performed by specialists called 'cuppers.' It is of two kinds—*dry C.* and *wet C.* The former consists in producing congestion of a part; the latter, in abstracting blood from a part to which dry C. has just been applied. The instruments necessary for the purpose are—(1) a glass resembling a common tumbler; (2) a spirit-lamp (when these are not at hand, a candle and a common tumbler will serve the purpose); and (3) when wet C. is to be performed, an instrument containing lancets (scarificator) to pierce the skin, that blood may be withdrawn. The lancets are concealed within the instrument, and by moving a trigger they project through slits and cut the skin. Their number varies, but they are so arranged as to cut exactly to the required depth. In C. the part is first sponged with hot water, which produces local congestion. The air is exhausted from the glass by means of the spirit-lamp, and the glass is then quickly placed on the part already sponged. This increases much the flow of blood to the part. This part of the operation is dry C. The scarificator is now applied, which cuts the skin, and the glass having the air re-exhausted by the spirit-lamp is again applied, and is now rapidly filled with blood. The number of glasses will depend on the amount of blood to be abstracted; each glass takes about four or six ounces of blood. The lancets must be so arranged as only to cut through the true skin; when they cut deeper, the fat underneath the skin prevents the free escape of the blood.

Cu'pule, the cup in which the fruit (acorn) of the oak and the nut of the Spanish chestnut is contained, and is a sort of involucre composed of a number of adherent bracts. It is also applied to a cuplike body found in some fungi, such as *Peziza*.

Cupulif'eræ, or **Coryla'ceæ,** the Oak or Mastwort order, a natural order of Dicotyledonous plants, consisting of trees and shrubs, abundant in the forests of temperate regions, though a few are found in the highlands of tropical and hot climates. In all about 300 species, distributed over eight or nine genera, are described. The oak, hazel, chestnut, hornbeam, are the best known. C. are mainly important for producing excellent timber, though the seeds of many of them are edible, and others have astringent barks and cupules.

Curaça'o, one of the West India Islands, lies E. of the opening to the Gulf of Maracaibo, about 75 miles off the

Venezuelan coast, S. America. Area, 210 sq. miles; pop. 27,254. The capital, Willemstadt, is situated on the south coast. Like the neighbouring islands of Aruba (pop. 7888) and Buen Ayre (pop. 4053), C. produces tobacco, maize, figs, coconuts, citrons, oranges, &c., and carries on an export trade in maize, beans, cattle, salt, &c., chiefly with the contiguous coast. It gives name to a liqueur (*curaçoa*) or sweetened spirit, which owes its peculiar flavour chiefly to the rind of Curaçoa Oranges (q.v.). In addition to that ingredient, a proportion of cinnamon, mace, and other sweet spices is used in the preparation of curaçoa. Besides this liqueur, some wines are exported from the island which are remarkable for their delicate flavour and freedom from any alcoholic fire. C. was discovered by the Spaniards in 1527, conquered by the Dutch in 1634, taken by the English in 1807, and restored to the Dutch in 1815.

Curaço'a Oranges, the immature fruits of the ordinary Seville or bitter orange, *Citrus vulgaris* of Risso. They are valued for their rind, which has a very pleasant aromatic odour and a bitter taste, and is largely used in medicine as an aromatic tonic, and in the preparation of the favourite liqueur *curaçoa*.

Cu'rarine is an Alkaloid (q.v.) contained in *curara*, *urari*, *woorara* or *woorali*, a resinous substance used by the S. American Indians to poison their arrows. C. is an amorphous body with a bitter taste. It acts as a violent poison when introduced directly into the blood, but is comparatively harmless when swallowed. Its physiological action is peculiar, for it paralyses the nerves of motion without affecting those of sense.

Curass'ow, or **Hocc'o,** a family of Rasorial birds (*Cracidæ*), representing in America the Old World pheasants. The bill is arched, the nostrils are basal, the wings short and rounded, the tail long and very broad, the tarsi stout, the toes slender, and the hind toes as long, and situated in the same plane, as the front toes. The common crested C. is as large as a turkey, and occurs in Brazil and Guiana. Its colour is black, the belly and tail-crests white. The head has a crest of tufted feathers. The red C. has been domesticated in Holland. Another species, the Pauxi or *Ourax pauxi*, has a knob or tubercle at the base of the bill.

Red Curassow.

Cu'rate (lit. 'one who has the *care* (Lat. *cura*) of souls') is the lowest degree in the Church of England. By 1 and 2 Vict. c. 106, where an incumbent does not duly reside, the bishop is empowered to grant a certain fixed salary to the C. out of the proceeds of the benefice. This shall not be less than £80 a year, unless the value of the benefice is under £80 a year; in which event the salary of the C. shall be the full value of the benefice; nor less than £100 or than the value of the benefice (if under £100), where the pop. amounts to 300; nor less than £120, where pop. amounts to 500; nor less than £135, or than value of the benefice (if under £135), where pop. amounts to 750; nor less than £150 or than value of benefice (if under £150) where pop. amounts to 1000 persons. Higher stipends and more curates may be assigned for more populous parishes and more wealthy benefices. In special circumstances the bishop may assign smaller stipends than those mentioned in the statute, but must record the particulars of the case in a book kept in the diocesan registry and open to inspection by leave of the said bishop. Under the Pluralities Amendment Act, 1885 (48 and 49 Vict. c. 54), the bishop is empowered by sections 8—10 to assign extra stipend up to £70 in certain circumstances; may appoint two or more curates, and may assign to each curate a stipend not exceeding £200 or net income of benefice.

Curatell'a, a genus of small Dillineaceous trees from tropical Africa, the rough leaves of one of which, the American C., are used in Guiana for polishing.

Cura'tor, a kind of guardian appointed by the Court of Session in Scotland. The powers and duties of curators vary with the nature of their appointment, and the condition of those over whom their guardianship or curatory extends. They may be classed as *C. to a minor*, *C. to an idiot*, *C. bonis*, and *C. ad litem*.

Curator to a Minor.—A minor in Scotland, until he arrives at puberty (see AGE), which in males is fourteen and in females twelve years, is under the guardianship of a tutor. (See PUPIL, TUTOR.) From puberty to majority he is under a C. The guardianship, in both cases, vests without legal formality in the father, unless the child is forisfamiliated. (See FORISFAMILIATION.) When the father is dead, or legally disqualified, the minor has largely the choice of his curators, but their appointment requires the sanction of the court. All deeds executed or contracts entered into by a minor without consent of his curators are ineffectual against the minor, but they may be held binding on the other party. The term in English law corresponding to C. to a M. is *Guardian* (q.v.).

Curator to an Idiot (or *deaf and dumb person*, or *furious person*, or *lunatic*), is appointed under a brieve of the Chancery. (See BRIEVE.) He is entrusted with the person as well as with the estate of his ward. The court appoints to the office the nearest male relation on the father's side, except when a wife is fatuous; in which case the husband becomes C. Curators to insane persons are subject to the provisions of the Pupils' Protection Act (q.v.).

Curator Bonis.—When an heir is deliberating whether or not he shall enter (see ENTRY OF AN HEIR), when an infant is without a tutor, when a succession opens to one resident abroad, when trustees have declined to accept or cannot legally do so, and in similar cases, the court appoints a C. B. He is subject to the rules contained in the Pupils' Protection Act and its amendments, in the relative Acts of Sederunt, and in the Notes of the Accountant of the Court.

Curator ad Litem is appointed by the court to attend to the interest of a minor in a lawsuit or in other judicial proceedings. When a minor has curators at the beginning of legal procedure, they act as *curators ad litem*. The C. ad L. is not obliged to give caution because he has no intermeddling with the minor's estate—he is simply appointed for a special purpose, and when that ceases his office does so also.

Curb, in veterinary science, means a strain of the extensor ligaments or tendons running down the back of the 'hock' in horses. This lesion occurs chiefly from sudden starts or great exertion, or from the effort made in keeping back a heavy load in descending a hill. The symptoms are swelling and inflammation in the joint, and consequent lameness, which may disappear afterwards, when the animal has been exercised for some time. The treatment consists in rest and fomentations during the active stages of the inflammation, together with cold applications afterwards, and blistering to allay any tendency to swelling that may remain.

Curcu'ligo, a genus of herbaceous plants of the natural order *Hypoxidaceæ*, natives of S. Africa and tropical Australia and India. The fleshy roots of some species (like *C. stans* of the Ladrone Islands) are eaten. Most of the genus is bitter and aromatic.

Curcu'ma, a genus of annual plants of the natural order *Zingiberaceæ*. Turmeric (q.v.) consists of the old tubers of *C. longa* and other species. The young tubers are colourless, and furnish a kind of arrowroot. East India arrowroot, or C. starch, is obtained by bruising and powdering the tubers of *C. angustifolia*, and then throwing the powder into water. Starch is also obtained from *C. rubescens*, *C. leucorhiza*, &c. Zedoary tubers, used in India as an aromatic tonic and as a perfume, are furnished by *C. aromatica* and *C. Zedoaria*.

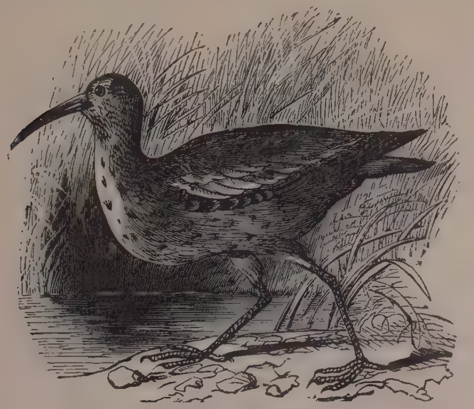
Curd (casein of milk) is a composition similar to the fibrin of wheat, the legumen of bean and pea, and the albumen of egg. It has been suggested by Mulder—and the suggestion is generally accepted—that the cheesy matter in milk is derived directly and without much change from the food upon which the animals live. From a gallon of new milk 1 lb. of C. is produced on the average, but Alderney and Guernsey cattle will give more. According to Dr. Voelcker, the ultimate elements of C. are carbon 53·57, hydrogen 7·14, nitrogen 15·41, oxygen 22·03, sulphur 1·11, and phosphorus 0·74 per cent. Curds-and-cream form a delightful dish, for which Devonshire and Cornwall are specially famous.

Cur'few (Fr. *couvre-feu*, 'cover fire'), the tolling of the church-bell at eight o'clock, or some other hour in the evening, as a signal for the people to put out their fires and retire for the night. The introduction of this practice into England has been ascribed to William the Conqueror, who is said to have used it as a means of preventing the English from assembling in the evening to concoct plans of rebellion. The tradition is sufficiently ludicrous. There can be little doubt that it owed its introduction into England to the same cause that made it common throughout Europe—viz., as a regulation to prevent fires, which were very frequent when houses were built of wood. The evening-bell, still rung in many places in England, is called the C., and though the original signification has long passed away, the word has won an abiding-place in our language, mainly through the line in Gray's *Elegy*—

> 'The curfew tolls the knell of parting day.'

Curl, a destructive disease in potatoes—a variety of chlorosis—in which the tubers 'produce deformed curled shoots of a pallid tint, which are never perfectly developed, and give rise to minute tubers. It is supposed C. arises from the tubers being overripe.' It is a local disease, and quite unknown in many districts (Berkley).

Cur'lew, a genus of Grallatorial or Wading birds, nearly allied to the Snipes, and to the Sandpipers. The bill is long, slender, and curved downwards towards its tip. The face and head are feathered. The tail is short, and the wings, when at rest, reach to the tail. The C. is not migratory. It inhabits the sea-coasts, generally, of the Old World, and also of Australia. Its food is chiefly worms and molluscs, and its cry is of a peculiar shrill kind.


Esquimaux Curlew.

> 'Wild as the scream of the curlew,
> From crag to crag the signal flew.'
> *Lady of the Lake.*

The nest is built among grass or heath. The whimbrel is smaller than the former species, and is also found in Britain, whilst N. American species and the Esquimaux C. are also known.

Cur'ling, a Scottish game on the ice, popular with all ranks. It is usually played on frozen lakes and rivers, though artificial ponds are becoming common. Set matches, called *bonspiels*, are played between rival clubs and parishes, and even between different divisions of the kingdom. A body of rules, generally held as binding, has been issued by the Caledonian Curling Club. C. is played with flattish circular stones, about 9 inches in diameter, from 30 to 45 lbs. in weight, with handles inserted in the upper surface, while the under is carefully polished. A *rink* is formed, from 30 to 40 yards long and 3 broad, at each end of which concentric circles (*broughs*) are drawn, the inner one being named the *tee*, which is the curler's aim—the game much resembling that of bowls. At some distance short of each tee a transverse line is drawn—the *hog-score*—stones failing to cross which are put off the ice. The game is usually 31; the players, four on each side; the last player, or director, being called the *skip*. The game is graphically described in *Guy Mannering*, and Burns' Tam Samson was an adept in it: the following stanza from the humorous *Elegy* contains several of the technical terms of the game:—

> 'He was the king o' a' the core,
> To *guard*, or *draw*, or *wick a bore*;
> Or up the *rink* like Jehu roar
> In time o' need;
> But now he lags on Death's *hog-score*—
> Tam Samson's dead.'

Curr'an, John Philpot, a distinguished Irish barrister, orator, and wit, was born of humble parents at Newmarket, near Cork, 24th July, 1750, studied at Trinity College, Dublin, and the Middle Temple, London, and was called to the Irish bar in 1775. By his power as a ready and sarcastic speaker he speedily reached forensic eminence, and in 1784 entered Parliament, in which he became celebrated as one of the ablest opponents of the policy of the Government towards Ireland. After the Union, to which he was opposed, C. was made, in 1806, Master of the Rolls. He resigned this post in 1813, and retired on a pension to London, where he died, 14th October, 1817. His wit and other attractive social qualities, shown in such books as *Recollections of C.*, will long keep C.'s memory green in the hearts of Englishmen as well as of his own countrymen. See *Life of C.* (Lond. 1819), by his son, J. Philpot Curran, by Phillips, and by O. Regan.

Curr'ant, the common name for various species of plants of the genus *Ribes*, but most generally applied to *R. nigrum* and *R. rubrum*, the black and red C. of our gardens. The red C. is a native of the S. of Europe and of Asia, and perhaps N. America, and is most likely only naturalised in Britain. The white C. is a variety of the red C., the result of cultivation, and in addition there are many other varieties and intermediate forms. The black C. is a native of most woods and the banks of streams in Europe and the N. of Asia. Both it and the red are highly prized for preserving in the form of jams and jellies. It is largely grown in some parts of the Continent for the purpose of making the *Liqueur de Cassis*. There are many other closely-allied species in America, India, &c. The red-flowering C., so common an ornament of our shrubberies in spring, is a native of America to the W. of the Rocky Mountains. It was introduced into Britain in 1826. Its berries, though insipid, are not poisonous. The golden C. is an ornamental shrub from the same regions, producing a fine-flavoured berry. The term C. is applied in Australia to *Leucopogon Richei*, one of the *Epacridaceæ*. Its berries are wholesome. The Indian C. of America is the snow-berry. The native C. of New S. Wales is also *Leucopogon Richei*, while the same name is given in Tasmania to some species of *Coprosma* (natural order *Cinchonaceæ*). The grape-C. is a kind of raisins or dried fruit of the Corinth or C.-vine, a small variety of the ordinary vine, cultivated chiefly in the Ionian

Islands. They are most extensively used in cakes and puddings, but of themselves are highly indigestible.

Currant-Wine, a beverage prepared from the fermented juice of the berries of the red currant, to which a proportion of sugar is added. C.-W. is a favourite domestic preparation, and a wholesome and pleasant drink. A kind of liqueur is similarly prepared with the more strongly flavoured black-currant berries.

Curr'ency, the name applied to the medium of exchange or circulating medium used at any time and place. Its uses, direct and indirect, are obvious: the chief are the establishment of one mode of calculating value, the facilitation of exchange where barter could not take place, and the saving of expense and trouble in the exchange itself. Each of these primitive advantages suggests a great expansion of commerce. They have been realised separately: as (1) in the African conventional unit or *macute*, which had no physical existence at all; (2) in the cattle and fur C. of many nations without foreign trade. Now, however, the precious metals are universally recognised as the best basis for exchange; and by the mercantile school were long considered as the only permanent wealth; a fallacy which led to the early prohibitions of importation and the bounties on exportation. The durability and divisibility of gold and silver, their uniform quality when pure, and the facility with which the quality may be tested, have secured them the first place; copper deriving its C. chiefly from the mint-mark, and from being confined to small transactions. Copper was, however, extensively used at Rome, and iron was exclusively used at Sparta. The C. metals fluctuated little in intrinsic value (although the occasional discoveries of gold-fields, *e.g.*, in Australia and California, produced wide and sometimes violent effects on trade), but it was necessary to prevent fraud that the central Government (wherever such existed) should guarantee the purity of the C., and direct that it should be accepted. Hence state coinage and the prohibition of private coining, a privilege which was frightfully abused in systematic debasement by the later Capetian Kings of France and by the Roman Emperors of the East, &c. In Scotland (where James I. had directed the money to be of the like weight and fineness as that of England), there were mints in Edinburgh, Aberdeen, Perth, Dumbarton, Roxburgh, Stirling, Glasgow, and Linlithgow. Notwithstanding this variety of local coinage, there was a great dearth of C. in Scotland; and the 'sterling' silver penny of the English Plantagenets (which had taken the place of the silver penny of the 'Easterlings' or Baltic trading communities) varied so much from the Scots money, that ultimately £100 Scots was equivalent to £8 6s. 8d. of sterling money. An Act of James II. (1456) tried to retrieve the C., by enacting that several foreign coins in use, such as Henry nobles, dolphins, Rhenish guildings, &c., should 'be cried,' or pass for more than their intrinsic value; and that the coins were to remain in the country. In England, the rude process of minting by shears and hammer had led to extensive clipping and to the institution of the horse-mill. The clipped coin, not being called in, displaced the milled coin; and this produced a state of uncertainty and injustice from which the nation was rescued in 1695 by the Coinage Act, due to the joint efforts of Locke, Somers, and Montague. The new C. was restored to its ancient weight and fineness, and the clipped money was made illegal tender after a certain date. When the milled silver was fully in circulation, the price of the golden guinea fell from 30s. to 21s. 6d. At the Treaty of Union a uniform C. was adopted for England and Scotland, compensation being given for losses through change of denomination. The Scots merks (1½d. more valuable than the English shillings) were called in by 'unpremeditated proclamations;' but the premium was claimed for £40,000 worth of English shillings which had been circulating in Scotland as equivalent to Scots merks. In spite of the facilities for smuggling and melting afforded by the small bulk of the precious metals, the British system has survived a good many commercial crises. The value of the C. depends, in the first place, on the supply (*i.e.*, all money in actual circulation) and the demand (*i.e.*, all goods offered for sale); in the second place, supply and demand remaining constant, it depends on cost of production. The relation between the C. and prices is, however, considerably modified by the use of bills of exchange, accommodation bills, promissory-notes, and cheques. These are the instruments of credit. The experiments made in inconvertible paper C., such as the *assignats* of the French Revolution, show that while the substitution of a paper for a metallic C. held in reserve is a national gain, any further increase of paper is a national robbery. The Austrian irredeemable paper florin varies in value from 11 to 7 *grammes* silver. Accordingly, not merely the Bank of England, but the banks of issue in Scotland, are carefully restricted in their note-issue by reference to their store of bullion. From 1797 to 1819 the cash payments of the Bank of England were, in consequence of the war, suspended, large hoards of bullion being required for military purposes; and there was, at one time, a controversy whether the resumption of cash payments, under Peel's Act of 1819, did not unduly benefit those who had advanced money to the state during the depreciation caused by the suspension. The present system of banking in Great Britain was settled by Peel's Bank Charters Acts, 1844-45 (7 and 8 Vict. c. 32, and 8 and 9 Vict. c. 38). In 1893 the number of pieces struck at the Royal Mint was estimated at 78,380,020, representing value to the amount of £10,789,523 17s. 3d. Of these coins 16 denominations were required for the Home circulation, while 18 more were for use in the Colonies. The profit to the Mint amounted to £206,604 17s. 9d. The value of silver per ounce was 3½d. less than in 1892; and since then it has fallen still lower. As an example of the depreciation of silver, it may be stated that, whereas the silver dollar in use in the Far East was valued at 3s. 11¼d. in 1890, in 1895 it had sunk to 2s. 2½d. The Indian rupee, which used to be exchangeable at 2s., is now worth only 1s. 4d. There the mints have been closed for the coinage of silver.

Curr'ents, Ocean. In treating of these, the most permanent of oceanic movements, we shall first enumerate the more important C., of which careful charts are annually prepared by the British Admiralty, and then consider the physical causes which give rise to the phenomena.

According to Captain Duperrey, there are three great C. flowing N. out of the Antarctic Ocean. The *first* flows in a generally easterly direction, till it strikes the W. coast of S. America. Here it divides, the one branch travelling southward, warming the shores of Patagonia, rounding Cape Horn, and then striking E. by N. towards the S. of Africa, uniting at the same time with the *second* Austral current. This combined current separates at the Cape of Good Hope into two branches, the one flowing eastward to Australia, and ultimately mixing with the westerly equatorial C. of the Indian Ocean, the other striking N. along the W. coast of Africa as far as the Gulf of Guinea, where it is turned out across the Atlantic in a due westerly direction towards Cape St. Roque, in S. America. Here it divides, the one branch coasting down by Brazil till it meets the first Austral current, the second continuing in a north-westerly direction towards the Caribbean Sea and the Gulf of Mexico, which it enters, and is then deflected through the Strait of Florida across the Atlantic towards the N.W. coast of Europe, constituting the Gulf Stream. The Gulf Stream divides at the Azores, one part still directing itself towards the N.W., and washing, through the agency of its numerous ramifications, the shores of Spain, France, Great Britain, Ireland, Denmark, Norway, and Spitzbergen, the other part turning S. then W., thus forming the N. equatorial current, which is separated from the S. equatorial by a narrow reversed current flowing towards the Gulf of Guinea. Returning now to the point at which the *first* Austral current breaks on the W. coast of S. America, we may trace the course of the northern branch. After coasting along by Chili and Peru, it is deflected across the Pacific towards the E. Indies, constituting the great S. equatorial current of the Pacific. It is much broken up by the numerous islands of Australasia; and a portion of it travels S. to the E. coast of Australia, where, making a detour, it mingles its waters with the *third* Austral current, which, after flowing E. along the S. coast of Australia, has now struck N.E. towards New Zealand. In the N. Pacific, a *drift-current* (one due to the action of a prevailing wind), flowing E., then S.E. along the N. American coast, is reversed off the Californian seaboard, and returning towards China, forms the N. equatorial current of the Pacific, which is separated from its companion current by a narrow easterly-directed current, as in the case of the corresponding movements of the Atlantic. A portion of the N. equatorial flows up to Japan; but the greater part turns N. and N.E., uniting with the original drift-current of the higher latitudes, thus forming an endless circulating stream of water. The branch of the *second* Austral current which flows eastward to Australia, uniting with a portion of the *third* Austral stream, turns N., and ultimately, as before mentioned, forming the westerly-directed current of the Indian Ocean, gives rise to the Mozambique current between Africa and Madagascar, which is continued S. to the Cape of Good Hope; but here it is stopped by the opposing current from the W. and turned back towards Australia. Of the C., which have their origin in the N. Polar seas, the most important is the Labrador current, which, travelling S. past Labrador and Newfoundland, has been recognised in the *Challenger* soundings in a cold sub-current far S. off the United States coast. These are the principal constant C. There are others, however, deserving notice, which occur especially in the Indian Ocean, and flow one way in summer and the contrary way in winter. Others again appear and disappear in such a desultory manner that they are as yet little understood. The most interesting and important of these O. C. to Europe is undoubtedly the well-known Gulf Stream, whose temperature, higher as it is than that of the waters through which it passes, must have a considerable effect in modifying and equalising the climate of Western Europe. It would be wrong, however, to give this ocean river the whole credit for the great difference existing between the moist, temperate climate of Scotland and the cold, bleak, and frigid climate of Labrador. The prevailing W. and S.W. winds, laden with vapour due to the evaporation of the waters of the Atlantic, are perhaps as important an element in the phenomenon. The Gulf Stream is not distinguishable from the surrounding water in our latitudes, but in the earlier part of its course it is distinctly marked off, being of a deep-blue tinge, and having at its margin an evident fogbank, produced by the condensation of the water vapour as it passes from a warmer to a colder atmosphere. As it enters the Atlantic, it has a velocity of five miles an hour, and a temperature of 89° Fahr.—some 12° warmer than the adjacent sea.

The great cause of O. C. is the action of prevailing winds. The equatorial trade-winds, for instance, induce upon the ocean a surface flow; and as an outflow must necessarily give rise to an indraught, we have here an explanation, taking into account the effect which the distribution of land must have, of the generation of the great African and S. American coasting C., the occurrence of endless streams of circulating water, and the existence of the Austral C. Other causes, of course, may be at work, yet the great *general* cause is probably the effect of aerial C., which arise from differences of temperature and pressure. The rush of waters out of the estuary of some large river may be felt for hundreds of miles out to sea; differences of salinity and temperature may also give rise to ocean movements; but it seems impossible that such causes could produce streams so constant in direction and rate of flow, so river-like in their comparative narrowness, and so easy of recognition, as these O. C. are. In 1844 Captain Maury, one of the first to show the importance of charting the various C., attempted to prove the existence of a general polar set of equatorial water, accompanied by a creep of polar water along the bottom towards the equator. His reasoning was based upon the lower temperature and less salinity of polar as compared with equatorial water. But if the assumption concerning the salinity be true, it would be physically impossible for polar water to descend below equatorial water, because of the necessarily less specific gravity of the former. Dr. W. B. Carpenter, however, dropping the salinity point, has argued that there must be what he calls a *vertical* circulation of the nature above mentioned, because the sinking of the heavy polar surface-water, due to its low temperature, must be accompanied by a surface influx of a specifically lighter water, which therefore must come originally from the equator. The equilibrium is restored by the flow of the cold polar waters along the ocean-bed towards the equator. Owing to the greater velocity of rotation at the equator than at higher latitudes, this surface-set must gradually shoot ahead of the earth, and therefore have a general motion to the N.E. or S.E., according as the flux is towards the N. or S. pole; and the respective return under-surface flows must be directed towards the S.W. and N.W.

The best current-charts are those of the Admiralty, that in W. and A. K. Johnston's *Physical Geography*, the one in Stieler's *Hand Atlas*, and those in Maury's *Physical Geography of the Seas*.

Curri'e, James, M.D., the biographer and editor of Burns, was born in Dumfries-shire, 31st May, 1756, studied medicine at Edinburgh, and settled as a practitioner in Liverpool in 1781. He died at Sidmouth, 31st August, 1805. His edition of Burns realised £1400 for the benefit of the widow. A professional work, *Medical Reports on the Effects of Water as a Remedy in Febrile Disease* (1797), showed that his views on this subject were in advance of the time.

Curr'ycomb, an iron comb for currying or dressing down horses. It is made up of several notched plates fastened to an iron back parallel to each other.

Curr'y Pow'der, a condiment of East Indian origin, very extensively employed in Oriental food, and at the same time a favourite stimulant relish in European countries. It is a very complex preparation, the leading ingredients being ground capsicum and turmeric powder, to which are added ground corianders and black pepper, with occasionally cardamoms, cummin, fenugrek, &c. There are many sorts of curries, which differ not only in the C. P. used, but also in the preparation of the curry. Broadly speaking, there are four curries—Indian, Malay, Chinese, and European, of which the first two are the most palatable. Chinese and European curries are spoilt by being too liquid; they are usually of a bright yellow, whereas the Indian and Malay are of a brown colour. The Indian curry may be 'dry,' but the Malay is always served with a thick curried sauce.

Rice is taken with all curries. The European cook is satisfied with adding a few pickles to the curried meat, beef, mutton, rabbit, chicken, fish, or pork. The Chinese cook sends up, with the curry, dried fish and sliced vegetables. The Indian and Malay curries mean several curried meats with numerous additions or sambals, as they are called, each served on a little saucer by itself. Thus the curry may consist of a plate of curried fowl, another of curried fish, another of curried prawns, another of curried eggs, and others of several curried fruits, of vegetables interspersed with prawns or shrimps boiled with them, dried fish, fresh ground capsicum, raw prawns or shrimps made into a paste and mixed with cayenne, small boiled cucumbers, shaved coconut kernel, hard-boiled eggs, and pickles. The eater helps himself from the rice bowl, and then from any or all of the dishes of curried meats and sambals.

Cursing, Letters of. Previous to the Reformation letters of excommunication by the Church were termed L. of C.

Curso'res, the order of Running birds represented by the *Struthionidæ* or ostriches, rheas, emus, and cassowaries, and the *Apterygidæ* or New Zealand *Apteryx* (q.v.). This order is distinguished by the flat nature of the breastbone or sternum, by the rudimentary wings, by the length of limbs, and by their muscularity, adapting them for running. The hinder toe is wanting in all but *Apteryx;* the ostriches have two toes only, while the others have three toes. The claws are blunt nails, and the under surfaces of the toes are broadened to form soles in running. The barbs of the feathers are unconnected and loose. The pelvis (as in the ostriches) is unusually strong and firm, and in these latter birds the pubic bones unite to form a *symphysis*—a conformation seen in no other bird. The C. correspond to Huxley's division *Ratitæ*, or those birds with flat shield-like breastbones.

Cur'tilage, a legal term in England for a courtyard or piece of ground lying near and belonging to a dwelling-house, beyond which limit housebreaking cannot be said to have been committed by an intruder.

Cur'tis, George William, author and editor, was born in Providence, Rhode Island, 24th February, 1824. In 1842 he joined the once-famous 'Brook Farm Association,' and went through that curious phase of existence for eighteen months. He then proceeded to Concord, the home of Emerson and of the transcendental philosophy of New England, visited Europe in 1846, and returned to America in 1850. C. was then employed on the staff of the *New York Tribune*, and wrote *Lotus Eating* (1851); became editor of *Putnam's Monthly*; and from 1853 spent much of his time as a popular Lyceum lecturer. He also edited *Harper's Weekly* and *Harper's Monthly*. Among his other works may be mentioned *Potiphar Papers*, *Howadji in Syria*, and *Prue and I*.

Curtis'ia, a genus of *Cornaceæ* (q.v.). *C. faginea* of S. Africa furnishes the wood from which the natives make their spear or *assagay shafts*; hence the tree is usually called Assagay-tree or Hassagay-wood.

Cur'tius, Ernst, a German antiquary and philologer, was born at Lübeck, 2nd September, 1814. He studied philology at Bonn, Göttingen, and Berlin, was appointed professor at Berlin in 1844, and also, in the same year, tutor to Friedrich-Wilhelm, Crown-Prince of Prussia. In 1856 C. accepted the Professorship of Philology and Archæology at Göttingen, a post he held till 1865, when he was removed to a similar chair at Berlin. He became, after 1853, a member of the Academy of Science at Berlin, and after 1870 director-general of the museums of the same city. He wrote much, and among his works may be mentioned *Anecdota Delphica* (Berl. 1843), and *Peloponnesos* (Gotha, 1851-52), a scientific and pictorial delineation of the Greek Peninsula, embracing its history, legends, and monuments of art.—**Georg C.,** brother of the preceding, also a famous philologer, was born at Lübeck, 16th April, 1820. He studied philology at Berlin and Bonn, and gained his degree of doctor at Berlin in 1842, by an essay *De Nominum Græcorum Formatione*. He was subsequently professor at Dresden, Berlin, Prague, and Kiel, till in 1862 he was appointed Professor of Classical Philology and joint-director of the classical seminary at the University of Leipzig. He died 12th August, 1885.

Curtius, Mettus or **Metius,** according to Roman legend, was a noble youth who, when the Forum had opened in 362 B.C., and the soothsayers had declared that the chasm could only be filled by throwing into it the most valuable possession of the state, exclaimed that the greatest wealth of the state was a brave citizen in arms, and mounting his horse in full armour, leapt into the chasm, which immediately closed over him.

Curtius, Rufus Quintus, a Roman historian, author of the very inaccurate work *De Rebus Gestis Alexandri Magni*, is supposed to have lived in the time of Vespasian. The first two books of the ten of which the work originally consisted have been lost, and there are numerous gaps in the remaining eight. The first edition was printed at Venice, probably about 1471, and among the best modern ones are those of J. Mützell (Berl. 1841) and of Zumpt (Bruns. 1849; 2nd ed. 1864). Investigations as to his age have been published by Niebuhr, Büttmann, and G. Pinzger.

Cur'vature of a plane curve is the rate of change of direction per unit of length of a point supposed to be moving uniformly along the curve. It is thus seen that the C. of a circle is the same at every point, and that it varies inversely as the radius—the less the C., the larger the circle. Take any three consecutive points on the curve, and let the length of the arc between the first and third be $\delta\varsigma$, and the angle between the tangents at these two points $\delta\theta$. If the arc be very small, it may be treated as a part of a circle, when $\delta\theta$ may be taken to represent the angle between the radii of C. Hence we have ultimately, as $\delta\varsigma$ is taken smaller and smaller, $r\delta\theta=\delta\varsigma$; and therefore, taking the limit, the C. is $\frac{d\theta}{d\varsigma}=\frac{1}{r}$, where r is the radius of C. The method commonly employed for obtaining an expression for r at any point, is to find the circle which has contact of the first and second order with the curve at that point. A curved line not confined to one plane is called a curve of double C.

Curve, as defined by Euclid, is a line no part of which is straight. In analytical geometry, however, there must be some definite relation between its Co-ordinates (q.v.) which is expressible by an equation. Curves whose equations contain only powers of the co-ordinates are termed *algebraic*; but if other functions, such as sines, tangents, logarithms, enter, they are called *transcendental* curves. Curves are classified according to the *number* representing the highest power of the co-ordinates. The straight line is of the first order; the conic sections are of the second, and are called quadrics; the cissoid and witch are of the third order, or cubics; and the conchoid and cardioid are of the fourth, or quartics. For many curious properties of some of these higher curves, see Salmon's *Higher Plane Curves*.

Curves, Anticlinal and Synclinal, are geological terms applied to the ridges and troughs of undulating strata. The former are indicated by the same series of strata dipping away on both sides from an imaginary line parallel to ridges, and the latter by the same series dipping towards a corresponding line from both sides of it. Thus a valley may be, and very commonly is, really an anticlinal curve; and these C. often occur in continual succession over a plane area, so that the physical configuration of a district can be no indication of the geological structure. The imaginary lines about which the beds may be supposed to be bent are termed respectively the *anticlinal* and *synclinal axes*. Very perfect examples of these C. are found in the Swiss Jura.

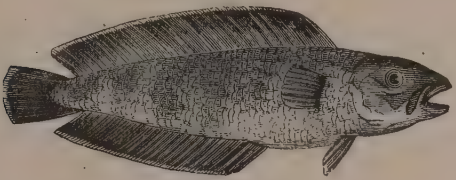
Cur'wen, the Rev. John, founder of the Tonic Sol-fa method of teaching music, was born at Heckmondwike, Yorkshire, in 1816, and educated at Coward College and University College, London. He became an Independent minister in 1838, and a few years afterwards his attention was called to the subject of teaching children music in connection with his Sunday-school. In 1841 he visited Miss Glover's school at Norwich, and afterwards tried her system with some success. His own notation and system (see TONIC SOL-FA SYSTEM) he developed gradually from this time, without any idea at first of the revolution it would effect in the musical education of the country. C. became pastor of the Congregational church at Plaistow, Essex, in 1844, and retained his charge until failing health and the growing cares of his musical work, which he felt it his duty to carry on, compelled him to resign in 1865. In 1876 he was President of the Tonic Sol-fa College, an institution founded by him in 1862 to grant certificates of proficiency in music and promote musical culture. C. devoted most of his time to the duties of this office, to the publication of the *Tonic Sol-fa Reporter*, and to spreading the knowledge and love of music among the people. He died 6th May, 1880.

His works include a *Grammar of Vocal Music*, a number of courses of lessons and exercises in choral singing adapted to different classes, a book on analytical harmony, *How to Observe Harmony*, *Commonplaces of Music*, *Lectures on Psalmody*, &c.

Curzo'la (anc. *Corcyra Nigra*, from its dark pine forests; Slav. *Karkar*), a beautiful island in the Adriatic, off the coast of Dalmatia. It is 25 miles long, with an average breadth of 4 miles; area, 68 sq. miles; pop. 16,148, chiefly engaged in the coast-fisheries. C. is still for the most part covered with wood, the pine attaining a great size and yielding excellent ship-timber. There is a town of the same name in the N.E. corner of the island with a pop. of 6093.

Cuscuta'ceæ, the Dodder order, a natural order of corollafloral Dicotyledons, considered by some as a sub-order of *Convolvulaceæ*, consisting of leafless parasitic climbing plants. There are about fifty species, included under four genera, chiefly natives of temperate climates. They possess acrid properties, and are often destructive to flax, clover, and other crops round which they climb. After the suckers get attached to the stem of the plant on which it is climbing, the dodder separates its connection with the soil. See DODDER.

Cusk, a member of the *Gadidæ* or cod family. It possesses a long body and one dorsal fin, which runs along the whole back, besides ventral fins and a barbel at the chin. The European and American Cusks are said to be distinct species. The colour of the latter is brown or yellow, or white with brown spots. This fish is from 2 to 3 feet in length, weighs from 4 lbs. upwards, and is caught off the Canadian shores. The European C. is met with between the Shetland Isles, Norway, and Iceland. The fishermen salt and dry it. It is very like the American C.


American Cusk.

Cusp (Lat. *cuspis*, 'a point'), in geometry, is a stationary point of a curve, at which there are two branches with a common tangent. When the branches are both on the same side of the tangent, the C. is *ramphoid;* when on opposite sides, *seratoid.*

Cuss'o, or **Kouss'o,** the flowers and tops of *Brayera anthelmintica*, a tree about 20 feet high, a native of Abyssinia. It belongs to the *Rosaceæ*. It was introduced into Europe about the middle of the present century, and since then has been used medicinally.

Cus'tard (Cymr. *cwstard*, from *caws*, 'cheese' or 'curd;' comp. Lat. *caseus*), a kind of pudding prepared from milk and eggs well whipped up together, and allowed to *set* by the application of heat. The dish is flavoured by the addition of aromatic essences, such as lemon-peel, orange-peel, almond, nutmegs, &c. It is highly digestible and nutritious, and as it takes the most delicate flavours, it can be rendered exceedingly pleasant.

Custard-Apple, the name given to the fruits of various species of *Anona*, S. American and W. Indian shrubs and trees, types of the order *Anonaceæ*. Several are cultivated for the sake of their fruits. The sour-sop of the W. Indies, which often weighs 2 lbs., and has an agreeable acidulous flavour, is the fruit of the prickly Anona. The sweet-sop is a native of the Malay Islands, but is now extensively cultivated in the W. Indies. Its luscious pulp is esteemed by some tastes, and the seeds contain an acrid principle fatal to insects, on which account the natives of India use them powdered and mixed with the flour of the gram as a wash for the hair (Royle). The cherimoyer is considered by the Peruvians as the most delicious fruit in the world. The common C.-A., or bullock's heart, is a native of the W. Indies, but is cultivated in the E. Indies and other tropical countries; it is not so much valued as the other fruits of the genus. The C.-A. is also valued for its fragrant leaves and aromatic woods. The wood of the alligator-apple is used in place of cork; the fruit has a pleasant taste, but is dangerous to eat on account of its narcotic properties; this is the marsh A.

Custard Apple.

Cus'tom. In law, the word is applied to general or local usage. In the former case it falls to be determined by a judge, in the latter by a jury. When the right of an individual arises from usage, it is not called C., but Prescription (q.v.). Uniform C. has almost the same legal effect as statute. C. must be one which, in the memory of man, is without its contrary, has been continued, is peaceable, compulsory, reasonable, sure, and consistent with other customs.

Cus'tomary Freehold is, in English law, a kind of tenure of estate practically the same as Copyhold (q.v.). It is also called copyhold in frank tenure or privileged copyhold. It is held by custom and not, as copyholds are, at the will of the lord, which, however, is of no real importance now. A C. F. passes by conveyance, or surrender, and admittance.

Customs Duties are duties levied on commodities exported or imported. They were first authorised by statute (chiefly on wool, sheep-skins, and leather exports) in the 3rd Edward I., and the mode long employed in their collection was to fix a certain rate of value on each kind of merchandise, and to grant on these rates a subsidy, generally of 1s. per £1 of value in the book of rates. Aliens paid duties. In time the customs became tonnage and poundage; the former on wine, the latter on all other goods. These meant in fact a duty of 5 per cent. on everything which when granted to the Crown were known as *subsidy.* William III. obtained a subsidy of 10 per cent. Dues were fixed on certain things in the reigns of Charles II. and George I., while other dues remained or were imposed irrespectively of these. The whole system remained one of great uncertainty and inconvenience until the Customs Consolidation Act of 1787 abolished all duties and fixed a single duty on each commodity, &c. Further amendments and consolidations were effected by subsequent acts. Importation of the following articles is prohibited under penalty of forfeiture or destruction of the commodity:—Copyright books; extracts or essences of coffee, chicory, tea, or tobacco; immoral books, prints, and similar articles.

Persons may be searched, and severe penalties are enacted against any endeavour to contravene or evade the law. Offering to bribe or reward a customhouse officer is prohibited under a penalty of £200.

The British revenue for the year ending 31st March, 1895, was £82,551,191 (net), of which there was derived from customs £20,115,000 (net).

Legislation regarding customs has various and formidable difficulties to contend with. In the first place, while the exigencies of the Public Revenue (q.v.) make it impossible to dispense with customs, the principles of Free Trade (q.v.) must, in imposing them, be as little contravened as is consistent with that exigence. Then the duty must not be raised to a height which will discourage lawful importation, and make smuggling remunerative. To do this is a double evil—it causes loss to the revenue, and demoralises the people.

Cus'tomhouse is the office at a seaport—or abroad at a frontier or seaport—where the Customs Duties (q.v.) are levied. The collection and management of the customs of the United Kingdom are under the control of a department called the Customs Establishment, at the head of which are a chairman, deputy-chairman, commissioner, and secretary. For the year ending 31st March, 1895, the total cost of all the establishments in connection with the Customs was £835,000.

Cus'tos Rotulo'rum, a principal county justice of the place, who appoints the clerk of the peace and keeps the rolls and records of his county.

Cuth'bert, a monk of Jarrow, who wrote the letter containing a graphic and touching account of the death of the Venerable Bede. C. had been a disciple of Bede, and became afterwards Abbot of Jarrow. His letter is printed in Stevenson's edition of the *Historia Ecclesiastica* of Bede (Lond. 1838). The English reader will find it in Bohn's translation, edited by Dr. Giles.

Cuthbert of Canterbury, a Mercian bishop, obtained the see of Hereford in 736, became Archbishop of Canterbury in 740, and died in 758. He is memorable as the author of a letter to St. Boniface (q.v.) dealing with Church corruptions, which is reprinted in Hussey's edition of Bede's *Historia Ecclesiastica* (Oxon. 1846).

Cuthbert, St., of Durham, the Apostle of Northumbria, was born about 635. He was a native of Bernicia, that district lying between Tweed and Tees, and passed his boyhood at the little lowland village of Wrangholm, on the southern edge of the Lammermoors. The early years of C. gave his character a distinctive bent. He was a shepherd—a seer of visions, as shepherds have been in all ages. As he tended his flock by night, the heavens seemed to open above him, and a crowd of bright angels winged upwards, bearing the soul of St. Aidan to glory. This wonder befell him in his fifteenth year; a nature like his, fervid and simple, was impressed profoundly, and he desired eagerly to become a monk. C. accordingly entered the monastery of Melrose, an offshoot from the older house at Lindisfarne. The youth, however, was no dreaming visionary, but an earnest worker. The semi-heathen people that surrounded him woke his missionary ardour, and he ministered for years among the Northumbrians with equal patience and zeal. Leaving Melrose, he shifted his sphere of labour southward. The Council of Whitby, by its decision that Roman ecclesiastical rule should be adopted by the English Church, caused bitter dissensions in the religious houses. Wearied with these strifes, C., who had become Prior of Lindisfarne, withdrew in 676 to a barren islet off the Northumbrian coast. Building with his own hands a rude hut of turf and driftwood, he wished to end his days as a hermit on this lonely rock. His former career had been one of active effort in spreading his faith, and now he felt that his closing span would best be given up to meditation and prayer. But the fame of his sanctity did not allow C.'s recluse life to continue. Ecgfrith, king of the Northumbrian English, was an ambitious monarch, warring against the Pictish Britons of the N. The presence in his dominion of a man so saintly as C. would certainly bring success, therefore he besought him to return. Bishop Trumwine, whom the Picts had driven from his see, added his entreaties. The venerable saint consented reluctantly, and in 684 again became Bishop of Lindisfarne. Next year King Ecgfrith marched against the Picts, and was defeated and slain at Nechtansmere. C. was said to have foreseen and foretold the disaster. He resigned his bishopric in 687, and retired to the island where he had lived as an anchorite. There he died two months after. A monk of Lindisfarne saw from the watch-tower of his monastery a light on the lonely islet of St. C., which was the appointed signal that the old man was no more. His remains were taken to Lindisfarne, and being found incorrupt at the end of eleven years, the belief arose that so they would continue. Danish attacks forced the monks to bear their precious relic inland, and in 945 it was taken to Durham, where it was thought to work many miracles. After the Reformation the coffin was buried under the cathedral pavement, and remained there till 1827, when it was opened, and the bones of the saint were found.

The character of St. C. resembles strongly that of Columba, only that the former was more of an ascetic. Both were evangelists of an eminently practical nature; neither was distinguished for scholarship or erudition. St. C. was a spiritual enthusiast, and yet a man of strong, firm mind. The union of these qualities gave him his great influence over his countrymen. The reverence bestowed on him in lifetime lasted for generations after he was gone. The Church held as a festival the anniversary of his death, and a cloth which he was said to have used in celebrating mass was carried as a standard by English armies. St. Edmund, St. Thomas-à-Becket, and St. C., rank together as the three foremost saints of the mediæval English Church.

None of the early English ecclesiastics have had so much light thrown upon their lives, both by contemporary records and by later investigation, as St. C. Bede has left an account of him both in verse and in prose. There is also a *Historia Translationis Sancti Cuthberti* preserved in the *Acta Sanctorum*, vol iii., and two works, one a *Life* the other an account of his miracles, by Reginald of Durham. More recent biographies are those of Raine (*St. C.*, Durh. 1828) and of Eyre (*History of St. C.*, Lond. 1849). An interesting sketch of St. C. is given in Green's *Short History of the English People*.

Cu'ticle (Lat. *cuticula*, dim. of *cutis*, 'the skin'), the epidermis or uppermost layer of the skin. It is composed of layers of epidermic cells, which become more and more flattened from the surface of the true skin outwards, until on the surface they form hard dry scales. See SKIN.

Cutis Vera, the true skin, covered by the epidermis, and resting on close connective tissue, in the meshes of which there are often numerous fat cells. See SKIN.

Cut'lass (Fr. *coutelas*, Old Fr. *coultelas*, from Lat. *cultellus*, dim. of *culter*, 'a knife'), a broadsword used by sailors in hand-to-hand encounters. It is about three feet long, is very heavy, and has only one cutting edge.

Cut'lery (Fr. *coutellerie*, from *couteau;* Old Fr. *coutel* and *coltel;* Lat. *cultellus*, dim. of *culter*, 'a knife'), a term under which is included cutting instruments such as pocket and table knives, forks, scissors, razors, scythes, sickles, and machine knives generally. The cutting instruments which were used by the primitive inhabitants of the world, before metallurgical operations were understood, consisted of sharp-edged flakes of flint or other hard stone, which they fashioned with wonderful neatness. Remains of such flint-knives are very abundant. Cutting implements of iron or steel were not fabricated till after a kind of bronze had been long used for the making of knives and all other metallic implements. From very remote times the manufacture of C. has been identified with the town of Sheffield, which to the present day stands at the head of all centres of this industry. Its fame was widespread even in the days of Chaucer, who mentions its peculiar manufacture—

> 'A Shefelde thwittle bare he in his hose.'

The processes through which a piece of C., such as, for example, a razor has to pass, are very numerous, when we consider the low price at which such articles are sold. A razor, selling with case complete for one shilling, has to undergo the following series of operations:—A piece of rolled cast-steel sufficient for the blade is cut off a rod. It is heated and hammered into the rough form of the razor, in which state it is called 'the mould.' The 'tang' is next hammered into shape, and a hole pierced in it for riveting the blade into the scales. It is thereafter 'smithed'—*i.e.*, heated and hammered—into proper shape, and the name and mark of the maker is stamped on it. Next the blade is hardened by heating and sudden plunging into cold water; it is ground at the tip, the back is rounded, the tang finished with the file, and a file-surface given to the inside of the tang. It is then ground on a grindstone, and polished on a wheel covered with buff leather, when it is ready for putting into the scales. The scales of cheap razors are made of horn-tips, which are first shaved and scraped, and next moulded into shape by heat and pressure in moulds of the proper form. These are thereafter polished on the buffing-wheel; the blade is riveted in, and the razor is thus complete. Table-knives go through an analogous series of processes, but there are many different ways of forming and fastening the tang into the handles. In the making of steel forks, a 'web' of steel is beaten out of the required breadth and thickness, and by a powerful stamping-press the prongs are stamped in this web. The piece is then annealed and the prongs cut out of the stamped web. After grinding and pointing, the prongs are opened out, filed, and smoothed. They are then set into their proper position, hardened, ground on a dry stone, glazed, and burnished on a buffing-wheel, when they are ready for handling the same as knives. The tang in forks and knives is usually made of iron, which is welded on to the steel at an early stage of the process. Of recent years machinery has been adapted to the moulding of knives, &c., and in such cases steel is used for the tang as well as the blade. The dry grinding of C. is a peculiarly unhealthy occupation, owing to the particles of steel and silica settling on the lungs and originating 'grinder's asthma.' Many means have been tried to obviate this great evil, often much against the will of the grinders, who prefer short life and high pay to good health and fair wages. The most efficient preventive has been found to be a powerful blast created by fans, drawing away the minute particles by a channel having an opening over each grindstone. Even with this amelioration, and with wet grinding itself, the occupation of grinders remains unhealthy, and the average duration of their lives is much under that of men employed in ordinary healthy trades.

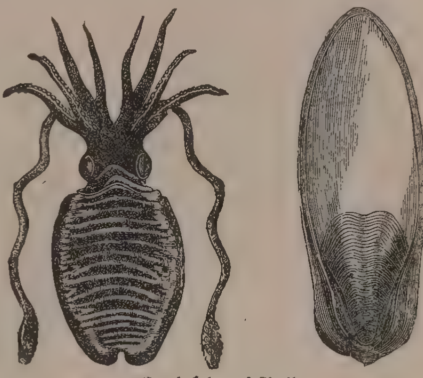
Law as to Cutlery.—By 59 Geo. III. c. 7, articles of C. manufactured with the hammer may be stamped with the *figure of a hammer*, any time after the forging, and previous to the grinding or polishing. Using such device on C. not made with the hammer subjects it to forfeiture, and any one having it for the purpose of sale, or selling it, or exposing it for sale, is liable to a penalty of £5. Furthermore, the penalty is fixed at £5 per dozen for any number of such improperly stamped articles over and above 12 in his possession. Any one stamping on C. the word *London* or *London made*, or words of similar import, unless the article is made in London or within 20 miles of it, or having an article so stamped for the purpose, &c., is liable to a penalty of £10, with forfeiture of the article, and £10 for every dozen of such articles over and above 12 in his possession.

Cuttack' (*Kataka*, 'the fort'), the capital of an executive district of the same name, and capital of the province of Orissa, province of Bengal, India, at the beginning of the Mahanadi delta, 230 miles S.W. of Calcutta. It has little trade, its natural commercial advantages being neutralised by the periodic flooding of the river, to guard against which it is banked round. C. is connected with Calcutta by an irrigation canal. Pop. 47,186. Orissa College is here. C. dated from the beginning of the 11th century, when it was founded by the Long-haired or Lion dynasty, and has continued to be the seat of government ever since. Its position among the canals and hills renders it important, yet its only manufacture is gold and silver filigree work. The *district* is subject to the same vicissitudes as the town, has little trade, but contains iron ore. Area, 3633 sq. miles; population, 1,937,671. The other chief towns are Jajpur (11,992) and Kendrapara (17,647).

Cutt'er (so called from its *cutting* the water in its swift motion) is a small sailing vessel having one mast and is rigged like a Sloop (q.v.). In the navy, a C. is a large Clinker-built (q.v.) boat, of which every man-of-war has at least two.

Cutt'ings are portions of the branches of trees and shrubs inserted into the ground, and which, by sending forth adventitious Roots (q.v.) from the stem, enable the cutting to take root in the ground, and produce a tree or shrub the same as that from which it was taken. It is essential to success that a bud should be left on the cutting, and that the bark should not be stripped off in pushing it into the soil.

Cutt'lefish, the name applied popularly to any member of the Molluscan class *Cephalopoda* (q.v.), in which the body is enclosed in a muscular mantle-sac, the gills being two or four in number, and the effete water of respiration being ejected by an *infundibulum* or 'funnel.' Cuttlefishes are divided into four-gilled, or *Tetrabranchiate*, and *Dibranchiate*, or two-gilled forms. Of the four-gilled forms, the Pearly Nautilus, with its numerous arms, destitute of suckers, its external many-chambered shell, and its want of an ink-sac, is the only living example. The latter group includes all other living cuttlefishes together with the extinct *Belemnites* (q.v.). The *Ammonites* (q.v.) and allied forms are extinct cuttlefishes belonging to the Tetrabranchiate section. Gigantic cuttlefishes have been met with of late off the Irish and N. American coasts. The shell in two-gilled cuttlefishes is internal, and exists as the 'pen' or 'cuttle-bone.' In the Argonaut or paper-nautilus, the shell is external, but it is not a true shell, being secreted by two of the arms, and not by the *Mantle* (q.v.). The two-gilled cuttle-fishes are able to seize prey by means of the numerous *acetabula* or suckers with which their arms are provided.



Cuttlefish and Shell.

Cu'vier, Georges Chrétien Léopold Dagobert, was born at Montbeliard, 23rd August, 1769, where his father had retired after serving with distinction in the French army of the Seven Years' War. His taste for natural history is said to have been first excited by a copy of *Buffon*, the illustrations of which he was copying. By the kindness of the Würtemberg family he obtained a university education at Stuttgart, where he studied natural science in the *Cameralwissenschaft*, or Administrative Science Department of the Academia Carolina. An engagement as tutor in a noble French family living on the coast of Normandy, where he remained from 1788 to 1794, gave C. an opportunity for personal observation of marine animals, which led him to the systematic study of anatomy. A correspondence with Geoffroi St. Hilaire drew C. to Paris, where he made the acquaintance of such men as Lamarck, Jussieu, &c., and was appointed a member of the Commission of Arts and Professor at the Central School of the Panthéon. From this he became Professor of Comparative Anatomy at the Museum, then at the Collége de France, then at the Jardin des Plantes. He also lectured at the Athenæum. C. and St. Hilaire produced together the celebrated *Mémoires sur une Nouvelle Division des Mammifères*, and several others, in which the Linnæan classes of *insecta* and *vermes* were divided into molluscs, insects, vermes, echinoderms, and zoophytes; molluscs being subdivided into cephalopods, gasteropods, and acephala. C.'s celebrated *Leçons d'Anatomie Comparée*, delivered at the Museum, contain the theory of a rational harmony between different organs and their functions, leading to a division into four great types, which was afterwards fully developed in the *Règne Animal distribué d'après son Organisation*, published in 1816. Special lines of inquiry were directed to the systems of digestion and circulation in molluscs, and to fossil remains generally. Especially in the latter inquiry his theory of rational harmonies was of use in filling up the connections between isolated remains, as in his determination of the species of elephants from observation of the teeth and lower jaw and of a drawing of the skulls; also in his classification of the fossil remains of Montmartre. Important services were thus rendered to palæontology and geology, C. and Brogniart making a joint study of the geological conditions of animal life, which the former summed up in his *Recherches sur les Ossemens Fossiles* (1812), to which his *Discours sur les Révolutions du Globe* is an introduction. The *Règne Animal* was intended to furnish not only the outlines of a true classification, but to apply principles so established to all existing groups: the latter design was partly carried out in the *Histoire Naturelle des Poissons*, a work in which C. was assisted by Valenciennes, and in which above 5000 species of fish are described. In the meantime public honours flowed in upon him. He became perpetual secretary to the Institute of the Department of Natural Sciences, an inspector-general for establishing the well-known French *Lycées* or public schools; he drew up the report of 1808 upon Natural Sciences; he was sent on important educational missions to Italy, Holland, and the Hanseatic towns. Before the abdication of Napoleon he was made a councillor of state, and under the Restoration monarchies he held high posts in the bureaux of Education and Public Worship, and as President of the Committee of the Interior for the last thirteen years of his life he effected many useful reforms in the teaching institutions of France. After the Revolution of July he was made a peer. He died 13th May, 1832. In politics C. occupied the position of a moderate Liberal. The closing years of his life were marked by a keen controversy with St. Hilaire, who maintained that real analogies existed even between molluscs and vertebrates, and also that species were variable. See Lee's *Memoirs of Baron C.* (Lond. 1833), and Pasquet's *Éloge de C.* (Par. 1833).

Cuxha′ven, or **Kuxhaven,** a town of N. Germany, in the amt of Ritzebüttel, belonging to Hamburg, is situated at the mouth of the Elbe, on its left bank, 65 miles N.W. of Hamburg by railway. It has a good harbour, a lighthouse, bathing establishments, and is the port from which the Hamburg steamers ply in winter when the Elbe is frozen over. Pop. 8249. In and near C. are five strong forts.

Cuya′ba, the capital of the province of Matto Grosso, Brazil, on a river of the same name, a tributary of the Paraguay, is a naval and military arsenal, has several churches, a hospital, a theological school, &c., and some export trade in gold, diamonds, ipecacuanha, and hides. Pop. 14,096.

Cuyp or **Kuyp, Albert,** one of the most distinguished painters of the Dutch school, the son of Jacob or 'Old' C., a landscape and portrait painter, was born at Dordrecht in 1605. He painted landscapes with cattle, moonlights, winter pieces, canal scenes, &c., and all of them with splendid success. De Waagen says of him—'In elevation of conception, knowledge of aërial perspective, with the greatest glow and warmth of the serene atmosphere, C. stands unrivalled, and may justly be called the Dutch Claude.' It is easy to distinguish in his pictures the time of day intended to be represented. The most ardent collectors of examples of C. have been Englishmen, and the majority of his works—which within the last century have wonderfully increased in value—are in English public and private collections. The precise date of his death, which took place after 1683, is unknown.—**Benjamin C.,** his nephew, painted historical *genre* pictures with much power.

Cuz′co (the 'navel' or 'centre'), the second town of Peru, formerly the seat of the Incas and capital of their empire, situated amid magnificent scenery in the valley of a lofty tableland, at the height of about 12,000 feet above sea-level, and at the distance of over 400 miles E.S.E. of Lima. Its valley is watered by the Gautanai, one of the extreme head-waters of the Amazon. The town, which is regular, is the seat of a bishop, of a so-called university and several schools, a museum founded in 1848, and two hospitals. Among the remains of the Old Peruvian empire are the ruined walls of the temple of the sun and the ruins of the palace of the Incas at the foot of the hill of Sacsahuaman. The citizens produce excellent goldsmith's and lace work, carvings, and cotton and woollen cloth. Sugar-refining, soap-making, &c., are carried on. Agriculture is the chief employment, and the country around is as fertile as it is beautiful. The climate is agreeable and healthy. For an account of the wealth and magnificence of ancient C., see Prescott's *Conquest of Peru*, an authority, however, which certain recent writers have ventured to consider not quite trustworthy. Pop. 28,376.

Cuzco.

Cyan′ic Acid, a liquid substance best obtained by distilling its polymer, Cyanuric Acid (q.v.). C. A. has a very pungent smell, recalling that of acetic acid, and exercises a corrosive action on the skin. When kept for a short time, it suddenly becomes a white crystalline mass of cyamelide. C. A. is a monobasic acid, and forms crystalline salts in which its hydrogen is replaced by metals. When its vapour comes in contact with dry ammonia gas, a white crystalline powder, the cyanate of ammonium, is formed.

Cyan′ogen, a compound of carbon and nitrogen, was discovered in 1813 by Gay-Lussac. It is best obtained by heating its compound with mercury (cyanide of mercury). C. is gaseous at ordinary temperatures, but may be condensed to a liquid by subjecting it to cold or pressure. It has an odour recalling that of bitter almonds, and burns when ignited with a very characteristic peach-coloured flame. It is soluble in water and alcohol. Its solutions, when kept, deposit a brown substance called Para-C., a body having the same percentage composition as C. itself, but probably polymeric with it. (See POLYMERISM.) C. is interesting as affording an excellent instance of a *compound radical* or group of elements behaving like a single element. In its chemical relations it closely resembles chlorine, as will be seen by an inspection of the formulæ in the article on Chemistry.

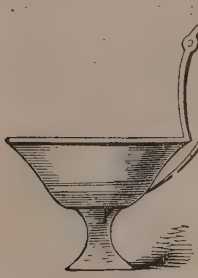
Cyano′sis (Gr. 'blueness' or 'blue disease') is a condition in which there is a blue or purple colour of the skin, due to an admixture of venous and arterial blood, depending in most cases on a malformation of the heart. See HEART, MALFORMATION OF.

Cyan′otype, a photographic process discovered in 1842 by Sir John Herschel, in which sensitive paper is prepared by washing in a solution of citrate of ammonia and iron, and after exposure in the camera, the image is developed by means of a solution of ferrocyanide of potassium, which produces a violet-tinted picture. A solution of carbonate of sodium acts as a neutralising agent and fixes the image.

Cyanu'ric Acid is a white crystalline substance, and a *tribasic* acid, forming crystalline salts in which one, two, or three atoms of its hydrogen are replaced by metals. When strongly heated, C. becomes converted into Cyanic Acid (q.v.).

Cyath'ea, a genus of tree ferns, abundant in S. America, the W. Indies, India, the Malay and Pacific Islands. Some are lofty, and cultivated in our conservatories and gardens. The pulp within the trunk of two fine species of New Zealand and the Pacific Islands is eaten by the natives of these countries.

Cyath'us, a one-handled drinking cup, which the Greeks were in the habit of using also as a ladle whenever they wished to serve the feasters with the wine from their large mixing bowls.


Cyathus.

Cyb'ele, a genus of Trilobites (q.v.) belonging to the family *Cheiruridæ*, in which the body segments number eleven, the caudal shield being composed of few segments. They are found as fossils in the rocks from the Upper Cambrian to the Devonian series, most plentifully in the Silurian system.

Cybele. See Rhea.

Cycada'ceæ, or **Cyca'deæ,** a natural order of Dicotyledonous, small, palm-like, unbranched trees or shrubs, allied to the *Coniferæ* (q.v.), natives chiefly of the temperate and tropical regions of America and Asia, and also of the Cape of Good Hope, Madagascar, and Australia. There are about fifty species and seven genera, of which *Cycas*, *Dion*, *Encephalartos*, and *Zamia* are the best known. The stems and seeds of the plants of most yield mucilage and starch—*e.g.*, inferior sago, prepared from the stems of Cycas of the Moluccas and Cycas of Japan, the latter being known as Japan sago, though none of it is imported into Europe. The seeds are edible, and from those of *Dion edule* the Mexicans prepare arrowroot. *Encephalartos* is Caffre-Bread (q.v.). Arrowroot is obtained from the stems of *Z. integrifolia*, of the Bahamas and other W. Indian islands, though not exported to Europe. Many species of Cycas are found fossil in formations later than those of the Coal measures, such as the Oolite, &c.

Cycadaceæ.—Cone and leaf.

Cy'chla, a genus of Teleostean fishes found in the rivers of S. America, and belonging to the family *Chromidæ*. The typical fishes of Brazil and Guiana belong to this genus. The teeth are minute, but closely set in the mouth, and the colours are very varied and brilliant. The genus *Chromis*, of which the *C. Niloticus* of the Nile is an example, is nearly allied to C. The chromis of the Nile is about two feet long.

Cycla'men, a well-known and distinct genus of perennial herbs belonging to the natural order *Primulaceæ*, with beautiful flowers, heart-shaped leaves, and round, tuber-like root-stocks. Most of them are natives of the S. of Europe, though the genus extends to N. Africa and Western Asia. The fleshy root-stocks, though acrid, are eagerly sought after by swine; hence the plant is known in the popular language of various countries as 'sow-bread.' A stimulant ointment is prepared from the roots of the ivy-leafed C. which, when applied externally by friction, is reputed a powerful vermifuge for children. The active principle of the genus is *cyclamine*, which acts on the animal system like Curarine (q.v.). Many of them are cultivated in our gardens as spring flowers.

Cy'cle (Gr. 'circle'), a name applied, chiefly in astronomy, to a period or interval of time, after the passing of which the same phenomena occur in the same order and circumstances as they did throughout the former period. Cycles are only approximately correct, since the periodic time of no known natural phenomenon is commensurable with our day. The more important articles are mentioned under the special headings Golden Number, Indiction, Metonic Cycle, Period, &c.

Cyclobranchia'ta ('circle-gilled'), a term sometimes used in the classification of Gasteropodous (q.v.) mollusca, and applied to those forms in which the gills are placed in a circular manner round the body, and generally between the 'Foot' and 'Mantle' (q.v.). The cyclobranchiate arrangement is well seen in the Limpets (q.v.), and Chitons (q.v.).

Cy'cloid ('circle-like'), the curve generated by a point taken upon the circumference of a circle rolling along a given straight line. It has many interesting and curious properties, some of which are proved simply and neatly upon kinematical principles in Thomson and Tait's *Elements of Natural Philosophy*, part i. s. 104. Its evolute is an equal and similar C.; its area is three times that of the generating circle; it is the curve of swiftest descent from one point to another not in the same vertical line; and a heavy body sliding without friction down the arc of an inverted C., under the action of a constant force, will take exactly the same time to reach the lowest position, from whatever point of the curve it starts. Huyghens applied this property to obtain a perfectly isochronous pendulum.

Cycloid Fishes, or **Cycloi'dei,** and **Cycloid Scales,** the name applied to the commonest variety of fish-scales, seen in most of our familiar fishes (*e.g.*, salmon, herring, &c.), each scale consisting of a horny plate of more or less rounded form. The outline is smooth, or at most wavy. Agassiz called such fishes *Cycloidei*, but his arrangement has not been followed. Most Teleostean fishes, but not all, are *Cycloidei*.

Cyclope'an Ar'chitecture is the name given to walls of massive unhewn stones, because in ancient Greece such walls were fabled to have been built by the Cyclopes (q.v.). There are remains of these walls on the sites of Tiryns, Mycenæ, and other places in Greece, Asia Minor, Italy, and Sicily. They are built of huge, uncemented blocks, which are generally, as at Tiryns, of irregular polygonal shape, not fitted together, but having the gaps between them filled with small stones. Occasionally, as at Larissa, the stones are smooth and fitted into each other. At Mycenæ the blocks are comparatively regular, and are arranged in horizontal lines. These structures are thought to be Pelasgian, but nothing certain is known of their origin. They are alluded to by Homer, who speaks of the 'walled Tiryns,' and 'the well-built Mycenæ.' The C. A. of the ancient Etrurian towns was probably Pelasgian. Parts of the C. A. of Cortona remain, one fragment being 120 feet high. The name C. A. can be extended to various structures in America and Asia, as to the walls of Cuzco in Peru, and to the ruins of the citadel of Persepolis. The *duns* or hill-forts of Britain are likewise specimens of C. A.

Cyclo'pes (Gr. 'circular-eyed'), in Greek mythology, a gigantic race of shepherds, dwelling on the S.W. coast of Sicily, first mentioned in the *Odyssey* (ix.). They were cannibals. Their chief, Polyphemus, is described as having but one eye in his forehead. Hesiod mentions only three C.—

Brontes ('Thunderer'), Steropes ('Lightning-Flasher'), and Arges ('the Bright' or 'Fiery'), also one-eyed, who were the sons of Uranus and Gæa, and forged thunderbolts for Zeus. For having provided him with that with which he slew Asclepius they were themselves killed by Apollo. Later they are represented as the servants of Hephæstus, with their workshop in Ætna. The C. to whom the walls known as Cyclopean are attributed (see CYCLOPEAN ARCHITECTURE) were considered by Plato as merely types of uncivilised man. Cox (*Manual of Mythology*) compares them to the Trolls or Frost-giants of Northern mythology.

Cyclo'pia, a genus of S. African shrubs of the order *Leguminosæ.* The leaflet of *C. genistoides*, a plant cultivated in our greenhouses, is called the 'bush tea,' from its agreeable tea-like smell. A decoction of it is used as an expectorant in chronic catarrh and consumption.

Cy'clops, one of the best-known 'water-fleas,' or Entomostracous Crustacea (q.v.), included in the order *Copepoda* of that class. The head and chest are protected by a carapace. The feet number five pairs. Each foot has divided extremities and is provided with hairs. The eye is single, and two pairs of antennæ exist. The females carry the eggs in two external *ovisacs.* The young pass through a metamorphosis. These forms occur plentifully in our fresh-water lakes and streams.

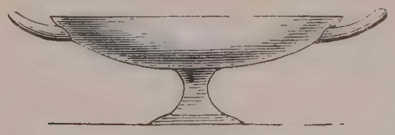
Cyclo'sis ('circulation'), the movement of the latex or milky sap in the lactiferous, or milk-vessels, of various species of plants. The assertion that this movement is merely mechanical, from one part to another when the plant is injured and the juice is allowed to escape, is, in all likelihood, erroneous, for the movement can be well seen if the undersurface of the leaf of Celandine (q.v.), the bracts of the common bindweed, the lower surface of the split stipules of the Indiarubber plant, &c., be put under the microscope, and a strong reflected sunlight be thrown on it. The movement is sometimes very rapid, at other times slower; and the direction of the circulation can be changed at will by the interception of the sunlight. It is not the result of evaporation. (Brown's *Manual*, p. 44.)

Cyg'net, the name given to young swans.

Cygnus, a northern constellation, one of whose stars, Deneb, forms with Vega and Polaris a brilliant right-angled triangle.

Cyl'inder ('a roller'), the general name for a surface generated by a straight line moving parallel to itself. The sections by a series of parallel planes are similar and equal. If the section by a plane perpendicular to the generator be an ellipse, then there will be two different series of parallel planes, whose sections are circles. These are termed the *subcontrary* sections. When the perpendicular section is a circle, we have the *right C.* of Euclid.

Cylix, a wine-bowl at one time in use among the Greeks. The body was both wide and shallow. It possessed a foot and two handles, and its sides were often profusely ornamented.



Cylix.

Cy'ma (Gr. *kuma*, 'anything swollen,' 'a wave'), in architecture, a wavy-lined moulding, consisting of a hollow and a round. The *C. recta* has the hollow above the round; the *C. reversa* has the round above the hollow. They are called *ogees.*

Cym'bal (Gr. *kumbalon*, from *kumbē*, 'the hollow' of any vessel), a musical instrument of percussion, consisting of two metal plates which can be struck against each other. The C. is of very great antiquity.

Cym'ophane (Gr. *kuma*, 'a wave,' and *phainō*, 'I make to appear,' 'I display'), a variety of Chrysoberyl (q.v.), which shows a milky opalescence or 'wave of light,' and is much prized, when cut *en cabochon*, by jewellers, who call it *opalescent chryosolite.*

Cym'ric, or **Kym'ric, Language and Literature.** The Cymric, as well as the Gaelic branch of the Celtic language, shows the peculiar characteristic, the *differentia*, of the Celtic—*i.e.*, changes on the beginning as well as on the ending of its words; but though these changes differ so much in each of the dialects into which Cymric is subdivided as to warrant their being classed separately, the general resemblance of the laws which regulate them is sufficiently strong to prove them all to be of one family. See Rhys's *Lectures on Welsh Philology.*

The Cymric is divided into three branches—Welsh proper, Cornish, and Breton or Armoric. The English public knew almost nothing of any literature contained in these languages until Edward Lhuyd, an accomplished scholar, published in 1707 his *Archæologia Britannica*, showing that in Welsh many ancient treasures were preserved. His work excited very little attention at the time. In 1764 the Rev. Evan Evans, and twenty years later E. Jones, published specimens of the old poems of Wales, accompanied with English translations. Two Scotchmen, Laing and Pinkerton, who had taken a very prominent part in denouncing the Gaelic Ossian as a forgery, denounced the Welsh bards in the same style, and were listened to, although they were profoundly ignorant both of Gaelic and of Welsh. Sharon Turner answered them with considerable ability in his *Vindication of the Genuineness of Ancient British Poems* (1803). In 1801 Owen Jones, a native of Myvyr, in Wales, who devoted much time and money to the illustrating of his country's literature, published a collection of great extent and value under the title of *The Myvyrian Archæology of Wales.* Two accomplished writers, Stephens (*Literature of the Kymry*, 1840), and Nash (*Taliesin, the Bards and Druids of Britain*, 1858), laboured hard to prove that the great majority of poems published by him are spurious, while they admitted a few to be genuine and ancient. The question, however, has been conclusively disposed of by W. F. Skene, who in 1868 published the *Four Ancient Books of Wales*, with a translation and a learned and exhaustive dissertation. He assigns the poems ascribed to the four great bards, Taliesin, Aneurin, Llywarch Hen, and Myrddin, to the 7th c., and considers that they were written down at various periods from the 12th to the 15th centuries. There are no traces of poetic composition from the 7th to the 12th centuries preserved, but during the next two centuries great literary activity manifested itself both in N. and S. Wales, and the writings of no fewer than seventy-six authors are handed down in circumstances which forbid any question of their genuineness.

It is worthy of remark that, in the old poems, Arthur (q.v.) is spoken of without romance or extravagance as the Guledig, or war-leader, who fought many successful battles against the enemies of his country, while in the later ones the popular romances concerning him are found full-blown. Much of the Welsh literature is of great historical value, and the Welsh deserve praise beyond any of their Celtic cousins elsewhere for still publishing newspapers and periodicals in their native tongue.

Little need be said of the Cornish dialect of the Cymric. It was spoken in Cornwall until after the middle of last century. The English has, however, entirely displaced it, and it is chiefly through the *Archæologica Cornu-Britannica* of Dr. Pryce, published in 1790, that a knowledge of it must now be sought.

The Armoric or Breton is still spoken by a numerous people in the N. of France, and is much better known. See *Breton Literature* under BRETAGNE.

Cynan'che (Gr. *kuōn*, 'a dog,' and *agcho*, 'I strangle'), an inflammatory disease of the throat. See THROAT, DISEASES OF.

Cynan'chum, a genus of S. American, Malayan, and

Mediterranean herbs belonging to the natural order *Asclepiadaceæ*. Montpellier, or French scammony, a violent purgative, is in the juice of *C. Monspeliacum* mixed with other purgative substances; and the sap of *C. ovalifolium*, a native of Penang, supplies good caoutchouc. The leaves of *C. Argel* are used to adulterate Alexandrian senna.

Cyn'ics, a philosophic sect founded in the 4th c. B.C. by Antisthenes (q.v.), an Athenian and disciple of Socrates. The C. were so called either from the Cynosarges, a gymnasium where their founder taught, or from the Gr. *kunikos* ('doggish'), because of their snarling captiousness, or of the bestiality into which they sank. Their tenets were Socratic in so far as they advocated ethical in opposition to physical inquiries. They made virtue synonymous with self-denial and contempt of fortune. Their bracing but narrowing teaching appeared in nobler form in the Stoical school. Among the most famous C. were Diogenes (q.v.), Crates, and Menippus.

The effigy over the marble pillars raised by the Athenians to the memory of Diogenes was a dog, with the following inscription beneath it:—

> '"Say, dog, what guard you in the tomb?"
> "A dog." "His name?" "Diogenes." "From far?"
> "Sinope." "He who made a tub his home?"
> "The same—now dead, among the stars a star."'

Cynocephali (Gr. *kuōn*, 'dog,' and *kephalē*, 'head'), a species of baboon, in ancient times regarded by the Egyptians as possessing more than ordinary intelligence. As a mark of their intellectual sagacity, Thoth is often represented with the head of this baboon, and, according to some persons, the same honour is done to the C. by the god Anubis, whose head may be taken for either a baboon's or a jackal's.

Thoth as the God of Letters.

Cyn'odon, a genus of grasses, only one (*C. Dactylon*) of the fourteen species of which is a native of Britain. It inhabits the southern coast of England. Its roots, in common with those of another species (*C. lineare*), are reputed to possess some of the properties of sarsaparilla. In India it is known as *Dhob*, *Doorba*, and is one of the chief fodder grasses.

Cynomo'rium, a genus of plants belonging to the natural order *Balanophoraceæ*. *C. coccineum* is found in the island of Malta, and more particularly on a single rock in the islet of Gozo; is fungus-looking in appearance, and was long celebrated as the *Fungus Melitensis*. It is found in the Levant, Northern Africa, and the Canary Islands, where it is esteemed as an article of food. It was formerly highly esteemed as a styptic and astringent, and at one period was so much valued as a remedy for dysentery, &c., that the rock on which it grew was carefully watched, and its produce deposited in a Government office, whence it was sent as a precious gift to friendly sovereigns by the Grand-master of the Knights of Malta. Even under the British Government, until recently, the office of keeper of the rock was kept up.

Cyn'osure (Gr. *Kunosoura*, 'the tail of the dog'), a name given to Ursa Minor, a northern constellation, whose tail terminates in the Pole Star. It was the object by which travellers and mariners directed their course, and hence has arisen its metaphorical application to anything to which attention is strongly directed:—

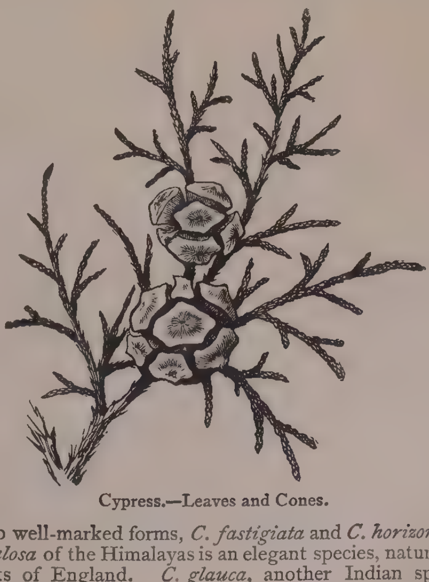
> 'Where perhaps some beauty lies,
> The *cynosure* of neighbouring eyes.'—Milton, *L'Allegro.*

Cypera'ceæ, or **Caricin'eæ,** a natural order of glume-bearing Monocotyledonous plants, of which about 120 genera and 2000 species are known. They are found all over the world, though chiefly in moist, cold, and temperate regions. Some are demulcent, others bitter and astringent. The long underground stems of *Carex arenaria* bind together drifting sands, and are for that purpose planted on parts of the coast. The herbage of one of them has very nutritive properties, but the order possesses no marked economic or medicinal species. The creeping underground stems of *Carex arenaria* have been used as a substitute for sarsaparilla, under the name of *German sarsaparilla*; and the species known as 'carnation grasses' are erroneously believed to cause 'rot' in sheep. *Eriophorum*, or Cotton-Grass (q.v.), and the *Papyrus* of the Nile (q.v.), also belong to this order.

Cype'rus, a genus of plants of the natural order *Cyperaceæ*, most of the species of which are tropical. The tubers or corms of many are mucilaginous and nutritious, while those of others are bitter and medicinal. Among the latter may be classed *C. longus*, the rhizomes of which are astringent, tonic, and stomachic, and were at one time employed in medicine, but now, from their odour of violets, are more valued in perfumery, as are some of the Indian species. The tubers of *C. esculentus* (the *Souchet comestible* or *Amande de terre* of the French) are used for food in the S. of Europe, and when roasted can be substituted for cocoa and coffee. They are also employed in making *Orgeat* (q.v.). Unlike most of its order, its roots contain a fixed oil. The tubers of *C. bulbosus* and *geminatus*, though small can be used as an article of food. From *C. textilis* of India, and other species, mats, &c., are woven. The roots of other species bind drifting sands together.

Cy-Près, a term of English legal doctrine. In certain cases, where the will of a testator cannot be precisely carried out, the court will, by the doctrine of C.-P., administer as closely according to the will as the law permits. A secondary or particular object must give way before the primary and general object of a will.

Cy'press, a very large genus of evergreen trees and shrubs, type of the *Cupressineæ* family of conifers. *C. sempervirens* of Persia and the Levant is planted in burial-grounds. It has two well-marked forms, *C. fastigiata* and *C. horizontalis*. *C. torulosa* of the Himalayas is an elegant species, naturalised in parts of England. *C. glauca*, another Indian species,



Cypress.—Leaves and Cones.

though hardy in Portugal, can seldom stand our winters without protection. *C. funebris* of China is a valuable ornamental hardy evergreen. *C. macrocarpa, Goveniana, Lawsoniana,* and other species from N.W. America, are well known as hardy ornamental trees. The wood of *C. sempervirens,* believed to be the *cedar wood* and *gopher wood* of the Bible, is perhaps the most durable of all woods. All of them are highly scented, and at one time this balsamic odour from the wood was believed to be salutary in chest diseases. There are besides the following, which are not true Cypresses, viz.: the *bald C.* of America, broom C. and summer C., deciduous C., ground C., embossed C.

Cyp'rian, Thascius C., one of the fathers of the Church, was born at Carthage about 200. He was highly educated, became a teacher of rhetoric, and was converted to Christianity in 245. As the brilliancy and popularity of his lectures had won him a great reputation, the pagan party was intensely chagrined at his change of faith, and sought to cover him with ridicule. C. was indifferent to its censure and reproaches, devoting himself to the study of the Bible and his favourite author Tertullian. On account of his zeal and earnestness in religion he was made a presbyter a few months after his baptism, and Bishop of Carthage in 248. C.'s episcopal career was spent amidst the storms of persecution and theological strife, and his writings are marked by an intense and high-wrought feeling. During the Decian persecution (250) he retired into concealment for about two years, but his enforced seclusion was not spent in idleness. Letter after letter was shot forth from his retreat, full of warning, direction, exhortation, and he was never more vigilant in his episcopal supervision than when he dared not show his face in Carthage. On his return he was engaged in a controversy regarding the reception of the lapsed—that is, those who during the persecution had publicly renounced Christianity—as well as in the Novatian controversy. In 257, in the persecution under Valerian, C. was banished to Curubis. Here as usual his pen was active. Recalled next year by the governor, in consequence of the rigorous edict that all bishops, priests, and deacons were to be put to death, C. was executed at Carthage in presence of an immense crowd. His genuine writings consist of eighty-two epistles and thirteen treatises. On account of his high ideas of episcopal power he has always been a great authority in the Roman Catholic and other Episcopal Churches. The best editions of C.'s works are those of Bishop Fell (1682), and of Maran (Par. 1726). There is an English translation (1868-69) in Clark's *Ante-Nicene Fathers.*

Cyprin'idæ, a family of Teleostean fishes represented by the Carps (q.v.), Minnow, Bleak (q.v.), Roach, Barbel (q.v.), Bream, Tench, &c. In this family the mouth is small and the jaws toothless, the upper jaw being formed by the intermaxillary bones. Teeth exist in the inferior pharyngeal bones, and these bite against the base of the skull, which is covered with horny plates. The head is small, and dorsal fin single. No pyloric cæca exist, and the air bladder is generally divided. Most C. inhabit fresh water.

Cyprindidæ is also the name given to a family of Lamellibranchiate mollusca, including shells belonging to the genera *Cyprina, Crassatella* (q.v.), *Isocardia* or heart-cockles, *Cardita,* &c. The shells are equivalve and closed, the ligament external, and the mantle lobes united posteriorly, and pierced by two siphonal apertures. The foot is thick and tongue-shaped.

Cyprinodon'tidæ, a family of Teleostean fishes, distinguished by having small jaw-teeth, but numerous teeth in the throat. The branchiostegal rays are five or six. The head is scaly, and no soft dorsal fin exists. To this family belong the *Anableps* (q.v.), and the genus *Orestias* of S. America.

Cy'pris, a genus of Entomostracous Crustacea (q.v.) belonging to the order *Ostracoda.* They are familiar freshwater fleas. They have a bivalve shell or carapace, from which the feet, numbering two or three pairs, are protruded at will. The carapace is closed by an adductor muscle. A pair of tail-appendages subserve locomotion. *C. vidua* and *C. tris-striata* are well-known species.

Cyprus (Gr. *Kupros,* mod. Gr. *Kebris*), the third largest island in the Mediterranean Sea, is distant 41 miles from Syria and 60 from Asia Minor. Area 3584 sq. miles; pop. 209,286, of whom only 48,044 are Mohammedans. The island is divided into six provinces:—Nicosia, Larnaca, Limassol, Famagusta, Paphos, and Kyrenia, of which Nicosia is the most populous with 61,695, and Famagusta comes next with 41,423. The blind number 2074; the deaf and dumb 214; and the lepers 108. The mountains are grouped in two chains, one running parallel to the N., the other to the S. coast. The latter is the higher, reaching in Mount Troodos (anc. *Olympus*) an elevation of 6655 feet. Between the two ranges lies the great plain of the Messorie (or Messaria), rich in cereals, wines, cotton, madder roots, locust-beans (10,000 tons yearly), sumac, all of which are exported, besides raisins, silk cocoons, hides, cheese, cattle, and sheep. The sponge fishery is very remunerative (over £20,000). Salt is inexhaustible in certain lakes (the two largest are near Larnaca and Limassol), tobacco is now grown in small quantity (years ago it was an important product), and wool forms a staple article of commerce, though the climate is so dry that frequently there is but little pasturage. In 1869 the crops were a complete failure, and the poorer inhabitants were reduced to great extremities. The axes of the mountain-chain are of igneous origin, being flanked by limestones, sandstones, and slates. Coal, sulphur, and various minerals might be worked to advantage. Anciently it was famous for its copper-mines, the name 'copper' being derived from the island. A telegraphic cable, laid in 1871, connects Nicosia with Latakieh on the Syrian coast, and 240 miles of wire are in use throughout the island. The annual exports have risen from £314,628 in 1889 to £316,872 in 1893, while the imports show an increase of £72,548 during the same period. There are over 200 Christian, and over 100 Mohammedan schools in the island; to these the Government give a grant when recommended by their Inspector. The capital is Nicosia, or Lefkosia (q.v.); the chief ports, Larnaca (q.v.), and Limassol. The ancient capital of C., Paphos (q.v.), was held to be a favourite abode of Venus. C. was ruled by petty kings till it was subdued by Cyrus of Persia. It was subsequently conquered by the Greeks in 477 B.C.; was annexed to Egypt about 323 B.C., and became a Roman province in 58 B.C. After the division of the Roman, it formed part of the Byzantine Empire. In A.D. 648 it was taken by the Saracens, from whom it was soon retaken by the Greeks. In 803 it was captured by Harûn-al-Rashid, but was won back by Nicephorus II. Richard I. of England reduced it in 1191, and ceded it the succeeding year to Guy de Lusignan, whose descendants reigned over it till 1489, when Caterina de Cornaro (q.v.) sold it to the Venetians. It was finally taken by the Turks in August, 1571, in whose hands it remained till 1878, when by a convention between Great Britain and Turkey, dated 4th June of that year, the government of the island was transferred to the former power. C. is now virtually a British possession, and its first British governor, Sir Garnet Wolseley (q.v.), in the month of August, 1878, proclaimed the authority of Queen Victoria amidst the enthusiasm both of Greeks and Turks. Since then the commerce, &c., of the place have vastly improved. The British Governor, or as he is called, High Commissioner, has all the power of a colonial governor, with an executive council of four to assist him. There is also a legislative council of eighteen, six of whom are members *ex officio,* and the remainder are elected every five years, three by the Mohammedans and nine by the other inhabitants. An elector must be a five years' resident, at least; of 21 years of age, and a male, payer of certain taxes. In August, 1895, the British garrison was reduced by three-fourths, and owing to the scare caused thereby, that the island was about to be handed over to the Turks, the prosperity of C. rapidly declined. See Ungar and Kotschys' *Die Insel Cypern* (1865) for natural history, climate, products, &c.; also De Mas Latrie, *Histoire l'île de C. sous de Règne des Princes de la Maison de Lusignan* (Par. 1861-62); and for antiquities, Cesnola's *C., its Ancient Cities, Tombs, and Temples* (Lond. 1877). See also an interesting and valuable volume on the history and industrial condition of C., by R. Hamilton Lang, for many years H.M. Consul for the island (Macmillan & Co., Lond. 1878).

Cyr, Saint, a pleasantly situated village in the department of Seine-et-Oise, France, in the great park of Versailles, 12 miles S.W. of Paris, is notable in connection with an institution (*Maison de St. C.*) founded here by Louis XIV. in 1686, for the upbringing of 250 daughters of the nobility. This building was erected at the desire of Madame de Maintenon, who retired to it on the death of the King to spend the remainder of her life. In 1793 it was converted into a military hospital, and in 1806 Napoleon transferred hither the military school of Fontainbleau, where it has since remained as the *École Spéciale Militaire de St. C.*, educating some 300 officers, infantry and cavalry, of the general staff, and of the Marines. Pop. of village and school, 3641.

Cyrena'ica, anciently a district of N. Africa, named after its capital, Cyrene (q.v.). In its widest sense it included the region stretching on the N. from Carthage on the W. to Egypt on the E., and from the Mediterranean to the oasis of Phazania (Fezzan) on the S. The Greek colony, however, established here in the 7th c. B.C., occupied only the tableland of Barca (q.v.) and the terraces between it and the coast. Fanned by cool sea-breezes, and sheltered by the broad plateau from the hot winds of the Sahara, these terraces, well watered, and enjoying a diversity of climates, were among the most delightful and fertile regions of the globe, and furnished a succession of harvests for eight months of the year. Corn, wine, oil, honey, and fruits of all kinds abounded, and the district was famous for its breed of horses. From the time of the Ptolemies C. was sometimes called Pentapolis, from its five chief cities, Cyrene, Barca, Teucheira, Hesperides, and Apollonia. C., after being a Roman province, was subdued by Chosroes (A.D. 616), and finally overrun and wasted by the Arabs (A.D. 647). The whole region is rich in valuable remains of antiquity.

Cyre'né (Gr. *Kurēne ;* Doric form, *Kurāna*, corrupted by the modern Arabs into *Grenneh*), the capital of Cyrenaica, founded in 631 B.C. by a colony of Dorians under Battus, whose dynasty terminated about 450 B.C., when a republic was established. It subsequently became a Roman colony with the title of *Flavia*. C. was long the chief Greek colony in Africa, and several of its sons were distinguished in the annals of Hellenic intellect; as the poet Callimachus, a scion of the royal house of Battus, the philosophers Aristippus and Carneades, the polyhistor Eratosthenes, and the rhetorician Synesius. Extensive ruins still mark the site of the city.

Rock-cut Temple, Cyrene.

Cyril, St., of Jerusalem, one of the fathers of the Church, was born about 315. Of his earlier years nothing is known, but his writings evince a superior education. He was elected Bishop of Jerusalem in 351. In the Arian controversy then raging he formed one of the middle party, called Semi-Arians, but was nevertheless persecuted by the stricter Arians, through whose influence he was banished from Jerusalem three times. His persistent and unscrupulous opponent was Acacius, Metropolitan Bishop of Cæsarea. In 381, at the Council of Constantinople, he joined the Nicene party, and took an active part in the debates. He died in 386. C. is chiefly distinguished for his catechetical works (edited by Touttée, Par. 1720; and by Reischl and Rupp, Munich 1848-60), in which he set forth the doctrines of the Church in a popular style.—**St. C. of Alexandria,** born at Alexandria about the end of the 4th c., was educated among the monks in the Nitrian desert, and then succeeded his uncle as Bishop of Alexandria (412). He immediately attacked the Novatians, and had their churches shut up, got the Jews banished from the city and their synagogue pulled down, and occasioned other insurrections in Alexandria. He must be held responsible in some measure for one of the most odious crimes in history—the murder of Hypatia (q.v.)—in so far as he inflamed the passions of a fanatical and ignorant community. C.'s chief controversy was with Nestorius, Bishop of Constantinople, who disapproved of the name 'Mother of God,' as applied to the Virgin Mary. At a council held at Alexandria (430), C. accused Nestorius of blasphemy against Christ, and Nestorius, in turn, accused C. of Apollinarianism. (See APOLLINARIS). A council was convened at Ephesus to settle the dispute, in which C. presided, and before all the bishops had arrived Nestorius was condemned and banished. When the other Eastern prelates, for whom C. would not wait, arrived, he himself was deposed by them, and a controversy was thus begun between the E. and W. Churches, which was not settled at the death of C., 444. In the religious strifes of the time C. plays a foremost part. The popes gave him the most extensive powers and the most unbounded praise, and the Coptic and Abyssinian Christians, among whom he is known as *Kerlos*, call him 'the world's doctor.' C.'s works include *De Adoratione et Cultu in Spiritu et Veritate ;* '*Polished Discourses on the Pentateuch*,' &c.

Cyr'il and **Metho'dius,** called the 'Apostles of the Slavs,' were two brothers of distinguished family, born in Thessalonica in the 9th c. M. first embraced a military career, and rose to the rank of general, while C. (whose proper name was Constantine) devoted himself to the study of languages, for which he displayed peculiar aptitude. The Slavic tongue, in various dialects, had long been in use in the valley of the Danube ; it had even penetrated as far S. as the Peloponnesus, and in a commercial centre like Thessalonica the brothers had no difficulty in acquiring a familiar acquaintance with it. At Constantinople, whither C. went to complete his studies, he was soon known as 'the Philosopher.' Chosen by the Emperor Michael III. to preach the gospel to the Khasars, who had requested the services of a Christian missionary, he appears to have met with some success among the Turanian tribes of the Ural ; but the real commencement of the evangelical career of the brothers was their mission to the Bulgarians, whom they converted to Christianity, and provided with an alphabet adapted from the Greek, by means of which this Slavic people soon acquired through translation some knowledge of the Græco-Christian literature. In 863 C., accompanied by M., who had now become a monk, were sent by the Emperor to the Moravian king. The Slavs of Moravia and Pannonia had been Christians for about a century, but were dissatisfied with their ecclesiastical dependence on the German see of Salzburg. They received with joy men who could enable them to celebrate divine worship in their own language. The brothers spent four years in organising a Slavic service. In 867 they were invited to Rome by the Pope, and were consecrated bishops. It was at this time that Constantine took the name of C., and shortly after died, 13th February, 868. M. returned alone to his great work, and became Archbishop of Moravia and Pannonia. The Latin Liturgy was generally displaced by the new Slavic one, and the supremacy of the Archbishop of Salzburg was more and more threatened. The latter appealed to the Pope, and charged M. with numerous heresies. In the end, however, M. got a verdict in his favour, but after a long struggle with the Latin priests of Pannonia, he withdrew to Rome in 881, where he died. The exact date of his death is not known. The brothers have a great place in Christian history. They gave a national character to the religion of the Slavic peoples. The alphabet invented by C., and called the 'Cyrillic alphabet' (Slav. *Kyrillitza*), was adopted by the larger portion of the eastern Slavs, *e.g.*, Bulgarians, Serbs, Bosniaks, Russians, &c.; it was afterwards modified and enlarged in the different countries, according to their respective needs, and the modern Russian and Servian alphabets are directly derived from it.

Cy'rus the Great (called by Greek historians *Palaios* and *Proteros*), said to be the son of Cambyses (the Persian) and Mandane, whose father Astyages, the son of Cyaxares and King of Media, had endeavoured to destroy him as destined by prophecy to usurp the throne, probably succeeded his grandfather in the year B.C. 559, when he changed his name (*Agradatus*) for the Persian *Kobresch*, or sun. The first volume of the *Histories* of Herodotus contains a number of picturesque stories about his birth and childhood. After subduing the principal towns of Media, C., in 546, conducted a great expedition against Crœsus of Lydia, whom he defeated at Thymbra, and took prisoner at Sardis, and afterwards made a satrap of his new empire. The Greek colonies of Asia Minor, with the exception of Miletus, formed against C. the Pannonian League, which received moral support from Sparta; but C. was recalled to the S. by a revolt at home. In the year 538 he was engaged in the conquest of Babylonia, where the luxurious Belshazzar offered only a feeble resistance. His later campaigns seem to have been directed against Bactriana, Margiana, and Sogdiana, the territories forming the upper basin of the Oxus. C. probably penetrated as far as the Massagetæ and Sacæ, and Ctesias has left an account of an expedition against the Derbiccæ. In one of these C. was killed, B.C. 529. His name is thus associated with the predominance of the Persians over the Medes, and of the Zend nations over the Semitic. The *Cyropædia* of Xenophon is not a history, but a kind of ethical romance.—**Cyrus the Younger** was the son of Darius Nothus or Ochus, King of Persia, and Parysatis. While governor of Asia Minor he had assisted the Spartan general Lysander against the Athenians at Ægos-Potamos (B.C. 405). Accordingly, when Artaxerxes Mnemon, the eldest son of Darius, succeeded to the throne, and C.'s first conspiracy had failed, it was chiefly from Sparta that he obtained the army of 13,000 Greeks which, under the command of Clearchus, accompanied him on his famous expedition from Sardis in 401 B.C. At Cunaxa, between Pylæ and Babylon, on the Euphrates, he encountered his brother, whom the satrap Tissaphernes had warned of his approach. C. was killed and his Asiatic troops dispersed, but the Greeks held their ground, and began from the battlefield their wonderful 'Retreat of the Ten Thousand' (*Katabasis*) up the Tigris valley, through the highlands of Armenia to Trapezus on the Black Sea. From the accounts left by Xenophon (who was a leader in the retreat), C. appears to have been intelligent and of a good disposition. The *Cyropædia* of Xenophon relates to the elder C. It is interesting to compare the route of C. eastward through Laodicea, Iconium, Tarsus, and Beræa, with the routes of Alexander and the Crusaders.

Cyst (from *kustis*, 'a bladder'), a bag or tunic in animal bodies, which includes morbid matter as a secretion or an endogenous growth, entirely or for the most part its own product. Cysts are formed (1) by a morbid growth, having a distinct elementary groundwork derived from cells or their nuclei; (2) by obstruction, dilatation, and growth of natural ducts or sacculi; and (3) by enlargement and fusion of the areolar spaces in connective tissue—the walls becoming condensed, and the inner surface secreting fluid like a serous sac. *Simple* or *barren* cysts contain fluid matter; *compound* or *proliferous* cysts contain variously organised bodies; *sebaceous* or *epidermal* cysts are formed from enlarged hair follicles; *mammary* cysts from enlarged lactiferous tubes; *sanguineous* cysts from dilated blood vessels, and from hæmorrhage into the cavity of serous cysts; *synovial* cysts in connection with the synovial membrane of the sheaths of tendons; *mucous* cysts in connection with mucous membrane and the ducts of mucous glands. *Serous* cysts or *hygromata* have thin or honey-like contents of a yellow or brownish colour, and *colloid* cysts have glue-like contents. *Proliferous* cysts are compound. The *cystic duct* is the membranous canal that conveys the bile from the hepatic duct into the gall-bladder. The *cystic artery* is a branch of the hepatic.

Cyst'olithes ('bladder-stones'), clusters of crystals found in the superficial cells of nettles and some other species of the order *Urticaceæ*, and various genera of *Acanthaceæ*, &c. They are globular or club-shaped and of various other forms, 'usually hanging by a short stalk in an enlarged cell; their principal mass is found to be cellulose, but their surface is studded with crystalline points of carbonate of lime.' The crystalline contents of the cells are enclosed by the general cell-wall, and by a very delicate organic covering closely applied to every part.

Cyt'isus, a genus of plants of the natural order *Leguminosæ* (sub-order *Papalionaceæ*). Laburnum (q.v.) and other species are much esteemed as ornaments in shrubberies and greenhouses. See also Broom.

Cyt'oblasts, a name given to new active cells in animal and vegetable structures. Sometimes the term has been restricted to the nucleus of the cell. See Cell.

Cyt'oplasm is a semi-fluid molecular material in which cells may originate or grow. See Cell.

Cyz'icus, a peninsula of Anatolia, projecting into the Sea of Marmora, and connected with the mainland by a sandy isthmus. It stretches from E. to W. 1 miles, and from N. to S. 9 miles. C. was once an island, its connection with the mainland being attributed to Alexander the Great. Cherry-orchards and vineyards now surround the ruins of the ancient city of C., which in size and beauty was one of the foremost cities of Asia.

Czacki, Tadeusz, a Polish author and administrator, was born 28th August, 1765, at Poryck, Volhynia. He held the post of director of the crown archives at Warsaw, and, as member of the commission of inquiry into the Polish revenue, did his best to give new life to the trade and industries of Poland. But his chief efforts were devoted to the improvement of the education of his countrymen in the Polish provinces of Russia under the Emperor Alexander. In 1807 he was appointed deputy of Prince Czartoryski, who had the care of public instruction in the Polish government of W. Russia. By energy, personal liberality, and strong appeal to the patriotic feelings of his countrymen, he was enabled to establish eighty-five primary schools in Volhynia, twenty-six in Podolia, and fifteen in the Polish Ukraine, besides a great lyceum at Krzemienietz. C. died 8th February, 1813, at Dubna, Volhynia. Of his works, which are numerous and varied, one of the most valuable is that upon Lithuanian law. In 1832, by order of the Czar Nicholas I., the scientific establishments founded by C. were abolished, and the artistic and literary treasures collected at Krzemienietz were carried away, partly to St. Petersburg and partly to the new Russian University at Kieff. See *History of the Life and Works of C.*, by Osinski (Krzemienietz, 1816).

Czar, or **Tsar** (Russ. *tsarj*, 'king,' probably a corruption of the Byzantine *Kaisar*, Lat. *Cæsar*, though some etymologists seek for its origin in the *sar* that ends the names of Assyrian kings), a title of the Emperor of Russia.

It was in partial use as early as the 12th c.; but it was not till the 16th c., when Ivan II., surnamed the Cruel, caused himself to be crowned C. of Moscow (1547), that the Muscovite princes formally adopted the title. After the conquest of Little Russia and Smolensk in 1654, they called themselves Czars of all the Russias—*i.e.*, of Great, White, and Little Russia. The word is now practically equivalent to emperor. The consort of the C. is named Czarina, his eldest son Cesarevitch, and his eldest daughter Cesarevna.

Czartorys'ki, a celebrated Polish family of Lithuanian origin, which can be traced back to the 14th c. In the same century also appears a Russian branch connected with the line of Rurik, and possessing the village of Czartorysk in Volhynia, from which the later name of the family is derived. The latter first become Polish in the person of Fedorovicz C., who in 1570 subscribed the union of Lithuania with Poland. With Georg Ivanovicz C. (died 1622) the family passed over from the Greek to the Roman Catholic Church. In 1623 the heads of the family were made princes of the German empire; in 1785 they received the Austrian 'Indigenat,' and in 1788 the Hungarian Diet conferred on them the rank of 'magnates.' For a considerable period the family flourished in two main lines, an elder at Novgorod, and a younger at Klevan. The former became extinct in the time of Sigmund the Elder; the latter was subdivided into two branches, that of Zukov and that of Korzec, of which the latter became extinct in the male line in the person of Prince Joseph Clemens C. (died 1810). To the Zukov line belonged **Prince Michael Friedrich C.,** born 26th April, 1696, died Grand-Chancellor of Lithuania, 13th August, 1775. His nephew, **Prince Adam Kasimir C.,** born 1st December, 1734, noted for his wealth, intelligence, and learning, was a candidate for the throne of Poland after the death of August III., but was defeated through the influence of the Empress Catharine of Russia, who favoured Stanislas Poniatowski. After the first partition of Poland, C., who had extensive estates in Galicia, entered the Austrian service, rose to the rank of field-marshal, but was never untrue to Poland. At the Congress of Vienna he headed a deputation to the Russian Emperor, and submitted to him a 'Constitution' for his native country. C. died at Sieniawa in Galicia, 19th March, 1823.—**Prince Adam Georg C.,** son of the preceding, was born at Warsaw, 14th January, 1770. After an education at Edinburgh and London, he took part in the second Polish partition war. Being afterwards taken to St. Petersburg as a hostage, he gained such favour with the Emperors Paul and Alexander, that he filled in succession the posts of Ambassador to Sardinia, assistant to the Minister of Foreign Affairs, and curator of the University of Wilna; but when the Revolution of 1830 broke out, he gave both his heart and his property to his countrymen, and in 1831 became head of the National Government. When the insurrection was crushed, C. was especially excluded from the amnesty, and went to live in France. The most notable event in his later life was the liberation of his serfs in Galicia in 1848. C. died at Montfermeuil, near Paris, 26th July, 1861.—**Adam Louis, Prince C.,** is now the head of the family. He is the son of Prince Ladislas C. (born 3rd July, 1828, and died 23rd June, 1894), and his second wife Marguerite of the Bourbon-Orleans family. Prince Adam Louis C. was born in Paris on 5th November, 1872.

Czas'lau (Boh. *Caslau*), a town of Bohemia, 46 miles E.S.E. of Prague. Its deanery-church steeple is the highest in Bohemia. C. has manufactures of brass, coffee substitutes, beetroot sugar, and alcohol. During the Thirty Years' War the place suffered much. Near it, on the 17th May, 1742, the Austrians were defeated by Friedrich II. of Prussia. Pop. town 8388; district 63,638.

Czechs, the name given to the branch of the great Slavic family which has spread farthest west. Driven forward by the Avari (q.v.), they came, in the latter half of the 6th c., into the country now called Bohemia (q.v.). The C. are first mentioned by the earliest Russian chronicler, Nestor, who wrote during the latter half of the 11th c.

Language and Literature.—The Czech language, a branch of the widely-spread Slavic, is spoken in Bohemia, Moravia, and, with some modifications, by the Slovacks in the N. of Hungary. In the 15th c. it began to be written in Roman characters. It has forty-two open vowels and distinctly marked sounds, is rich, precise, and euphonious, and, like the classical languages, is ruled by quantity rather than accent. In its complicated grammar there is a dual number, while there is no separate form for the passive voice. The best grammars are those of Burian (3rd ed. Vienna 1850), Koneczny (3rd ed. Vienna 1855), Tomiczek (4th ed. Prague 1865). The best lexicons are those of Franta-Schumansky (Prague 1859), Koneczny (3rd ed. Vienna 1855), Rank (1871). The Czech literature began to clearly develop itself in the 13th c.; there are even traces of it as far back as the 10th c. The rhyming Chronicle of Dalimit (1314), the *Manual for Children* by Schtitny (1376), and the poem, *The Council of the Beasts,* by Smil von Pardubitz (1384), are famous books of the times before Huss. The era introduced by that reformer (1469-1526) gave a powerful impetus to prose. Doctrinal, polemical, devotional, and political writings became numerous. The *Travels* of Postupik (1464) and Lobkowitz (1493) may be mentioned, and also the political writings of Ctibor of Cimburg (1494) and Cornelius of Wschehrd (1520). The Augustan age of Czech literature was from 1526—1620. During this period the Bohemians were free and prosperous. Literature was fostered by the two universities at Prague, and the language became matured. The names of Streyc and Lomniki of Budezc are famous in poetry; Bartosch (died 1544), Sixtus of Ottersdorf (died 1583), Blahoslav (died 1571), Brzezan (died 1610), and Dacicky (died 1629), are eminent as historians, and Beneschowsky and Abraham of Ginterrod as students of language. The Bible was translated and published 1579-93. But the Thirty Years' War (1618-48) was an irreparable disaster, not only to the literature but to the nationality of the C. During that war the Jesuits burnt most of the books which had been produced between 1414 and 1635. An imperial decree, issued in 1774 and also in 1784, prohibiting the use of the Czech language in the higher schools, was another disaster to Czech literature; but the writings of the historians Count Kinsky (1774), Parizek (died 1823), Prochazka (died 1804), the popular author Kramerius (1783), and the poet Jungmann (1805), kept it alive. Since 1818, however, Czech literature has had fair scope. The language has been permitted by imperial edict in the higher schools; valuable remains of old

Bohemian Peasants.

literature have been discovered, and fresh literature has been largely produced. Poetry, belles-lettres, history, archæology, and science are assiduously cultivated. Among the newer poets are Kollar (died 1852), Czelakovsky (died 1852), Agnell Schneider, Vinariczky, Tomicek; the fabulist Zahradnik; the lyrical poets Marek, Turinski, Hanka, Kamaryt, Chmelinski, Stule; the idyllic Langer; the dramatists Stzepanek, Machaczek, Klicpera, and Ulczkovsky; the didactic Jablonski; the epic poets Huievskovski, Negedly, Holy, and Wocel. Among the national historians are Palacky and Tomek; Schafarik and Wocel are distinguished in Czechic antiquities; Jungmann, Schafarik, Hanka, and Presl in Czechic philology. See the works of Dobrowsky (2nd ed. 1818), Jungmann (1825), Count Thun (1842), Wocel (1845), Wenzig (1855), Hanus (1868), and A. H. Wratislaw, *Native Literature of Bohemia in the 14th c.* (Lond. 1878).

Czeg'led, a town of Hungary, 43 miles S.E. of Pesth by railway. The chief industries are brewing and agriculture. Pop. 22,050.

Czens'tochau, or **Czenstochōva,** a monastery of the order of St. Paul the Hermit, on the summit of Mount Klarenberg (Pol. *Jasnogora*), in the government of Warsaw. In the church of the monastery is the famous dark-brown Madonna which the legend asserts to have been painted by St. Luke, and which has made C. the favourite resort of Roman Catholic pilgrims in Russian Poland. In 1655, by the help, it was believed, of the Virgin, the monastery, manned by 70 monks and 150 soldiers, withstood for thirty-eight days 10,000 Swedes and a part of the Polish army. The Emperor Alexander allowed the works to be demolished after C. came into the possession of Russia in 1813. At the foot of the mount on which the monastery stands lie the two towns of 'Old' and 'New' C., which carry on a lively trade in amulets and images.

Czern'owitz (Slav. 'Black Town'), the capital of the crownland of Bukowina, in Austria-Hungary, on the Pruth, 138 miles S.E. of Lemberg by railway. It has a Greek cathedral, hardware manufactures, and a considerable trade between the Moldau and Bessarabia in timber, wool, skins, cattle, and brandy. Over the river, here 760 feet wide, stretches a bridge of six arches. Pop. 54,040, with 2174 troops.

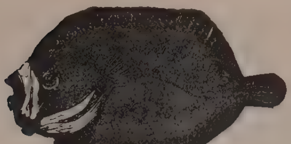
Czer'ny, Georg, popularly *Karadgorge* ('Black George'), a Servian leader, was born at Vishevac, near Belgrade, 21st December, 1770, and was originally a swineherd and drover. He was led to take an active part against the Turks by the plunder of his cottage in 1801 by janissaries. Gathering round him a band of discontented Servians, and secretly supported by Russia, he raised an insurrection against the Turks, and ultimately captured Belgrade. He was even recognised in 1808 by the Porte as Prince of Servia, but a new struggle with Turkey taking place, he had to flee to Russia, and then to Austria in 1812. C. returned to Servia in 1817, but was murdered in the July of that year at the instigation of Prince Milos, the new ruler of Servia and founder of the present dynasty. When the latter was deposed in 1842, C.'s second son, Alexander, known as *Karadgordjevitch* ('son of Black George'), was elected his successor, but was obliged to resign in 1858. Prince Michail succeeded and was assassinated in 1868. Milan, his nephew, was elected Prince, proclaimed King in 1882, and abdicated in 1889, when his son Alexander, the fifth member of the dynasty, was raised to the throne of Servia, which has been independent of Turkey since the Berlin Treaty of 1878.

Belgrade.

D.

D formed the fourth letter in the Phœnician alphabet, and it holds the same place in all the alphabets derived from that source. Its Semitic name was *daleth*, which means 'a door,' and is familiar to us through its Greek equivalent, *delta*. This name is thought to be derived from the original form of the letter (Δ), like a tent-door, which is the same both in Phœnician and Greek, and is scarcely altered in the Roman capital. The pronunciation of the letter D has also retained a similar uniformity. The sound which it expresses in English, it expresses everywhere, except in the Spanish and modern Greek languages, in both of which it is pronounced like *th*. D belongs to the class of consonants called Dentals, and is readily interchangeable with the other members of the same class, especially with *th* and *t*. Examples of this change are *theos* in Greek and *deus* in Latin, *dell* or *dale* in English and *thal* in German. A good example of a double change is *tod* in German, which in English becomes 'death.' D is also interchanged, though less regularly, with *l* and *r*. *Odusseus* and *dakru* in Greek correspond to Ulysses and *lacrima* in Latin; and in Latin itself, *ar-cesso* is only a surviving archaic form of *ad-cesso*. As *b* has an affinity for *m*, so D exhibits a tendency to affix itself after *n*, originally as a mere euphonic change in pronunciation, but finally as a recognised alteration in spelling. Thus, the Latin *tener* becomes the English 'tender'; and 'kind' is only another form of 'kin.' When followed by *i*, D sometimes becomes *j*, as 'journal' from *diurnus;* and when conjoined with *s* it forms the origin of *z*. As a numeral, D stands for 500, being manifestly a condensation of IↃ. As an abbreviation, it is best known as standing for doctor in D.D. and M.D.; and d.d. is to be understood as meaning *dono dedit*.

D, in music, the note next above the tonic in the scale of C major. The vibration fraction D: C is $\frac{9}{8}$.



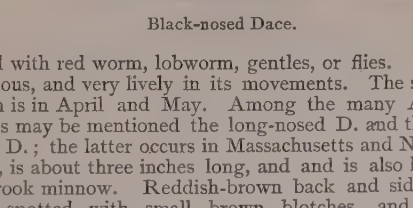
Dab.

Dab, a genus of Teleostean fishes belonging to the family *Pleuronectidæ*, or Flat-fishes. The D. is recognised by the rough or somewhat spiny nature of its back, hence the specific name *limanda* or 'file-backed.' It is of lighter colour than the allied Flounder (q.v.), and the lateral line is more curved than in the latter fish. The average length is 12 inches. The smooth or lemon D. is a second species, with a smaller head and still lighter colour than the common D.

Da Capo (Ital. 'from the beginning') a term used in music to indicate a repetition from the commencement, of a part or of a movement. D.C., as the words are usually abbreviated, was first introduced by Scarlatti in *Theodora*.

Dacc'a (Sansk. *Dhaka*, from *Dhakeswari*, 'the hidden goddess,' from a statue of Durga found there), the capital of a district of the same name, in the province of Bengal, British India, on the Buriganga ('Old Ganges'), 40 miles E. of Goalband, an important station on the Eastern Bengal Railway, and 190 miles N.E. of Calcutta, across the Gangetic delta. It has numerous mosques, and Brahmanical temples, a Government college, schools, a hospital, and several ruined palaces, also bridges, ghâts, bazaars and public fountains. But it is no longer celebrated for its manufacture of striped and figured muslins and delicate Kasheeda or embroidered cotton cloth, having, indeed, few industries now beyond the production of lac, dye, soap, cheese, and the gold and silver ornaments which find a market in Calcutta on account of their ingenious and original designs. The rainfall at D. is about 82 inches, and the mean temperature 72° Fahr. Pop. 82,321, including a small number of Portuguese, Greek, and Armenian merchants. In 1325 the district of D. was annexed to the Afghan kingdom of Gaur, and the town of D. remained for long the frontier fortress of the Mohammedans. After that the country was overrun by various savage tribes. In 1608 D. was made the seat of government of the Nawabs of Bengal. It reached the height of its prosperity under Aurungzebe, and later was visited by the Portuguese, Dutch, and French, who here erected factories. The British gained possession of the city and state in 1765, but descendants of the native ruler were granted allowances till as late as 1845. —The *district*, which is intersected by numerous rivers, yields great quantities of rice, tea, indigo, &c., and has manufactures of coarse cloth, coco-nut oil, country paper, and iron and brass implements. The production of cotton has declined in quantity though not in quality. Dacca merchants are most enterprising, and visit distant countries on trading expeditions. At least eight newspapers are in regular publication. Education is steadily advancing, not only in the elementary schools, but also among the high grade establishments. Area, 2797 sq. miles; pop. 2,420,656; of whom 935,565 are Hindus, 258 are Brahmos, 1,473,799 are Mohammedans, 76 are Buddhists, and 13 are Jains. The prevailing language is Bengali.

Dace, Dart, or **Dare,** a genus of freshwater Teleostean fishes, included in the family *Cyprinidæ* (q.v.) of that order. It is allied to the Chub (q.v.), Roach (q.v.), Barbel (q.v.), and Bleak (q.v.), and is generally found in slowly-running streams in England and on the Continent. It is a dullish-blue on the upper, and white on the under parts; the gill-covers and cheeks being silvery white. The average weight is about three-quarters of a pound, but a half-pound fish is considered a good take. In shape it is somewhat elongated. The scales are smaller than those of the roach. The flesh is not of particularly fine quality. The D. is fished for with line and float baited with red worm, lobworm, gentles, or flies. It is very voracious, and very lively in its movements. The spawning season is in April and May. Among the many American species may be mentioned the long-nosed D. and the black-nosed D.; the latter occurs in Massachusetts and New York states, is about three inches long, and and is also known as the brook minnow. Reddish-brown back and sides, white belly spotted with small brown blotches, and a dark streak drawn from the tail to the head, are its principal distinguishing marks. It is excellent eating.



Black-nosed Dace.

Da'cia, the country of the Daci, originally called *Getæ*, a people of Thracian origin, comprehended, in its widest acceptation, the countries now known as Hungary (E. of the Theiss), Transylvania, the Bukowina, the S. of Galicia, Moldavia (W. of the Pruth), Wallachia, and the Banat of Temesvar. Of the history of the Daci before the time of Philip of Macedon almost nothing is known, but even then (B.C. 335) they were a powerful race, and had established themselves on both sides of the Danube. In 292 B.C. they compelled the Thracian king, Lysimachus, who had invaded their territory, to surrender with his whole army. Curio, the first Roman general who penetrated as far N. as the Danube, did not dare to attack them. Augustus, in 10 B.C., sent Lentulus against them, but without success. From this time the wars between the Romans and the Dacians were frequent; and eventually the latter, under their king, Decebalus, obtained such a decided advantage over Domitian as to compel him to accept their terms and pay a yearly tribute. Thus matters continued till Trajan, in A.D. 101, set out through Pannonia, crossed the Theiss, marched along the valley of the Maros into Transylvania, and defeated them in a great battle near Thorda, on a field called to this day *Prat de Trajan* (Trajan's field). Decebalus, however, soon broke the conditions of peace imposed by the Emperor, and in A.D. 104 Trajan again set out against them. The Daci, unable to defend their capital, fired it and fled; while their leader, to avoid captivity, stabbed himself. D. now became a Roman province; colonists were sent thither; a bridge was built across the Danube, and the country was intersected by three great roads. In the time of Aurelian (A.D. 270-275) the Romans abandoned D. to the Goths. After submitting to the Gepidæ, Lombards, and others, it fell under the dominion of the Magyars in the 9th c. See Wilkinson's *Wallachia and Moldavia*, and Paget's *Hungary and Transylvania*.

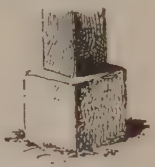
Da'cier, André, a French scholar and critic, was born of Protestant parents, near Castres, in Languedoc, 6th April, 1651. After studying at Saumur under Lefèvre, whose daughter Anne he afterwards married, he went to Paris in 1672. There he was employed to prepare for the Dauphin's use an edition of various classics, known as the *Delphin Edition*. D. and his wife renounced Protestantism in 1685. He became librarian of the Louvre, member of the Académie des Inscriptions, and Secretary of the Académie Française. He died 18th September, 1722. D.'s once brilliant reputation as a critic has greatly faded; his editions and translations are very indifferent. See Nicéron, *Mémoires*.—His wife, **Anne D.,** born at Saumur in 1651, rivalled her husband in erudition, and shared in his editorial labours. Her chief work, a translation of the Iliad (1711), involved her in a controversy with Lamotte. She attacked him, said Voltaire, like the head of a college, and he answered like a polite and witty woman. In the great controversy as to the respective merits of ancient and modern literature, along with La Fontaine and Boileau she advocated the ancient against Perrault, Lamotte, and others. Madame D. executed translations of Terence, Plautus, Anacreon, and Aristophanes. She died 17th August, 1720. See Sainte-Beuve's article *Sur Madame D.* in his *Causeries du Lundi*.

Dacoits' (Beng. 'robbers'), a term used in India for a class of robbers. They lived apart in a semi-savage state, and sometimes went in gangs of forty or fifty.

Dacryd'ium, in botany, a genus of trees of the natural order *Taxaceæ*, indigenous to New Zealand, Tasmania, and the E. Indies. The principal New Zealand species is *D. taxifolium*, which in a few cases reaches a height of 200 feet, and yields a valuable timber. *D. Franklinii*, the Huon pine of Tasmania, is a noble tree, yielding very valuable timber as well as splendid spars for ships.

Dac'tyl (Gr. *daktulos*, 'a finger,' because each finger consists of one long joint and two short ones) is the name of a trisyllabic foot in Latin and Greek versification, of which the first syllable is long, and the other two short, as *cārmĭnă*. In dactylic verse the D. is the prevailing foot, and the only other foot admissible in it is the spondee. The most important of the dactylic verses is the Hexameter (q.v.). In English verse a D. consists of one accented and two unaccented syllables, as *lúnacy*.

Dactylorhiz'a, a disease of carrots, turnips, and other agricultural plants, in which the root divides and becomes hard and worthless. It is commonly called 'fingers and toes.' Berkeley thinks that it is not properly a disease, but only a tendency in the plant to revert to the wild state, and can only be remedied by a careful selection of seed. It must be distinguished from 'anbury,' which is caused by the attacks of insects.


Dado.

Da'do (Ital. 'a die,' 'a cube'), in classical architecture, denotes the solid block or cube which forms the body of a pedestal between the base mouldings and the cornice. The name is also applied to wainscoting about the height of a chair-back, which resembles a continuous pedestal round a room.

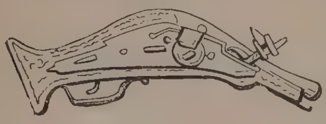
Dadur', or **Dadar,** a town in the Kachi province, Baluchistan, 5 miles E. of the Bolan Pass. The principal products of the neighbourhood are cotton, sugar, madder, several kinds of grain, cucumbers, and melons. Pop. 1980. The British here defeated a Kelat force in November, 1840. The heat at D. is so intense that it has reddened the unburnt bricks of the ancient sepulchres.

Dædalus ('the cunning worker'), a famous artist and mechanician of the heroic age of Greece, is represented as an Athenian of the royal race of the Erechtheidæ, being, according to some, the son, according to others, the grandson, of Eupalamus, the son of Erechtheus. To D. is ascribed the invention of carpentry and most of its tools—the saw, the axe, the plumb-line, and the auger—and glue. Among his greatest achievements in sculpture and architecture were the Cow of Pasiphae, the Cretan Labyrinth, the Colymbethra near Megara in Sicily, the impregnable rock-fortress and city near Agrigentum, in which were the palace and treasury of Cocalus; the temples of Apollo at Cumæ and Capua, that of Artemus Britomartis, in Crete; the Propylæon to the temple of Hephæstus at Memphis; an altar on the Libyan coast sculptured with lions and dolphins, and many wooden statues of gods and heroes. In naval architecture the invention of the mast and yards is attributed to him, and that of sails to his son Icarus—the fabled wings by which they essayed to cross the Ægean.

Dæn'dels, Hermann Willem, a Dutch commander, was born at Hatten, in Gelderland, in 1762, quitted Holland in 1787 in consequence of a revolution, and in 1793 aided Dumouriez with the volunteer corps called *Francs étrangers*. He held important commands in the Republican army until 1803, when he fell under suspicion and left the service. Three years later, however, he was restored by the French King of Holland. He defeated the Prussians, conquered E. Friesland, and was made general of the Dutch cavalry. In 1807 he was appointed governor-general of all the Dutch possessions in the E. Indies. D. ruled Java from 1808 to 1811, and compiled a valuable work, *Staat der Nederlandschen Oost-Indischen Bezittingen*. On the fall of Napoleon, the new King of Holland retained his services, and D. was engaged in colonial government till his death, 2nd May, 1818.

Daff'odil, or **Daffy-down-dilly** (a corruption of the Gr. *asphodelos*, the King's spear or asphodel lily). It is doubtful if the yellow D., now naturalised in Scotland, is a native of that country. It is, however, indigenous to England and most parts of Europe. There are several other species, all natives of southern countries, more particularly of those bordering the Mediterranean. *Narcissus poeticus* is one of the most common white cultivated forms. There are, besides, the rush-D., the Peruvian D., *Isme Amancaes;* the sea-D., *Ismene calathina*. The bulbs are purgative and emetic. For a description of the species see Baker's *Synopsis* of the genus.

Dag, a pistol in use in the 16th and 17th centuries. The D. was remarkable for its butt, which was fashioned like that of a musket.



Dag.

Dagg′er (Celt. *dag*, 'a point'), a short, pointed, two-edged sword or rapier, used by all peoples from prehistoric times to the present epoch. The broad-bladed short sword of the ancient Greeks may be taken as the type of this weapon of offence, of which almost every country has its own peculiar form. The poniard, dirk, French *misericorde*, or 'D. of mercy,' Italian stiletto and *anelace* (French *langue de bœuf*), Malay creese or kris, and Persian *kanjan*, are all varieties of the D. The mark of reference † is called a D. or obelisk.

Dagger Scene, an incident which took place in the House of Commons on 28th December, 1792, during the discussion of the 'Aliens Bill,' on which Burke and Fox were widely opposed. During his speech the former produced a dagger from his waistcoat pocket, and, flinging it down on the floor before him, thus continued, 'This is what you are to gain by an alliance with France; wherever their principles are introduced their practice must follow. You must equally proscribe their tenets and their persons from our shores,' and he ended an impassioned address by begging the House to strengthen the hands, not of the ministry, not of the opposition, but of the country, by passing the 'Aliens Bill.' It is said that Sheridan threw great ridicule on this theatrical exhibition by saying, 'The gentleman has brought his knife with him, but *where's the fork?*'

Daghestan′ (Tartar, *Tagh stan*, 'mountainous country'), a province in the Trans-Caucasian government, Russia in Asia, on the W. side of the Caspian. Area, 11,332 sq. miles; pop. 609,380. It is traversed by spurs of the Caucasus. In the valleys good crops of grain are produced, also of silk, saffron, madder, flax, and tobacco. The population is composed of Lesghians, Turks, Tartars, D. Arabs, and Armenians. Derbend is the chief town.

Dag′obert I., surnamed the Great, one of the Merwing kings of France. He was born about 600; succeeded his father, Hhlotar II., in 628; warred successfully against Gascons, Bretons, Saxons, and Slavonians; first opposed and then favoured the clergy; reformed the Frankish laws; died at Epinay, and was buried at St. Denis, in 638. He was an able but a cruel and licentious king. He is said, after conquering the Saxons, to have caused all those whose stature was greater than the length of his sword to be slain.

Dagöe, or **Dagen**, a Russian island in the Baltic, N. of Osel, and included in the Government of Esthonia, has an area of 367 sq. miles. It is separated from Vorms Island on the E. by Mago Sound, and forms, from its rocky character, the chief danger to ships entering the Gulf of Finland. Its capital is Keinis. On the W., the promontory of Dagerort has a lighthouse.

Da′gon (Heb. *dag*, 'fish'), the national deity of the Philistines, resembling in form the body of a fish, with the head and hands of a man (1 Sam. v.). Like the Indian Vishnu and Babylonian Odakon, it was a symbol of water and of the generative and vivifying principles of nature, which produce their effects through the influence of water; for which the fish, with its immense fecundity, was specially adapted. The corresponding female element was the Syrian goddess Atargates (2 Macc. xii. 26) or Derceto. See Layard's *Nineveh*, &c., Stark's *Gaza*, and Selden's *De Diis Syriis*.

Daguerre′otype, a positive photographic process named after Daguerre, who, in 1839, made known to the Academy at Paris that photographs of great beauty, in nicety of detail and gradation of light and shade, could be produced by developing by means of mercury the latent image obtained on a sensitive surface of salts of silver. The details of the process are as follow:—a copper plate, coated on one side with a film of silver, is highly polished, and rendered sensitive to light by being exposed in darkness to the vapour of iodine, thus forming an iodide of silver of a reddish-yellow colour. On exposure of the iodised plate in the camera for a short time, a latent image is formed which is developed by the vapour of mercury, which adheres to the parts affected by light, or, in other words, the lights of the picture, while the shadows are represented by the blackened polished metal. The picture is afterwards fixed by immersion in a solution of hyposulphite of sodium. It was afterwards found that the image acquired greater strength and an improved appearance by being coated with a boiling solution of hyposulphite of gold. The most important improvement that has been effected upon the original process is that the silvered plate is rendered extremely sensitive by employing the vapours of iodine and bromine successively. The D. process is now seldom practised in Great Britain.

Dahl, Johann Christian Clausen, a Norwegian painter, born at Bergen, 24th February, 1788. After residing at Copenhagen, and visiting the Tyrol and Rome, he was chosen Professor of Painting at Dresden, where he died, 14th October, 1857. His works consist of powerful landscape and marine paintings. Among others may be mentioned 'Winter in Zealand,' 'View of Bergen,' 'Scene in the Neighbourhood of Christiania,' and 'Winter Scene on the Banks of the Elbe.'

Dahl′gren, John A., a distinguished officer of the United States navy, was born in Pennsylvania in 1809, rose to eminence during the civil war, and, after the death of Admiral Foote, was appointed to the supreme command of the national fleet. He was admiral of the squadron that blockaded Charleston, and performed most efficient service. D. died at Washington, 12th July, 1870. He is perhaps most widely known in Europe through the invention of a cannon called by his name, which has been introduced into the United States navy. This gun is constructed with a very heavy mass of metal at the breech end; in front of the trunnion it is light. He wrote a *Report on Thirty-two-pounders* (1850), *Shell and Shell-Guns* (1856), &c.

Da′hlia, a well-known genus of Herbaceous plants belonging to the natural order *Compositæ*, cultivated in gardens for the beauty of its flowers. It is a native of Mexico, and was named in honour of Dahl, a pupil of Linnæus (q.v.), though, owing to the name having been preoccupied by another plant, it is also known, especially on the Continent, by the name of *Georgina*. More than 2000 cultivated varieties of this plant are described, but all are descended from two wild species—viz., *D. superflua* and *D. frustanea*; or, according to some, these two are only varieties of each other,

Dahlia.

and may be referred to one type, *D. variabilis*. In Mexico the D. grows on sandy meadows 5000 feet above the sea, and though introduced into England in 1789, it was not thoroughly established as a garden plant until 1814. Owing to careful cultivation, its garden varieties have now arrived at great perfection, chiefly by 'artificial selection' and Hybridising (q.v.), and the production of double-flowered forms. In Mexico the bulbs are used as food, and, owing to the quantity of *Inuline* (q.v.) which they contain, are nutritious. In 1800 they were introduced into France for that purpose, but on account of their acridity and 'medicinal flavour' were disliked by men and cattle, and the attempt to grow them on a large scale has now been discontinued. Though grown in the open air, the D. is not altogether hardy in this country, being frequently cut down by early frosts, and the tubers have to be taken up and stored away in winter out of the reach of frosts.

Dahl'mann, Friedrich Christoph, a German historian of Swedish descent, was born at Wismar, 17th May, 1785. After studying at the Universities of Copenhagen and Halle, he devoted himself to history, the fruits of which were shown particularly in his *Forschungen auf dem Gebiete der Deutschen Geschichte* (Alt. 1822-23), and his edition of the *Chronik von Dithmarsen* (1827). D., who had been appointed secretary to the States of Slesvig-Holstein, allowed himself to be drawn into the arena of politics, and expressing too independent opinions, was refused the promotion he would otherwise have obtained. So he accepted, in 1829, the Professorship of Political Science at Göttingen, which post, however, he resigned when King Ernst suppressed the Hanoverian constitution. D. then lived for a time in Leipzig and Jena. In 1842 he accepted the chair of History in the University of Bonn. The Revolution of 1848 brought back D. to public life. He became the head of the constitutional parliamentary Liberals in the German Diet, and was at one time asked to form a ministry. Foiled, however, by the Reactionary party, he retired finally from political life, and devoted himself entirely to teaching and writing. He died at Bonn, 5th December, 1860, leaving unfinished a history of Friedrich II. of Prussia, to which he had set himself during the last years of his life. D. has left behind him many valuable historical works.

Dahomey', a native state of W. Africa, on the coast of Upper Guinea, extends from To-Go land on the W. to Yoruba on the E., and has an estimated area of 3960 sq. miles, and a pop. of some 250,000. The country rises in a gently sloping plane for about 200 miles inland to the base of the Kong Mountains, has a rich soil of reddish clay, is watered by many minor streams, and yields cotton, sugar, tobacco, indigo, palm-oil, ivory, india-rubber, yams, melons, oranges, limes, pine-apples, and other fruits, and beans, peas, maize, millet, and Guinea-corn in abundance. A very plentiful supply of cattle is to be found over all the country. Wild animals are numerous, including the lion, tiger, elephant, hyæna, the boa, and other reptiles. The inhabitants are a tall, well-made, and warlike, but savage race, of pure Negro blood, belonging to a branch of the Ewe family, partly employed in agriculture, and practising a rude form of fetish-worship made up of ridiculous ceremonials and extensive human sacrifices. All the females in the state belong nominally to the king, and at a grand yearly festival there is a general distribution of wives. The only considerable town is Abomey or Agbome, the capital, situated 95 miles inland from its small port of Whydah. It is surrounded by mud-built walls and by a ditch four miles in circumference, but only contains some 20,000 inhabitants. In 1876, for an outrage on a European, by name Turnbull, at Whydah, the King of D. was ordered to pay a fine, and on his refusing, a blockade of the coast was made, which was removed on his making concessions, in 1877. In Oct. 1885, at the request of the king, Dahomey was placed under the protectorate of Portugal. In 1890 King Benhawzin and the French fell out about Porto Novo and Kotonu, which the latter claimed. A short war resulted in the submission of the king, who agreed to waive all claim to the territory in question on the receipt of an annual payment of £800. Peace lasted only two years, when the French were forced to march against the king, who fled, leaving his capital in the hands of his enemies. In 1894 he surrendered, and was sent to Senegal with the chiefs who had sided with him. The French had already annexed the districts of Whydah, Savi, Godomey, Abomey-Kalavy, and Avrekete, and proclaimed the rest of the country a French protectorate. Later on, in 1894, Guthili was elected king, and in January, 1895, obtained French recognition. It is most probable that France will annex the whole country close up to the German frontier of To-Go land.

Dah'ra, a maritime district of Algeria, between Oran and Algiers, chiefly notable in connection with the horrible massacre by the French of the *Ouled-Riahs*, a Kabyle tribe that fought stubbornly in the revolts of Abd-el-Kader. In June, 1845, this tribe, which had sought refuge in some extensive caves, refused to surrender to Colonel Pélissier, who thereupon choked the entrances to their retreat with fascines, and engulfed the whole band, numbering some 800, in a terrible death by suffocation and burning.

Daillé (Lat. *Dallæus*), **Jean,** a French Protestant theologian, born 6th January, 1594. After finishing his studies at Saumur, he was entrusted in 1612 with the education of the grandsons of Duplessis-Mornay. In 1625 he was appointed pastor and professor at Saumur; the following year he was translated to Paris, where he was a pastor for forty-three years. D. died 15th April, 1670. Among his warmest friends were Conrart and Balzac. His masterpiece is his *Traité de l'Emploi des Saints Pères pour le Jugement des différends qui sont Aujourd'hui en la Religion* (Gen. 1632; Eng. trans. 1651), in which he did much to shatter the authority of the fathers. Among his other writings may be mentioned his *Apologie pour les Églises Réformées* (1633; Engl. trans. 1653), and *La Foy fondée sur les Saintes Écritures* (Char. 1634), and 20 vols. of sermons. Even his adversaries admit his important services to the history of the Church by his learned researches into Church antiquities.

Daily Council was the court which, in Scotland, immediately preceded the institution of the College of Justice (q.v.), and from which the present court derives its title of 'Council and Session.' The D. C., in fact, was the court or council nominated by the king, in 1503, to take the place of the Court or Session erected in 1425, consisting of members of the Parliament named by the king, which had become so inattentive to its business as to create a public scandal. See COURT OF SESSION.

Daimiel (*Daimael*), a manufacturing town of Spain, province of Ciudad-Real, on the Azuar, 20 miles E.N.E. of Ciudad-Real by railway. It has a good Gothic church, a hospital, fine public gardens and promenades; its industries chiefly consist in the production of woollens, linens, blond lace, leather, and pottery. Pop. 11,508.

Dair-el-Kam'ar, or **Deir-el-Kamr,** a town in Syria, on a slope of Lebanon, 12 miles S.S.E. of Beirut, is the capital of the Druses (q.v.). The inhabitants, who are extremely industrious in cultivating the mulberry, the olive, and the vine, number 7060. Near D. are the ruins of the palace of the Emîr Beshîr, ruler of the Lebanon from 1788 to 1840.

Dai'ry, the department of a farm connected with the production of milk, the manufacture of butter and cheese, and the various industries arising out of the keeping of milch-cows. The word is derived from the old English *dey*, a servant-maid in charge of cows and milk. The D. on a mixed farm is generally a subsidiary concern, cows being kept on such primarily to supply the wants of the family and servants, and for breeding stock for fattening. In certain districts, however, where the herbage and climatic conditions are favourable, D. farming is practised, and the chief aim of the farmer in these cases is the production of milk, butter, and cheese. D. farming is largely practised in Buckinghamshire, Gloucestershire, Devonshire, Dorsetshire, and Cheshire in England, in Ayrshire and the S.W. of Scotland generally, the S. of Ireland, West of France, Holland, Denmark, and

Switzerland, and in New York, Ohio, Illinois, and others of the United States. When a D. farm is so situated that its produce can be readily disposed of in large towns as milk, this is generally done, and in such a case the D. operations are much simplified. Some dairies are devoted principally to the production of cheese, and on these the only residual product is whey, which is used for feeding pigs. In the case where butter is the staple, skimmed milk, *i.e.*, milk deprived of its cream, and churned or butter milk—healthy and nutritive beverages—remain. Cheese is made from skimmed milk, but cheese is valuable in proportion to the amount of fat or butter it contains.

Certain breeds of cattle are regarded as especially suitable for D. stock, while others are valued for fattening for the market. In Great Britain the Ayrshire and Alderney cattle are in greatest repute for D. purposes; the former on account of the large quantity of milk they yield on comparatively poor feeding, and the latter for the great richness of their milk, which, however, is small in quantity. The shorthorn breed is highly esteemed at once as good milkers and as kindly fattening stock. On this account shorthorns are preferred by town dairymen, who are obliged to renew their stock frequently, which they do most conveniently by feeding off for the butcher the cows to be withdrawn. Small breeds of cattle are, as a rule, better milkers in proportion to their weight than the larger kinds. See AYRSHIRE CATTLE.

The Byre (q.v.) or cowhouse of a D. farm should be lofty, spacious, well ventilated, and conveniently situated for feeding the animals, removing offal, &c. In the summer and autumn months cows are turned out to the grass parks to feed, and if the 'bite' is good, little more is required; but proper stall-feeding in winter, or when growing grass is not available, is a matter of serious importance. The nature of the food given has a most powerful influence on the richness and flavour of the milk secreted. Cows fed on brewer's grains, or 'draff,' give a large yield of thin, watery, insipid milk; turnip-feeding is at once detected by the strong 'nip' it communicates to milk and butter made therefrom. The winter feeding on a first-class Ayrshire D. farm 'consists in giving each cow in the morning 6 lbs. of hay; at nine o'clock they have steamed food, consisting of cut hay, turnips, bean-meal, and occasionally ground oilcake, or linseed-meal seasoned with salt. At noon each gets 4 lbs. of hay, and at 4 P.M. steamed food as in the morning. In the course of the day each gets 30 lbs. of raw turnips. A stable pailful of steamed food is the measure each gets at a time. During the day they have water between the intervals of meals.' Condimental foods are in favour in some dairies.

The largest yield of milk is secured by frequent milking, and if quantity is aimed at, cows are milked three times a day. When rich milk for butter or cheese is desired, milking twice a day is the rule. The average yield of milk varies within a wide limit, according to breed, feeding, state of health, interval since last calving, &c.; but the yearly average has been stated to range between 4900 and 2400 quarts. It is on record that a cross-bred cow, between a shorthorn and Galloway, gave as much as forty-five quarts a day. A cow not in calf will continue to give milk for several years, but the quantity gradually falls off, and when in calf they become dry several weeks before calving. The milk of a newly-calved cow is always richest in fat, and what is first drawn off is very highly-coloured, and known as colostrum or beistyn.

The D. proper, or milk-room, should be a cool apartment, so situated as to be as far as possible kept at a uniform temperature. An essential condition of the very first importance in a D. is the most scrupulous cleanliness of every corner, implement, and operation. There should be nothing to which foreign matter or any noxious odour adheres; marble shelving, glazed dishes and glazed tile-flooring should, if possible, be used, and all wooden implements should be washed and scalded and thoroughly dried before use. Nothing that will communicate any odour should be allowed to come near the milk, as cream quickly absorbs all smells, and reproduces them in the butter made from it. Milk sours and thickens quickly in the summer time, and after thickening, the cream particles become so entangled that they cannot rise to the surface; but with a well-situated D. and suitable milk-vessels, the cream can be secured before this occurs. Cream rises quickest in high temperatures, and when milk is exposed in shallow dishes. When, therefore, cream is to be secured for butter-making, shallow milk dishes are used; but when the manufacture of cheese is the object, the separation of milk in cream is avoided, the milk is poured into deep vessels, and in the best dairies it is generally agitated by working a kind of rake through it. As soon as the milk is brought from the byres it should be passed through a fine mesh sieve to free it from short hairs and any impurities. When the milk is to be creamed, it is poured into the shallow milk dishes, and under ordinary circumstances the whole of the cream will have risen, and be ready to skim off, in from eighteen to twenty-four hours; but in hot weather it is desirable to cream earlier. After the cream has been skimmed off, its butter-making qualities are not injured by its souring, and the frequency of churning is a matter of convenience.

In America a system of co-operative D. working has been in practice for several years, with great advantage as regards economy of labour, certainty of working, and quality of produce. The associated dairies, as they are called in America, are chiefly concerned with cheese-making, and each D. farmer pledges himself to supply milk in certain quantities and of pure quality. A certificate is given to each contributor of milk when his milk has been measured out and emptied into the tanks. By this system large quantities of milk of uniform quality are kept under the best conditions, and operated on by the most approved methods and apparatus. Such associated dairies have been introduced in Cheshire and Derbyshire, and in Sweden, Switzerland, and other Continental localities. A new D. industry, the preparation of condensed milk, has arisen. The milk is evaporated to a certain point by low steady heat, and a proportion of ground sugar added to it. In this form, when put in soldered tins, it will remain sweet and wholesome for a considerable period; and when sufficient water is added, it has the appearance, taste, and qualities of new milk, with only a little additional sweetness. So perfect indeed remains the substance of the milk, that on allowing the condensed milk to stand after dilution, cream forms on its surface.

The manufacture of butter and cheese will be treated of under these heads respectively. (See also CHURN.) The question of the comparative profit and advantage of selling D. produce as milk, or in the form of butter or cheese, is one which entirely depends on situation and local circumstances. Cheese-making is evidently an industry which can only be profitably cultivated on a large scale. See Morton's *Dairy Farming*, Horsfall's *Dairy Management*, and Stephens' *Book of the Farm*.

The most perfect and most expensively-erected D. in the world is, probably, that at the Queen's model farm situated within a short distance of Windsor Castle. It is 30 feet square; the roof is supported by six octagonal columns of white marble with richly-carved capitals. White porcelain tiles compose the floors, while the windows are filled with stained-glass, bordered with may blossoms, daisies, buttercups, and primroses. The floors are lined with tiles of a delicate blue tint, and rich medallions are inserted of the Queen, the late Prince Consort, and each of the royal family. Shields, monograms, and bass-reliefs are also used as ornamentation. All round the wall rests a marble table, and through the centre two long tables are supported by marble posts, and rest on basins through which flows perpetually a stream of fresh water. In this way is a cold temperature maintained throughout the D. The Aylesbury D. Co.'s farm at Stammerham covers over 1000 acres.

Da'is (Old Fr. *dais* or *deis*, 'a table,' Low Lat. *discus*), denoted in the Middle Ages (1) the high table on a raised platform at the upper end of a hall or refectory, (2) the seat on which guests sat at the high table, and (3) the canopy over the whole. The last became the most common use of the term, and thus we read of the D. of a throne, altar, shrine, stall, font, statue, or any object which has a cloth of estate, canopy, or heaven over it.

Dai'sy (Old Eng. *daeges eage*, 'eye of day,') the name of a genus of plants, plentiful in grassy meadows in Europe, and represented in America by one species, confined to Tennessee, Arkansas, and the neighbouring regions. In Continental Europe are found some species not native to Britain, but none of such interest as the common D., which, under the English name of D., the Scotch *gowan*, the French *marguerite*, &c., has been celebrated by poets in many languages as the emblem of modesty, purity, and fidelity, and as such was worn at tournaments by knights and ladies during the age of chivalry. Among the English poets of the D. are all who have touched upon pastoral subjects, from Chaucer to Burns. The allied genus, comprising five species closely allied to the D., is found in the S. of Europe. There are, besides, many other so-called Daisies, belonging to entirely different genera; among them may be mentioned the African D., Australian D., blue D., Swan River D., ewe D., French D. or Paris D., horse-D. and moon-D., Mexican D., and native D. of New Zealand. The ox-eye D. is also a name given to the horse-D. and moon-D. It is a common plant in England and in America. The stem is about two feet high, and the disk of the flower is yellow. It shows a marvellous tenacity when once established in a meadow, and farmers experience much difficulty in getting rid of it. The name D.-tree is applied to *Olearia* and *Eurybia*.

Ox-Eye Daisy.

Dako'ta (from 'D. Indians'), a territory in the United States, constituted in 1861, bounded E. by Minnesota and Iowa, S. by Nebraska, W. by Wyoming and Montana, and N. by the Dominion of Canada. D. is now divided into N. and S. Dakota: N. D. area, 70,195 sq. miles, and pop. 182,719; S. D. area 76,850 sq. miles, and pop. 328,308. Of these inhabitants 223 are Chinese, and 976 are civilised Indians. The Missouri flows through D. from N.W. to S.E., and N. Red River flows along its E. frontier into Manitoba. The largest sheet of water is the Mini Wakan, or Devil's Lake. The land is most prairie, and in the S. is very fertile, yielding rich crops of wheat, oats, and maize, besides sugar-cane and tobacco. The winters are intensely cold, but the climate is very healthy. The buffalo and deer abound, and the fur trade is valuable. The N. Pacific Railroad intersects D. from E. to W. The solitudes of the Black Hills have, since 1876, become the busy scene of gold-mining, and coal, iron, and copper are also found. The total debt, less sinking fund, of N. D. is over $3,000,000, while that of S. D. is close on $6,000,000. The value of the annual mineral production is, of N. D. over $61,000, of S. D. nearly $4,000,000. Yankton, in S. D., lies in the S.E., on the Missouri, and has a pop. of 3670.

Dalamow, Dalmow, or **Dalmau,** a town in the Rai Bareli district of Oude, on the Ganges, 68 miles above Allahabad. Founded as long ago as 1500 years, it was possessed by the Bhars, who long maintained a gallant resistance to the advance of the Mohammedans. In A.D. 1400, however, they were almost destroyed. There is a splendid Hindu temple of Mahadeo and many mosques. Over 60,000 persons are said to attend the large annual fair here; during the time it lasts, the locality profits much by the trade which goes on between the visitors and the natives. Pop. 5367.

Dalaradia, properly **Dalaraidhe,** a tribe of Picts or *Cruithne* (q.v.), who occupied the southern half of the county of Antrim and the greater part of the county of Down. According to the annals of Tighernach, the founder of the race was Fiacha Araidhe, who lived about the middle of the 3rd c. The annals of Ulster distinguish between the Irish and Scottish Picts, calling the former Cruithnii, and the latter Picti or Pictores.

Dalberg, or **Dalburg,** the name of an old German family raised to the rank of barons of the empire in the 17th c.—**Karl Theodor Anton Maria, Baron von D.,** born at Hernsheim, 8th February, 1744, was educated at Göttingen and Heidelberg, and studied canon law at Worms. He became chamberlain of that city (an office hereditary in the family from the 11th c.) and Governor of Erfurt. D. died at Regensburg, of which place he was archbishop, 10th February, 1817. His reputation stood high as a political ruler, student of science, and patron of letters. He was the author of several scientific works.—**Wolfgang Heribert, Baron von D.** (born 1749, died 1806), brother of the preceding, was the friend to whom Schiller addressed his *Briefe*.

Dalber'gia, a large genus of Leguminous plants, consisting of forest trees and climbing shrubs, natives of the tropics of the Eastern hemisphere. *D. Sisso* of Bengal and the provinces as far N. as the Punjab yields a fine compact timber called *Sissu* or *Sissum*, which, on account of its durability, is employed as sleepers on the Indian lines of railway, in the construction of gun-carriages, for the crooked 'knees' of ships, and for all purposes connected with house-building. *D. sissoides* yields the timber called blackwood and rosewood in Madras, where it is employed in making gun-carriages. *D. nigra* of Brazil supplies much of the 'rosewood' sent to Europe from that country. *D. latifolia*, also called blackwood and E. India rosewood, is the *Sal* (q.v.) of Bengal. *D. monetaria* of Surinam yields a resin not unlike Dragon's Blood (q.v.).

Dalecar'lia, or **Dalar'ne** ('the land of dales or valleys'), an ancient province of Sweden, now included in the län or prefecture of Kopparberg, of which Falun is the capital. The country is poor and hilly. The name is still dear to the inhabitants from the effective assistance given by the Dalecarlians to Gustavus Vasa in freeing Sweden from the Danish yoke in 1521.

Dalgar'no, George, was born at Aberdeen about 1626. He was educated in Marischal College, and afterwards at Oxford, where he taught a grammar-school until his death, 28th August, 1687. D. invented the finger alphabet for the deaf and dumb, treating of the subject in *Didascalocophus, or the Deaf and Dumb Man's Tutor* (Oxford 1680). He also wrote a treatise on a universal language. His writings show great learning, prevision, and originality.

Dalhou'sie, Fox Maule Ramsay, Earl of, was born at Brechin Castle, 22nd April, 1801. He entered the 79th Highlanders in 1819, and, after serving in Canada under his uncle, the Earl of Dalhousie, retired as captain in 1831. In 1835 he entered Parliament for Perthshire as a Whig, and sat for this county for two years, and subsequently for the Elgin Burghs (1830-41) and for the city of Perth (1841-52). In 1852 D., hitherto known as Fox Maule, on the death of his father, became Baron Panmure, and filled in succession the offices of Under-Secretary for the Home Department, Vice-President of the Board of Trade, President of the Board of Control, and Secretary at War (1855-58). His conduct in the latter post, during the war with Russia, excited a good deal of criticism. D. retired from political life in 1858, when Lord Palmerston resigned. In 1860, on the death of his cousin, the Marquess of D., he succeeded to the title of Earl, and the following year assumed the additional name of Ramsay. D., who had married, in 1831, the Honourable Montagu Abercromby, eldest daughter of the second Baron A. (died 1853), died 6th July, 1874, without issue, and was succeeded by his cousin, George Ramsay, 12th Earl of D., born 26th April, 1806; died 1880. Outside of politics, D. will be chiefly remembered for his devotion to the Free Church of Scotland, his last public act being to second, in 1874, the nomination of Dr. Rainy to the Principalship of the Edinburgh New College.

Dalhousie, Marquess of, James Andrew Broun-Ramsay, one of the most energetic Indian administrators that Great Britain has produced, was the third son of the ninth Earl of D., and was born at Dalhousie Castle, 22nd April, 1812. Educated at Harrow and Christ Church, Oxford, D., in 1832, by the death of his only surviving brother, succeeded to the honorary title of Lord Ramsay, and as such contested, although in vain, in 1835 the representation of Edinburgh in the Conservative interest. In 1837 he entered Parliament for Haddingtonshire; but his father, who had been Governor of Canada, dying the following year, he became a member of the House of Peers. In 1843 he showed his vigorous administrative powers and his industry as Vice-President of the Board of Trade under Sir Robert Peel, and still more so two years later as chief of the same department in the time of the railway mania. In 1847 he succeeded Lord Hardinge as Governor-General of India, and arrived at Calcutta 12th January, 1848. At once D. threw himself heart and soul into the work of improving the internal administration and developing the resources of India. He established roads, lines of railway, telegraphs, and irrigation works on a vast scale; reformed and cheapened the postal service; improved the system of education, and placed the various sects in the country on a more rational footing towards each other. Above all, he extended the Indian empire of Britain, conquering Pegu and the Punjab, and annexing several great dominions, the chief of which was Oude. Whether the policy of the 'great annexer' was always wise has been seriously doubted, and many believed that the Indian mutiny during the rule of his successor was to be traced to this policy, which has been described by a French critic as *brusques et precipitées.* But it was heartily approved of by the English nation. In 1849 he was made a Marquess, and obtained the thanks of both Houses of Parliament and of the East India Company, and in 1852 he was appointed Constable of the Castle of Dover and Warden of the Cinque Ports. His health, however, gave way before he left Calcutta in 1856, and after a long and painful illness, he died at Dalhousie Castle, 19th December, 1860. D. married in 1836 the eldest daughter of the Marquess of Tweeddale. She died in 1853, leaving no male issue, and the title of marquess became extinct, the earldom reverting to D.'s cousin, Baron Panmure. See *History of the Marquess of D.'s Administration of British India* (Lond. 1863-64).

Dal′ias, a town in the province of Almeria, Spain, 18 miles W.S.W. of Almeria, in the neighbourhood of mines of lead and antimony. Agriculture, mining, and fishing are the other industries. The principal buildings were destroyed by an earthquake in 1804. There are favourite mineral baths on the seaside near the town. Pop. 6254.

Dal′keith (Gael. *dal,* 'a field,' and *caeth,* 'narrowness,' 'narrow field;' or from *cath,* 'battle,' 'field of battle'), an ancient market-town and burgh of barony, 6 miles S.E. of Edinburgh, between the N. and S. Esks, consisting principally of one long street. The fine old Gothic parish church dates from the 16th c. There are several handsome churches belonging to different denominations, and an Episcopal chapel built by the Duke of Buccleuch within the grounds of D. Palace. The palace was erected about 1700, on the site of a very old castle, once termed the Lion's Den, from the haughty Earl of Morton having resided in it. The estate of D. was purchased from Morton by Buccleuch in 1642. One of the largest grain-markets in Scotland is held at D. The town has manufactures of woollens and brushes, besides tanneries and iron-foundries, and there are valuable coal-mines in the neighbourhood. Pop. of entire town, 7035. See Scott's *Provincial Antiquities.*

Dall′as, George Mifflin, an American diplomatist, was born at Philadelphia, 10th July, 1792. After a brilliant career at Princeton College, he spent a short time in a subordinate diplomatic post at St. Petersburg, and then settled down to the practice of law in his native city, where he filled several important offices, including that of district-attorney of Philadelphia. In 1837 he was appointed United States minister at St. Petersburg, but was recalled in two years. From 1844 to 1849 he held the office of Vice-President of the United States. In 1856 he became minister at the British court, and was entrusted with the settlement of the Central American question. In this capacity he gained the respect of all with whom he came in contact, was an especial favourite with Lord Palmerston, and diligently studied the political institutions of England. D. was succeeded in 1861 at the court of St. James by C. F. Adams. He died 31st December, 1864.

Dalles′ (Fr. *dalle,* 'a flagstone'), the name given by the French *voyageurs* to the rapids on the Columbia or Oregon river, forming, along with the cascades, magnificent scenery, but formidable obstructions to navigation. In the D., lofty walls of basaltic rock rise from either side, leaving a narrow passage, at one point only 58 yards in width, through which the angry waters rush with fearful rapidity.

Dalma′tia, the most southerly crown-land of Austria, lies along the N.E. coast of the Adriatic, and is hemmed in on the land side by Croatia, Bosnia, and Herzegovina. Area, 4940 sq. miles; pop. 527,426, of whom nine-tenths are Slavs (Morlaks of Servian descent), 46,000 Italians (mostly in the towns), and some 360 Jews. It consists of a strip of land 260 miles long, and having an extreme breadth of 60 miles. The coast, abounding in magnificent natural harbours, is surrounded by a fringe of islands, most numerous in the N. and largest in the S., of which the principal are Brazza (q.v.), Lissa (anc. *Issa*), Lesina *(Pharos)*, and Curzola *(Black Korkyra)*. D. is divided into twelve districts—Benkovatz, Cattaro, Curzola, Imoski, Knin, Lesina, Macarsca, Ragusa, Sebenico, Sign, Spalatro, and Zara. The mainland, nestling between the Dinaric Alps (q.v.) and the sea, is watered by few rivers, the largest being the Cettina, Kerka, Termanja, and Narenta. Its surface is in great part swampy, while one-ninth of it is covered with forest; only 22 per cent. is cultivated, yielding chiefly maize and barley. There is also an extensive cultivation of the vine and olive, and among the fruits are the fig, almond, and hill-cherry. Along the coast is found the richest algæ vegetation in all Europe. The climate of D. is hot but healthy, unless in the swampy regions, where fever prevails during certain seasons. The mean temperature is 62·5° Fahr., while its range is from 19° to 95°. D. has valuable coast-fisheries of anchovy, mackerel, and tunny. With fine pastures, it is celebrated for its sheep-farming. Most of the land is under pasture and wood, and agriculture is in a very backward state, sufficient grain not being produced for the wants of the country. D. produces large quantities of Maraschino, and other kinds of dessert wines. In various parts of the mainland and archipelago, asphalt is found, and there are iron and coal mines. Zara is the capital, and the other great trading places are Spalatro, Cattaro, and Ragusa. D. sends nine deputies to the Reichstag, and has a Diet of its own, consisting of forty-three members. The Roman Catholic Church has an archbishop at Zara, and in D. the number of its adherents amounts to about two-thirds of the inhabitants, while the members of the Greek Church are under one-seventh. The Slavs speak the dialect of Herzegovina. As a race, the Dalmatians are intelligent and handsome; the untutored Morlak is bold, independent, and cunning. D. is first known as a 'ledge of Hellenic land,' protected by its hills from the native barbarians of Illyricum. It was conquered by Augustus, B.C. 23, becoming the S. part of the province of Illyricum. In 489 it was captured by the Goths, and in turn by the Slavs (620). Towards the end of the 9th c. the coast-land fell into the hands of the Croatian princes, one of whom, Cascimir Peter, took the title of King of D. (1052). On the extinction of this dynasty (1100), King Ladislaus of Hungary seized part of the territory, while the other portion placed itself under the protection of Venice. By the peace of Passarovitz, 1718, Venice ceded a small piece of D. to Turkey, and by the peace of Campo-Formio, 1796, Venetian D. was transferred to Austria. In 1805 Napoleon annexed part of D. to the kingdom of Italy, and in 1805, having also captured Hungarian D., he united the parts, thus forming the province of Illyria. It again became Austrian in 1814, and was made a crown-land in 1816. See the works of Peter (1857) and Noë (1870).

Dalmat'ic (Lat. *tunica Dalmatica*, from Dalmatia), the characteristic dress of deacons in the early Christian Church, is a tunic extending to the knees, with long wide sleeves open at the sides, and ornamented with two purple stripes, the *angusti clavi* of the Roman dress. The simpler and older form was the *colobium* (Gr. *kolobos*, 'short'), which had only very short sleeves. When the other clergy began to wear the Chasuble (q.v.) the D. was conceded to the deacons, as more elaborate than the colobium, because they had nothing over it, although it was reserved for those at Rome till about the 10th c., when it became generally the proper dress for deacons. See Walcott's *Sacred Archæology* and Marriott's *Vestiarium Christianum.*

Dalri'ada. In the 3rd c. Cairbre Ruighfhadu—*i.e.*, 'Cairbre of the long arm,'—a prince of Munster, removed to Ulster, where his posterity attained considerable power. Bede calls him Reuda, other historians Riada. In 506 a band of his descendants, numbering 150, and led by Loarn, Angus, and Fergus, three sons of Erc, crossed to the opposite coast of Argyllshire, and took possession of Cantire and Knapdale, founding the very small 'kingdom of D.' In course of time they conquered the whole mainland of the county as far as Drumalban or the modern Tyndrum. The northern Picts or Caledonians maintained an almost constant warfare with them, and in the 8th c. appear to have utterly defeated them (having burned their capital, Dun-Add, near Loch Crinan, to the ground). Their history from the following century is involved in great obscurity, but at the close of that period, their leader, Kenneth MacAlpine, appears as king alike of D. and of the northern Pictland. It is believed that he acquired the new territory by inheritance through his mother. He proved to be a man of great ability, subdued both the Strathclyde Britons and the southern Picts, thus reducing Albainn (as it was then called and is still known to all Gaelic speakers) under one sceptre, and eventually imposing on it the name of Scotia or Scotland.

Dalry' (Gael. 'king's field,' or 'level field'), the name of several places in Scotland, of which the most important are—1. A town of Ayrshire, on the right bank of the Garnock, 19 miles S.W. of Glasgow. It owes its prosperity to the development of its extensive coal, lime, and iron fields. There are numerous blast-furnaces in the neighbourhood. There is also a large woollen-mill, giving employment to numerous hands. Pop. Dalry proper, 3686; Blair Works, 667; and Old Carsehead, 219. 2. A village in Kirkcudbrightshire, Scotland, on the river Ken, 15 miles N.N.W. of Castle-Douglas. Pop. 560, as against 603 in 1881.

Dalrym'ple, an ancient Scottish house, which takes its name from the estate of D. in Ayrshire, which it held in the 14th c. The family came into notice in the 15th c. for adherence to Lollardism, and **John D. of Stair** was among the first Scottish gentlemen who embraced the Reformation doctrines. His son, **James D. of Stair,** was a firm supporter of the Scottish Reformation of 1560.—**James D., Viscount Stair,** grandson of the last, was born at Drummurchie, Ayrshire, May, 1619. He studied at Glasgow University, became captain in the army raised to vindicate the Covenant (q.v.), and in 1641 was made Professor of Logic in Glasgow, an office which he resigned before his call to the bar in 1648. A Presbyterian and a Royalist, he was in 1649 appointed Secretary to the Commission sent to Holland by the Scottish Parliament to invite Charles II. to accept the crown, a mission in which D. showed considerable tact. In 1657 he was made a judge under the Cromwellian rule, an office in which he was confirmed at the Restoration, and which he offered to resign in 1663 rather than sign the Declaration Oath. In 1664 he was made a baronet, in 1671 Lord President of the Court of Session, and during the next ten years occupied himself in composing *Institutions of the Law of Scotland.* In 1681 he procured the insertion in the Test Act of a clause which rendered the Act contradictory and invalid. The persecution to which he was thenceforth subjected forced him in 1682 to withdraw to Leyden, where he occupied himself mainly with philosophy until 1688, when he sailed for England with William of Orange. He was reappointed President of the Court of Session, was raised to the peerage, and was the King's chief adviser in Scottish affairs. He died at Edinburgh, 23rd November, 1695. He was a man of great sagacity and learning, of sincere but unimpassioned patriotism, of amiable but almost phlegmatic temperament. His chief works are his *Institutions of the Law of Scotland* (1681), on which his reputation mainly rests, and his *Physiologia Nova Experimentalis* (Leyd. 1686), in which he sought to overthrow the Copernican theory.—**John D., First Earl of Stair,** eldest son of the above, was born in Wigtownshire in 1648. He became an advocate, and defended Argyll in his trial for treason. In 1686 he was made Lord Advocate, in 1688 Lord Justice Clerk, and in 1691 Secretary of State. His memory is stained by his complicity in the Massacre of Glencoe (q.v.). He became Viscount Stair in 1695, was made Earl of Stair in 1703, was largely occupied in preparing the way for the Act of Union, and died 8th January, 1707.—**John D., Second Earl of Stair,** son of the first Earl, was born at Edinburgh, 20th July, 1673. Having accidentally shot his elder brother, he was educated away from home. He studied at the Universities of Leyden and Edinburgh, fought as a volunteer under the Earl of Angus in 1692, was aide-de-camp to Marlborough during the campaign of 1702, in 1706 became commander of the Cameronian Regiment and the Scots Greys, and distinguished himself at Oudenard, Malplaquet, and Ramilies. He became Earl of Stair in 1707, and in 1718 went as British ambassador to Paris, where he skilfully counteracted Jacobite intrigues, but whence he was recalled in 1720, owing to his quarrel with Law, the Minister of Finance. He lived in retirement at Newliston near Edinburgh until 1742, when he was made commander of the British troops in Flanders, and was present at the battle of Dettingen (1743). He died at Edinburgh, 9th May, 1747. He was an able diplomatist and soldier. St. Simon characterised him as 'extravagant, ardent, and ambitious.' See Graham's *Annals of Viscount and First and Second Earls of Stair* (Edinb. 1875). The present Earl of Stair (10th Earl) sits as Baron Oxenford in the House of Lords. He was born in 1819, and succeeded to the title in 1864. He sat in the House of Commons as member for Wigtownshire, from 1841 to 1856. He is a Knight of the Thistle.

Dalrymple, Sir David, a famous Scottish judge and author, the son of Sir James D. of Hailes, and great-grandson of the first Lord Stair, was born at Edinburgh, 28th October, 1726. He was educated at Eton, and at the Universities of Edinburgh and Utrecht; was called to the bar in 1748, and won considerable reputation as a pleader; in 1766 was made a judge of the Court of Session, with the title of Lord Hailes; and in 1776 was nominated one of the Lords of Justiciary, which office he held till his death, 29th November, 1792. D. was a man of admirable character and varied acquirements. Amid his judicial labours he was a voluminous author of works displaying at once profound learning and the graces of an Attic style. Among his works are *A Discourse on the Gowrie Conspiracy* (1757); *Memorials and Letters Relating to the History of Britain in the Reign of James I. of England* (1762); *Memorials and Letters relating to the History of Britain in the Reign of Charles I.* (1766); *Annals of Scotland, from the Accession of Malcolm III., Surnamed Canmore, to the Accession of Robert I.* (1776); *Annals of Scotland from the Accession of Robert I., Surnamed the Bruce, to the Accession of the House of Stuart* (1779). He also edited various early Scottish poems, &c.—**Alexander D.,** a Scottish geographer, brother of the preceding, was born at New Hailes, near Edinburgh, 24th July,

1737. He was educated at Haddington, and in 1752 was sent to Madras as a writer in the service of the East India Company. The study of documents on the commerce of the Eastern Archipelago prompted him to resign his post and sail for these islands, with the view of creating a lucrative traffic. At Sulu, he made a favourable commercial treaty with the Sultan, but his projects were ruined by the outbreak of smallpox among the natives. He revisited England in 1765 to ventilate his mercantile scheme, which the Government would not embrace; went back to Madras as a member of council in 1775, returned to England in 1777, was appointed hydrographer to the East India Company in 1779, and died at Marylebone, 9th June, 1808. He wrote a large number of geographical treatises, political pamphlets, &c.

Dal'ton, a town in Furness, Lancashire, 16 miles W.N.W. of Lancaster, connected with both the Lancashire and Cumberland railway systems, and not far from the magnificent ruins of Furness Abbey. There are iron-foundries in the vicinity, and a considerable trade is carried on in the malting of grain. Romney, the painter, was a native of D. Pop. civ. par. 13,300.

Dalton, John, was born at Eaglesfield, in Cumberland, 5th September, 1766. In 1781 he removed to Kendal, where he became an usher in his cousin's school, and began a series of meteorological records which he continued with the greatest regularity to the day before his death. In 1793 he obtained the chair of Mathematics and Natural Philosophy in the New College, Manchester, became a member of the Literary and Philosophical Society in that city, and shortly afterwards contributed his first paper on some *Extraordinary Facts Relating to the Vision of Colours*. It was suggested by his inability to distinguish certain colours—a peculiarity which is known as *Daltonism* (q.v.), and which seems to have been due to the yellowish tinge of the refractive matter of his eye. In the *Manchester Transactions* for 1802 several other papers appear by him, bearing upon meteorological subjects, upon evaporation, and upon the relations subsisting between the pressure, volume, and temperature of permanent gases. From these is deduced D.'s law that the pressure of a gas at constant volume is proportional to the temperature, which, together with other important principles there laid down, has greatly aided the experimental determination of the specific gravity of gases. Many other valuable contributions to science are to be found in the *Philosophical Transactions*, in Thomson's *Annals of Philosophy*, and in Nicholson's *Philosophical Journal*. In 1793 appeared his *Meteorological Essays* (2nd ed. 1834). In 1803 D. began the working out of his atomic theory, an outline of which was given in the third chapter of the first volume of his *New System of Chemical Philosophy* (1808), while a further development and application appeared in the second volume of the same work, two years later. In 1817 he became President of the Manchester Literary and Philosophical Society, and in 1821 was elected a Fellow of the Royal Society, from which he received a gold medal in 1826 for his scientific discoveries. In 1827 the third volume of the *New System of Chemical Philosophy* was published, the most important part of which is the appendix, in which he treats, with his characteristic sagacity, of various thermal properties of gases. At the second meeting of the British Association at Oxford in 1832, the University conferred upon D. the degree of D.C.L., and at the Edinburgh meeting in 1834 he was made LL.D. In 1833 D. received from Government a pension of £150, which in 1836 was increased to £300. D. died at Manchester, 27th July, 1844. The present development of the atomic theory, with which D.'s name must ever be associated, is given under the article ATOMIC THEORY. D.'s merits as a chemist were as fully appreciated on the Continent as in his native country. He was a foreign Fellow of the Institute of France, a member of the Academy of Sciences of Berlin and Munich, and of the Natural History Society of Moscow.

Dal'tonism. Certain individuals are more or less deficient in the power of discriminating colours. This is D., from the name of the distinguished chemist who was himself the subject of it. It is sometimes termed colour-blindness. The most common form of D. is an inability to distinguish red from green—thus ripe cherries can be distinguished from the leaves of the tree only by their form. In other cases blue and green are confounded. In most cases, the colour-blindness is for the red rays. Frequently low tones of colour give rise to the same sensation as certain mixtures of black and white—producing grey. D., in all probability, depends on some peculiarity of the structure of the retina. It is well known that the periphery of the retina shows defective perception of the different colours—red appearing grey; green, blue; green, yellow, &c.; and it would appear that D. is 'only an extension of the want of perceptivity, normal in the periphery of the retina.'

Dalziel', Thomas, of Binns, W. Lothian, a Scottish general, born about 1599. He took the royal side in the civil war, and held the town of Carrickfergus for the King; was a major-general at Worcester, where he was captured, but escaping from prison, he entered the service of the Czar of Muscovy, and distinguished himself in the wars against the Turks and Tartars. In 1665 he returned to Scotland, and was appointed commander-in-chief of the forces there. On the 28th November, 1666, he suppressed a rising of the Covenanters at Pentland, with more humanity than might have been expected from a man of his ferocity of temper, intensified by Russian service and a fanatical loyalty to his King. After the execution of Charles I. he never shaved his beard, which grew down to his middle, and this, coupled with his antique dress, never failed to gather round him a crowd of boys when he appeared in London. D. died in 1685.

Dam'ages, in law, is the pecuniary recompense due to one person who has sustained loss or injury through the fault of another. Every illegal, unwarrantable, or malicious act, whether fraudulent or not, by which another is injured in his worldly interest, in his person, or feelings, founds a civil claim for D. against the person who has caused the loss or injury. D. for breach of contract are only due when it is impossible to enforce specific performance, and even when a specific penalty is annexed to failure, so long as performance is possible, the debtor in this obligation is not entitled to pay the penalty, and so get quit of the obligation. Where a particular subject has been lost, destroyed, or injured, without criminality on the part of the person culpable, the person sustaining the loss is only entitled to D. according to the real value of the loss, not according to the sentimental value which he may attach to the subject. But if the culpable person has criminally caused the injury, the sufferer, in estimating D., is entitled to have weight given not only to the value of the subject sentimentally, but to possible consequences. A master is civilly liable for the negligence of his servants or others employed by him. Formerly, in England, no action for D. was maintainable against a person who by wrongful act or negligence caused the death of another, though the offender was liable if the sufferer was only hurt, but this defect of law has been remedied by Lord Campbell's Act, which provides that any one who has wrongfully or neglectfully caused the death of another shall be liable in D., even though the circumstances of the act make it felony. The action is only competent to the wife, husband, parent or child of the person killed. The amount of the damages to be paid to the successful plaintiff is fixed by the jury, or, when there is no jury, by the judge.

Dam'aging Manufactures, Machinery, or **Mines.** Statute 24 and 25 Vict. c. 97, enacts the penalty of penal servitude (of 3 years—life) or of imprisonment for any term not exceeding two years, with or without hard labour, and with or without solitary confinement, and, if a male under 16 years of age, with or without whipping, for these offences.

Daman', a seaport and settlement of Guzerat, India, at the mouth of a river of the same name. Ships in the harbour are safe from the S.W. monsoon, and outside the bar there is good anchorage. Endemic fevers prevail, caused by the brackishness of the water. D. belongs to the Portuguese. The settlement of D. includes the pargana of Nagar Havili, and the pop. of the combined district is 49,084, of whom 1615 are Christians and 28,006 are Hindus. The area of the district is 82 sq. miles. The principal crops are rice, wheat, maize, and tobacco. Opium is no longer allowed to be transported, and the weaving and dyeing trade having declined, the town of D. is by no means so flourishing as it was before the British conquered Scinde. Mats and baskets are largely made here, and deep-sea fishing is remunerative to the inhabitants.

Daman, or sometimes **Hyrax,** an anomalous genus of mammalia, a distinct order, *Hyracoidea*, and sometimes regarded as included, from certain resemblances in the teeth, in the family *Rhinocerotidæ*, or that of the Rhinoceroses. Even in the character of its placenta (which is zonary and deciduate) it differs from the *Rodentia*, with which order it has also been supposed to possess structural relations. Hence the genus D. stands as the type of a somewhat aberrant group of mammals, intermediate between the *Ungulata* or hoofed mammals on the one hand, and the Rodents and *Insectivora* on the other hand.

The genus D. is represented by several species, of which the *H. Syriacus* of Syria (supposed to be the 'cony' of Scripture), and the *H. Capensis*, 'Klip Das,' or 'Cape Badger,' of S. Africa, are the best known. The H. of Syria is a small rabbit-like animal, the front feet having four, and the hind feet three toes. The nails are flat. The body is covered with fur, and the snout is divided as in Rodentia. There are four teats in the groin and two in the axillæ. From twenty-nine to thirty-one dorso-lumbar vertebræ exist, a number rarely exceeded in mammals. The adult has eight incisors, no canine teeth, sixteen premolars, and twelve molars. The outer upper incisors are small, but the inner large and curved, which grow throughout life. They are coated in part with enamel, like the incisors of rodents. The molars resemble those of the rhinoceros. The Syrian H. is of dark-brown colour, and the Cape H. wants the long black hairs of the former. No clavicles exist, and the tail is rudimentary.

Damar', a town of Yemen, Arabia, 120 miles N.N.W. of Aden, with 5000 well-built houses, the governor's castle, and a college for the Zeïtes, which is well attended.

Damaraland, a protectorate within German S.W. Africa, lying between 19° 30' and 23° S. lat., and extending from 20° E. long. to the Atlantic Ocean on the W. The coast-land is barren and deserted; but inland the soil is fertile and well-adapted for rearing cattle. Here is much copper, yet so far the mines have not been worked, owing to the excessive cost thereby entailed. In the centre the land is mountainous, and Omataka is the highest peak. The N. and W. parts are watered by small rivers, which run either into larger tributaries of the Zambesi, or into Lakes Ngami and Kumadan. In the S. are the Swakop and Nosob rivers. The inhabitants are of the Negro race, hardy, brave, and fairly intelligent. The imports, for 1894, into German S.W. Africa, have been estimated at £45,778, and the exports at only £6568; these proceed viâ Walfisch Bay, and the greater part enters or leaves D.; but there is a very considerable overland traffic, as to which nothing is definitely known. The productive capacity and natural resources of the country remain to be tested. The general appearance would seem to indicate a very prosperous future, should European capital be attracted to this quarter of the continent.

Damasce'ning, Damaskee'ning, Dam'asking, terms employed indiscriminately to denote the production of distinct styles of artistic ornament on iron, steel, &c., and derived from Damascus, where the manufacture of Damasked Steel (q.v.) attained great celebrity. D. is an entirely different process from that by which damasked steel is produced, being the inlaying of gold or silver threads in incisions, representing some design under-cut in metal. The threads are worked in with a blunt tool, and the whole afterwards filed and burnished. This art was successfully practised by the ancients, and during the Renaissance in Italy, Germany, and Spain, arms and armour were so enriched. Indian gold D., called *koftgari*, and produced chiefly in the Punjab, possesses great artistic excellence.

Damasce'nus, Joannes, afterwards surnamed **Chrysorrhoas** ('Golden Stream'), from his eloquence, was born at Damascus about A.D. 700, became a monk of St. Sabas near Jerusalem, and died about 760. He was the last theologian of the Greek Church, and his writings form the starting-point of systematic theology. His best-known work is *De Fide Orthodoxa*, a complete system of theology derived from the fathers. D. sought to propagate the Aristotelian philosophy, but, like most ecclesiastical writers of the times, was extremely credulous and untruthful. He has been canonised both in the Greek and Latin Churches. The best edition of his works is that by P. Mich. Lequien (Par. 1712).

Damas'cus (Turk. and Arab. *Dimishk è Shâm*), one of the oldest cities in the world, and the capital of the vilayet and the province of Syria, Asiatic Turkey, lies in the delightful plain of Chutah, at the E. base of Anti-Libanus, and at an elevation of 2238 feet above the sea. It is surrounded by gardens and orchards for a circuit of some 30 miles, and in its approach it has a splendid appearance. 'Tapering minarets and swelling domes tipped with golden crescents rise up in every direction from the confused mass of white-terraced roofs, while in some places their tops gleam like diamonds amid the deep-green foliage.' The Barrada (the Abana of Scripture) flows past D. in an easterly direction, to be joined by the Phega (anc. Pharpar) in the Bahr-el-Merj. The city is enclosed by dilapidated walls, dating chiefly from Roman and Arabic times. Its streets are gloomy and narrow, and are made hideous by uncared-for refuse-heaps and stagnant pools, and still more by crowds of vagrant, ravenous dogs. The 'street called Straight' (Acts ix. 11) runs about a mile from E. to W., and is the most spacious where all are miserably narrow. The private houses are generally mean, prison-like structures of grey mud, but the interiors of those of the better class are furnished and adorned with the most lavish magnificence. The principal public building of D. is its famous Grand Mosque, originally a Semitic shrine or temple. According to Fergusson, it is impossible to make out its original form in consequence of so much Moslem and Christian rebuilding. It occupies one side of a great square (163 by 108 yards), and the interior is portioned into nave and aisles by rows of Corinthian columns, supporting the roof in the style of the old basilicas. The quadrangle is entirely paved with tesselated marble, and is ornamented with beautiful fountains. A hospital for the sick is attached to the Mosque. Another notable building, the Great Khan, consists of alternate layers of black and white marble, and has a graceful cupola, supported on granite pillars. There are also an extensive citadel, an imposing serai or palace, besides 248 minor mosques, and many monasteries, bazaars, caravanserais, baths, cafés, &c. D. has now but a tithe of its once famous manufactures of silks, cottons, cloth of gold, jewellery, cabinet-work, leather, horse trappings, sword-blades (see DAMASCENING), &c. It is still, however, a great centre of the caravan trade, and receives from Britain calicoes, hardwares, sugar, &c., to the value of some £200,000 yearly. The September pilgrimage to Mecca, which had a strongly commercial as well as a religious character, was under Governmental protection, and cost the treasury £70,000 yearly. Consisting formerly of as many as 60,000 persons, the caravans have greatly fallen off since the opening of the Suez Canal. The pop. of D. is estimated at 198,600, of whom five-sixths are Mohammedans, and the remainder, Jews, Christians, and Druses (q.v.). The last of these occupy a quarter of the city by themselves. The exports in 1893 were estimated at £456,780, and the imports at £677,500. D. is a city of unknown antiquity. It is alluded to in Genesis xiv. 15, and for a long period was closely connected with the kingdoms of Israel and Judah. It was in the possession successively of the Assyrians, Babylonians, and Persians. Under the Persians it was made capital of the province of Syria, but it fell into the hands of Alexander the Great after the battle of Issus. During the long wars of the Seleucidæ and the Ptolemies, D. had no separate history, belonging sometimes to the one power and sometimes to the other. The Romans under Pompey subdued Syria, and made D. the capital of the province of Syria, B.C. 64. In 633 it was seized by the Caliph Omar; in 1401 Timur partly destroyed it by fire, and in

1516 it was taken by the Sultan Selim I. It has ever since remained in the hands of the Turks, except during an interval of eight years (1832-40), when it was under the rule of Ibrahim Pacha. In 1860 the Druses broke loose upon the Christians, killing some 4000, and carrying off many of the women as prizes for the harem. The French macadamised road was opened between D. and Beirut in 1863. There are now three railway projects on foot to connect D. with Beirut, Kaiffa and Acre, and the Hauran. Those between D., Beirut, and the Hauran are simply steam tramways, and are in the hands of French and Belgian companies, but the Kaiffa, Acre, and D. road is an ordinary railway. The Beirut line will shortly be opened to traffic. The D. and Hauran, or Syria-Ottoman, as it is called, railway is at present somewhat under a cloud, owing to financial difficulties which, however, may be soon overcome. See Porter's *Five Years in D.*, Addison's *D. and Palmyra*, Pococke's *Description of the East*, also article SYRIA.

Dam'ask, a woven fabric in which elaborate patterns of foliage, flowers, wreaths, scrolls, &c., are introduced, said to have been first made at Damascus. The production of the pattern depends on the arrangement of the weft and warp yarns in twill-weaving, the gloss or lustre on the weft being distinct from that of the warp threads, which run at right angles to them. In D. weaving, the design for the fabric has first to be prepared and drawn on 'point' paper, that is, paper ruled into small squares which correspond with the threads in the web. The weaving is done in the Jacquard machine (see JACQUARD), previous to the invention of which, about the beginning of the present century, the weaving of D. was effected by a very cumbrous and tedious process. Damasks are chiefly made in linen, and used for toilet and table covers, napkins and towels, but woollen fabrics and silks are also similarly woven, and used principally for furniture cloths. In furniture damasks the pattern is sometimes produced by the use of different colours, and a cheap D. for furniture and hangings is now made of a union of cotton and woollen yarns. The chief British seats of the linen D. manufacture are Belfast in Ireland and Dunfermline in Scotland, that being the staple textile industry of these two towns.

Damasked Steel. When steel presents a 'watered,' waved, contorted, or fibrous surface, as in the highly-prized Damascus blades, it is spoken of as *damasked*. The peculiar markings are due to the crystallisation of the iron and carbon from particular treatment in cooling. Carbon is present in excess of the ordinary proportions, and by the action of acids on the metal of unequal composition, and consequently of varying degrees of solubility, patterns of a certain order may be strengthened. The finely-watered blades of Indian manufacture are made of 'wootz,' or Indian steel, and of different qualities of iron, forged into bars, welded, spirally twisted, and beaten out flat. The blades are said to be hardened by being fixed while redhot to a wheel put in rapid motion. Very successful imitations of the real 'damask' have been produced by French manufacturers. Grey, black, and brown 'damasks' result by mixing quantities of platinum, silver, and palladium with the steel.

Dam'asus, a Spaniard, succeeded Liberius as Bishop of Rome, A.D. 366, after a sanguinary contest with Ursinus. He was active in suppressing Arianism and also Apollinarianism, for which purpose he held several councils and wrote a number of letters. His zeal was also excited against the Luciferians (q.v.), the Donatists (q.v.), and the Priscillianists (q.v.). In return for this his own private character was, rightly or wrongly, attacked. An edict of Valentinian's, that the clergy should not receive legacies from pious ladies, was said to have been aimed principally at him, and he was directly charged with immorality before a council held at Aquileia, but was acquitted. From 382 till his death in 384, he had Jerome (q.v.) for his secretary, who was engaged at the time on his version of the Bible. See Gibbon's *Decline and Fall of the Roman Empire*, chap. xxv.

Dambul', a village in Ceylon, 45 miles N.W. of Kandy, named from a vast rock-temple of Buddha, containing carvings of Buddha, one of which is of colossal size.

Dame (Fr. *dame*, Lat. *domina*, 'the mistress of the house'), a title of honour formerly given in England to a *lady*, understanding the latter term as the correlative of *gentleman*. It is now little used in England, but is applicable to married women of all classes. Before the time of the present system of public education there existed throughout the country districts innumerable small schools under the instruction, such as it was, of untrained, irresponsible, and imperfectly educated women. These schools were called *Dame* schools as opposed to those where the teachers had been themselves properly taught, had learned to teach, and were under the supervision of specially appointed managers. Absence of discipline, absence of proper instruction, and absence of suitable accommodation and ventilation were the chief characteristics of these *Dame* schools. *Madame*, shortened into *madam*, is still used on special occasions, and in ceremoniously addressing a lady in a letter; but it is not now the custom in England, as it was in former times, for ladies and gentlemen in addressing a lady orally to say *madame*, or *ma'am*. In France, again, it is considered discourteous to omit the title in addressing a married woman, whatever be her social rank. In Spain, it is proper to address a lady or a gentleman in the third person, by a term perhaps equivalent to 'your honour' in England. In France, the Virgin Mary was styled by way of pre-eminence *Notre Dame*.

Dame's Violet, a genus of plants of the natural order *Cruciferæ*, natives of the middle and S. of Europe. The common D. V., or white rocket, is found apparently wild in Britain, but is doubtless an escape from the many cultivated varieties. Its flowers are scentless by day but perfumed at night. It is cultivated in pots by ladies in Germany, as it was at one time in England; hence its name. Another species, the night-scented rocket, is a favourite house-flower in parts of the Continent.

Dam'iens, Robert François, was born at Tieulloy, in Artois, in 1714. His youth, passed in service, was so vicious that he earned the sobriquet of *Robert le Diable*. On account of a robbery he was compelled to seek refuge in Belgium, and there, in 1756, took his resolve to assassinate Louis XV. On the 5th of January of the following year he stabbed the King while he was leaving Trianon. D. was instantly captured. During his trial he behaved with great coolness; on hearing the sentence he only said, 'It will be a rough journey.' After frightful tortures, he was put to death, 28th March, 1757. His motive for the murder could not be determined. The people accused in turn the Jesuits, the Jansenists, the Dauphin, and the Parliament, of complicity in the crime; but the assassin revealed nothing. See *Pièces orig. et procéd. du Procès fait a Rob. Franç. D.* (Par. 1757), and *Vie de Rob. Franç. D.* (Par. 1757).

Damiett'a, called by the natives **Damiah,** Arab. *Dimiat* (anc. *Tamiathis* was four miles lower down), a seaport of Lower Egypt, in a governorat of the same name (area 4½ sq. miles; pop. 43,616), about eight miles from the mouth of the eastmost branch of the Nile. The mouth of the stream is protected by circular batteries. In the 13th c. it began to be a flourishing place, and was long famous for its manufactures of leather and cloth (it gives name to 'dimity'); but its industrial activity has long declined, and its formerly flourishing commerce has been absorbed by Alexandria. Rice and flax of excellent quality are extensively grown in the district, and there is some trade in the former and in fish. Pop. 34,046.

Damm'ar, an Oriental word signifying resin, applied in commerce to varieties of resinous substances. The gum-D. or D. resin of British commerce is, however, the produce of pine-trees, to which the generic name D. has been given. The chief of these, and the principal source of the D. of our market, is the Amboyna pine, the Oriental Dammara, a tree growing to a height of 200 feet, found in the East Indian Archipelago. It produces a beautiful, almost colourless, transparent resin, which constitutes the best portion of the resin imported as Singapore D. The Kauri pine of New Zealand, the Australian Dammara, is the source of the gum-Kauri or New Zealand D. of commerce. The tree now flourishes only in the North Island, but the resin is found in many places in a fossil condition. It is only the fossil gum which is of commercial value. It forms considerable mounds, to which annual additions are made by exudations round the trunks of living trees. Other species of Dammara in the Pacific Islands yield similar resins. Along the skirts of the Himalayan Mountains in India there exist immense forests of a valuable timber tree, *Shorea robusta*, which yields a resin called Sal D., but this is not like the dammars found in Western commerce. Black D. is produced in India from *canarium strictum*, and white D. or piny varnish exudes from *Vateria Indica*. A kind of D. is also yielded by *Popea micrantha*, a tree very common in the Malay Peninsula, Borneo, Sumatra, &c., and probably some portion of the Singapore D. of commerce is obtained from this source. The D. imported into England makes very clear, hard varnishes.

Dammara, a genus of *Coniferæ*, found in the islands of the Malay Archipelago, India, and Australasia. The Australian D., the Kauri or Cowdie pine of New Zealand, yields a hard, brittle resin like copal. In commerce it is known as Australian copal, Kauri gum, and New Zealand dammar, and is chiefly used for the manufacture of varnishes. The Oriental D. yields Indian dammar. The timber of the Australian D. is valued for masts and spars. The Dammaras of the South Sea Queen Charlotte Islands, New Caledonia, New Hebrides, and New Zealand, are all handsome trees of this genus. The last, as an inhabitant of the Moluccas, grows to the height of 100 feet, and yields a kind of fine transparent dammar.

Dammu'dah, or **Damodar,** a tributary of the Hoogly, rises in the district of Behar, province of Bengal, flows E. and S.E., and joins the Hoogly near its mouth, after a course of nearly 400 miles. Its valley, traversed for nearly 100 miles by the Calcutta and North-Western Railway, is rich in coal and iron.

Damnum, in Roman law, signifies any loss sustained in person or property. In law, *damnum absque injuria* denotes losses for which the sufferer has no legal right of compensation against the person causing his loss. Thus, where a new school is established to the detriment of one previously established, the latter sustains *damnum absque injuria*.

Damnum Fatale, a term of law denoting inevitable accident or damage for which no bailee could be held responsible, such as, loss by lightning, shipwreck, &c., by superior force, and by robbery. Loss by theft, however, did not relieve the bailee of his liability to pay damages to the owner. See ACT OF GOD.

Dam'ocles was a companion of Dionysius the Elder, tyrant of Syracuse, who, as Cicero relates, flattered that monarch by extolling his power and felicity. Dionysius placed the sycophant amidst the luxuries of a magnificent banquet, and suspended over his head by a single horsehair a naked sword. When D. observed his danger he formed a truer estimate of royal honours.

Da'mon and **Pyth'ias,** or **Phin'tias,** two Pythagoreans of Syracuse, of whom the latter was condemned to death for plotting against Dionysius I. He obtained permission to leave Syracuse to arrange his affairs, and D. willingly offered himself as a pledge for his friend's return. He returned just in time to prevent the sacrifice of D.'s life for his own, and Dionysius, struck with admiration of their friendly devotion, pardoned P., and requested to be admitted to their friendship.

Dam'per, a movable door in a flue or chimney by which the passage of air through it can be checked to any required extent. *Dampers* in a pianoforte are hammers which rest upon the strings, and thus prevent their sounding except so long as the corresponding keys are held down. A pedal is always provided, which, when pressed, lifts the whole of these dampers off the strings at once.

Dam'pier Archipelago and **Straits** are named after the celebrated navigator. The *archipelago* consists of about twenty small rocky islands, situated close to the N.W. coast of Australia, in S. lat. 20°-21° and E. long. 116°-118°. One of the *straits*, which is 20 miles broad, divides the islands of Rook and New Britain, and is situated in E. long. 148° and S. lat. 6°; while the other, which is about 15 miles broader, separates Waigiu island from the extreme N.-Western portion of New Guinea.

Dampier, William, navigator, buccaneer, and author, born of a good family in the parish of East Coker, Somersetshire, in 1652, joined a vessel at Weymouth as a boy, and sailed successively to Bayonne, Newfoundland, and in 1673 to the East Indies. He afterwards joined the naval service, and fought in two battles against the Dutch. He is next heard of as overseer of a plantation in Jamaica; but after six months' experience of this peaceable employment, he embarked in 1675 at Kingston for Campeachy Bay, where he was engaged in logwood-cutting till 1678, when he returned to London. Sailing again in 1679 for Campeachy, he joined a company of filibusters, and in 1680 he was one of a number of 360 buccaneers, who, having crossed the Isthmus of Panama, burnt the fort and town of Santa Maria, seized a number of canoes on the coast, and in these attacked and captured eight Spanish ships which were lying at anchor about two leagues from Panama. D. afterwards scoured the Gulf of Mexico, and during 1683-88 was actively engaged in buccaneering off the coasts of Africa, America, the Philippines and China, the Moluccas, and New Holland. Disgusted with the cruel and violent practices of his companions, he resolved to separate from them. Accordingly, in May, 1688, when near the Nicobar Islands, he and seven others, abandoning the vessel, sailed off in a small boat, hoping to reach Acheen. Of the eight adventurers, only D. and another reached the coast of Sumatra alive. Setting out again in search of fortune, D. arrived in England, 16th September, 1691, and published his *Voyage Round the World*, which attracted immediate attention. The Government commissioned him to undertake a voyage of discovery in the regions which he had already explored, and D. sailed from the Downs, 6th January, 1699. He explored the N. coasts of New Guinea, cleared the passage there now known as D. strait, and discovered many islands W. of New Guinea. On his return home he was wrecked. D. was never afterwards entrusted with full command, though he made at least two other voyages, the one in 1704, the other in 1708-11, as pilot. After the latter date, D. is no more heard of, and the year of his death is unknown. He is the author of *A New Voyage Round the World* (Lond. 1698), an *Account of the Philippines*, and an *Account of New Holland*. His works have considerable descriptive power and a fresh, nautical flavour, and show a clear, shrewd, and observant mind. See Pinkerton's *Collection of Voyages and Travels*, and Burney's *History of the Buccaneers of America* (Lond. 1816).

Damping off, a term used by horticulturists to express the death of plants, such as young seedlings, by an excess of moisture in the soil and atmosphere, especially in stoves and hotbeds.

Dan (Heb. 'judgment') was the fifth son of the patriarch Jacob. The tribe was the most numerous of all (62,700, Num. i., 64,400, Num. xxvi.) except Judah, although the territory it received in the land of Canaan was the smallest. It was, however, the most fertile part of the country, and tempted the Canaanite neighbours to seek to possess it, during which contest Samson appears on the scene. Perhaps on this account the tribe migrated to the N. and took possession of the town of Laish, which, under the name of D., was afterwards the northern extremity of the country.

Dan'a, Richard Henry, an American poet, born at Cambridge, Massachusetts, 15th November, 1787, and educated at Harvard University. He entered the legal profession, but soon adopted literature. In 1818 he became editor of the *North American Review*, and published the *Idle Man* in 1821. His early poems, *The Dying Raven* (1825), the *Buccaneer and other Poems* (1827), and his *Poems and Prose Writings*, have won for him a considerable reputation as a poet and essayist. Died in 1879.—**Richard Henry D.,** son of the preceding, lawyer and author, was born at Cambridge, Massachusetts, 1st August, 1815, and educated at

Harvard. He made a voyage to the Pacific as a common sailor, and gave his experience in *Two Years before the Mast*, his most popular work. D. was admitted to the bar in 1840, published *The Seaman's Friend* (1841), and contested Essex, Massachusetts, against General Butler, in 1867, for a seat in Congress, but was defeated. He edited Wheaton's *International Law* (1866). President Grant nominated him (1876) United States Minister to England, but the Senate rejected the nomination by a vote of thirty-six against seventeen. Died in 1882.—**James Dwight D., LL.D.,** an American geologist and mineralogist of European reputation, born at Utica, New York, 12th February, 1813. He graduated at Yale College in 1833, published his *Mineralogy* in 1837, accompanied Wilkes' exploring expedition in the Pacific Ocean (1838-42), and was busy for several years after in giving the scientific world the results. D. is author of a *Report on Zoophytes* (Wash. 1846), *Geology of the Pacific* (Wash. 1846), *Crustacea* (Wash. 1852), *Coral Reefs* (Philad. 1853), and *Manual of Geology* (1862). In 1855 he was appointed Professor of Natural History and Geology in Yale College, where he acquired a great reputation as a lucid and eloquent expounder of science.

Dan'aë, daughter of Acrisius, King of Argos, was confined by her father in a brazen tower to prevent the fulfilment of an oracle that a son to whom she would give birth would cause his death. But Jupiter wooed the maiden in a golden shower, and she became the mother of Perseus, whereupon Acrisius shut the mother and her child in a chest, and exposed them on the sea. Their floating prison drifted to Seriphos, where it was found by Dictys, a fisherman, who conveyed its tenants to his brother, King Polydectes. According to the common legend, Polydectes became enamoured of D., but dreading Perseus, now grown up, he sent him to subdue the Gorgons, and secure for him the head of Medusa, which he alleged he would present to Hippodamia as a wedding-gift. Perseus returned with the trophy, retired with his mother to Argos, and inadvertently slew Acrisius, thereby fulfilling the oracle.

Dan'aüs, son of Belus and Anchinoë, was originally King of Libya, while his brother, Ægyptus, ruled over Arabia. The brothers having quarrelled, D. fled in the ship *Armais* with his fifty daughters, and eventually reached Argos, of which he was chosen king. The fifty sons of Ægyptus came to Argos and asked their cousins in marriage. To this D. consented, at the same time providing each of the brides with a dagger, and enjoining them to slay their husbands on the night of the nuptials. This they all did except Hypermnestra, who spared Lynceus. D. persecuted him for a time, but became reconciled to him, and appointed him his successor. As a punishment for their crime, the Danaïdes were compelled in Hades to fill continually a vessel full of holes. From D. the Argives were called Danai.

Dan'avirke, a long wall in Slesvig, about 8 miles long, from 24 to 40 feet high, ascending from the Slei to the river Trene. Tradition says it was built in the 10th c. by King Gorm and his wife Thyra. It was restored and strengthened in 1850, but was captured by the Austro-Prussian troops in the Danish war of 1865.

Dan'by, Francis, a historical and landscape painter, born near Wexford, 16th November, 1793, and educated at the Royal Dublin Society. In 1820 he removed to Bristol, and, after residing for several years in Switzerland, settled at Exmouth. He died in 1861. Most of his works are illustrative of Scripture or profane history, such as 'The Deluge,' 'The Passage of the Red Sea,' 'Marius among the Ruins of Carthage.' His son, James D. (died 1875), was also an artist.

Dance of Death (Lat. *Chorea Machabæorum*, Ger. *Todten Tanz*, Fr. *La danse Macabre*), an allegory which took its origin in the 14th c., symbolising the sway of death over all men under the image of the dance. Visual representations of death were first made common after the spread of Christianity, and the skeleton became the most popular effigy. Monkish asceticism favoured the gloomy symbol: it was in harmony with the days of penance and flagellation. But a reaction followed the religious terrorism. Mediæval grotesquerie played with the notion and the personification of death, made the skeleton the medium of burlesque and mockery, and finally was wont to depict it in the action and posture of dancing. The allegory is presented in two forms —the dramatic and the pictorial. The drama first appeared in Germany, and was a sort of religious pantomime, being acted in the churches. Death, the centre figure, surrounded by persons of all stations, engaged in a dance, during which the characters vanished one by one, to indicate that they had died. Later, in France, this crude idea was elaborated into the *Danse Macabre*, a set of brief dialogues between Death and his companions, who were generally twenty-four in number. The title is perhaps taken from the Maccabees, the drama being performed on the festival of the seven martyred brothers, whose story is told in the seventh chapter of that book. Early in the 15th c. the drama reached Spain, under the title *Dança General de los Muertos*. The pictorial aspect of the allegory succeeded the dramatic. It arose in France, but took deepest root in Germany. England also has specimens of the pictured D. of D., received from Paris. The subject became common in painting, sculpture, and tapestry-work—the skeleton leading to the tomb a crowd of personages dressed in the fashion of the day, and typical of all classes. Very ancient specimens exist at Lübeck, in Auvergne, and at Basel. The last is said to have been painted in commemoration of the ravages of a plague. In the 15th c., when the drama was lost sight of, the pictured D. of D. assumed new forms, and entered largely into popular art. The subject was frequently used in the decoration of public buildings, as in the series of bass-reliefs on the façade of the Castle of Dresden, and the paintings in the cloister of Old St. Paul's, London. The antique idea culminated in the fifty-three designs, called *Imagines Mortis* of Holbein, the German painter. See Peignot's *Recherches sur les Danses des Morts* (Par. 1826); Douce's *Dissertation*, prefixed to Holbein's *D. of D.*; Douce's *D. of D.* (Lond. 1833); and Russell Smith's edition of Holbein's *D. of D.*, with introduction and notes (1849).

Dancette', or **Danse,** in heraldry, one of the two zigzag dividing or border lines, having an indentation larger than the other, which is called the *indented* line. In early blazonry a *fesse D.*, and sometimes a series of *fusils*, or elongated lozenges, conjoined *per fesse*, is styled simply a D.

Dan'cing may be defined as a rhythmical movement of the limbs. Among all people and in every age it has found favour with youth, and in most of the ancient nations it was an essential feature of religious worship. Moses and Miriam danced when the Israelites passed through the Red Sea. 'Praise him,' says David (Ps. l.), 'with the timbrel and dance;' and the same monarch, we are told, danced before the ark. Among the Greeks the significance of D. had a very wide range. The dance of the Eumenides or Furies typified the vengeance of heaven on the sins of earth; while certain hymns and dances in the market-places were expressive of the gratitude of man to heaven. The famous Pyrrhic dance represented the overtaking of an enemy and doing battle with him. Dances of a solemn, mystical nature were introduced into the representations of the Greek tragedies. The Romans, again, seem to have regarded D. as an effeminate amusement. In 1650 D. was prohibited in Scotland by an Act of the General Assembly. In our own time it is by some not only regarded as effeminate but as immoral. While the latter view may be regarded as a relic of that puritanical spirit which Scott has so skilfully drawn in his character of David Deans—whose righteous wrath at the notion of his daughters dancing will be remembered—it must be admitted that public D. is not always secure from the accusation. To private D. the only objection is one of hygiene. To spend the hours usually given to sleep in crowded, overheated rooms must be hurtful to health, and therefore to beauty.

Dancing and Music License.—By statute 25 Geo. II. c. 36, the keeping within the cities of London and Westminster, or within twenty miles round, without license from the

Quarter Sessions, any house, garden, or place for public dancing, music, or other public entertainment, is prohibited under a penalty of £100 on the keeper. Statute 38 and 39 Vict. c. 21 provided for the opening of such places of amusement after noon, instead of after five o'clock in the afternoon. The Local Government Act, 1888, transferred the licensing powers of the Quarter Sessions to the County Council.

An old May Day custom existed at Musgrave, in Westmoreland, according to which, at ten A.M., twelve young maidens of Brough, approved by the vicar, assembled at the foot of Brough bridge dressed in white, and crowned with rushes and flowers. Accompanied by a band, they marched through the fields to Musgrave church, where they hung their crowns on the side walls. A short service followed, the clerk and vicar retired, and then, a space being cleared near the altar, the fiddler struck up a tune, and dancing commenced, in which every one present joined till three or four o'clock in the afternoon.

One of the most remarkable dancing-parties ever recorded was that held in the Gosforth coal-mine on 2nd February, 1829, in commemoration of the finding there of coal. The ball took place at the bottom of the shaft, 1000 feet below the surface, in a room 15 by 22 feet and 48 feet high. It took place during the day, and 300 guests were present, the sexes being evenly divided.

Dancing Mania, an epidemic of frequent recurrence in the Middle Ages, and most common in the large German towns. It was a wild hysteric excitement, finding vent in convulsive gestures and delirious motion. Many only feigned to be so affected; but the disorder was to a great extent real, its victims losing all power of will, and sometimes in their madness committing suicide. The most extraordinary outburst of this mania occurred towards the end of the 14th c. It began in the city of Aix-la-Chapelle among those assembled for the Feast of St. John. Religious excitement rose to the extremes of frenzy; men and women, uttering maniacal cries, danced through the streets. The epidemic spread over all Holland and part of Germany to Strasburg and Cologne. Crowds of maniacs, their ranks joined by many pretenders, went dancing through the country, and much riot ensued. In Italy, where it was frequent in the 15th c., D. M. was known as *Tarantism*, being attributed to the bite of the Tarantula spider. The malady became known as St. Vitus's Dance, and was cured by immersion in cold water, according to the remedy of Paracelsus. It died out in the 17th c., and is now met with only in isolated cases. See Hecker's *Epidemics of the Middle Ages*.

Dandeli′on, a plant of the natural order *Compositæ*, common in pastures and by waysides all over Europe, and now naturalised in America and most other temperate parts of the world. The popular name is a corruption of *Dents du lion*—lion's teeth—and refers to the incisions on the margins of the 'runcinate' leaves. The root-stock is used as a tonic and aperient in liver complaints, and as a diuretic. The leaves, though disagreeably bitter, when blanched are sometimes used as a salad, and the rhizomes are used in the same way as chicory for mixing with coffee. The whole plant is permeated by milky juice, and contains resin, inuline, sugar, and a crystalline principle called *taraxacin*. It is eagerly eaten by rabbits and other wild animals, and in default of mulberry leaves is used to feed silk-worms.

Dan′dolo, an illustrious Venetian house, from which four Doges were chosen. The most distinguished of these was **Enrico D.,** elected in 1192. He governed with wisdom and energy, and persuaded the Venetians to furnish ships to the warriors of the fourth crusade in 1201. As the sum stipulated for the fleet was not paid by the crusaders, D. induced them to assault Zara, a town of Dalmatia in rebellion against Venice. After its capture, the crusaders and Venetians proceeded to Constantinople, which they assailed under pretence of dethroning a usurper. D., who was blind and above ninety years of age, led the attack by sea, and was the first to leap ashore. The city was taken, and the deposed Isaac and his son Alexius were restored to power, but an insurrection arising, were summarily executed, and the Byzantine Empire divided among the Latins and Venetians. D. was offered, but declined, the crown, accepting instead the title of Despot of Romania. This conquest added considerably to the Venetian dominions. He died at Constantinople, 1st June, 1205. See Andrea D.'s *Chronicle* in Muratori.

Dan′ebrog, or **Dannebrog, Order of** (Old Dan. 'banner of the Danes'), the second or red-cross order of knighthood in Denmark, is said to have been founded by King Waldemar II. in 1219. The order was revived in 1693, was reconstituted in 1808, and is conferred for eminent civil or military services on persons of all ranks and ages. The decoration is a gold cross patée, enamelled with white, and suspended by a white ribbon embroidered with red.

Dane′geld, or **Danegelt** (Old. Eng. 'Danish payment'), a tribute paid by the English to the Danes to stop their ravages. It was first raised by Æthelred II. in 991, and again in 1003, and levied after expulsion of the Danes to pay fleets for the protection of the coasts. The tax was suppressed by Eadward the Confessor in 1051, but revived by William the Conqueror, and abolished by Stephen. Every *hide* of land—that was as much as one plough could plough, or, as Bede says, as much as could maintain a family—was taxed, at first at 1s., afterwards at 7s.

Dane′lagh, properly **Denala′gu** ('Danish law'), the name given to the district in England which Ælfred ceded to the Danes under Guthrum by the treaty of Wedmore, A.D. 878. It was called D. because it was governed by Danish law. It included the greater part of England, comprising Northumbria, East Anglia, most of Essex, and most of East Anglia, or all eastern and most of central England, from the Thames to the Firth of Forth. Eadward the Elder won back Mercia, Essex, and East Anglia, but in the reign of Eadmund (940-946) Watling Street was again made the boundary between the D. and Wessex. The name D. was disused after the Norman conquest.

Danemo′ra, a small town in the province of Gotland, Sweden, 22 miles N. of Upsala, famous for its extensive iron-mines. There are seventy-nine shafts in the neighbourhood, of which seventeen are worked. The iron is of the best quality, and large quantities of it are exported to England.

Dan′iel (Heb. 'God is my judge'), **The Book of,** consists of two parts: chs. i.-vi. contain the history of D. and three other youths who had been carried away to Babylon on the capture of Jerusalem by Nebuchadnezzar; chs. vii.-xii. contain the account of four visions which occurred to D., written down by himself. The general voice of tradition has been that the first part of the book is authentic history, and that the D. mentioned was the author of the whole. Modern criticism, however, maintains that the book was composed as late as about the time of Antiochus Epiphanes (B.C.175-164), *i.e.*, three and a half centuries later than the time specified in the book, the historical narrative of D. being a disguised but unmistakable representation of the circumstances of the Jews under Antiochus, as described in the books of the Maccabees (*cf.* D. iii. with 1 Macc. i. and 2 Macc. vi. vii.; also D. iv. and v. with 1 Macc. i. 21 ff., and 2 Macc. v. 15 ff.). According to this view, the names of the four youths—D., Mishael, Hananiah, and Azariah—were found among the exiles who returned from Babylon (Neh. viii. 4, x. 2, 6, 23). See Bleek's *Introduction to the Old Testament*.

Dan′iel, Samuel, an English poet, was born in 1562 near Taunton, Somersetshire. He studied at Oxford, was tutor to Lady Anne Clifford, afterwards Countess of Pembroke, and held an office at the court of James VI. He resided generally in the country, and died at Beckington farm, in Somersetshire, 14th October, 1619. His chief work is the *History of the Civil Wars between York and Lancaster*. It is prolix and languid, with much pensive meditation and occasional bursts of eloquence. The verse is sweet and limpid, and the diction carefully sifted. D.'s style, according to Professor Lowell, is as modern as Tennyson's. Among D.'s other works are *The Complaint of Rosamund,* *Tragedy of Cleopatra*, *The Queen's Arcadia*, *Musophilus*, and *Sonnets*. In prose he wrote a *History of England* and a *Defence of Rhyme*, which Swinburne calls 'one of the most perfect examples of sound sense, of pure style, and just judgment in the literature of criticism.' D.'s poetical works were published at London in 2 vols. (1718).

Daniell, John Frederick, D.C.L., F.R.S., a distinguished chemist, was born in London, 12th March, 1790, became Professor of Chemistry at King's College, and died 13th March, 1845. He is widely known as the inventor of the galvanic cell and hygrometer which bear his name, and he is the only person that ever obtained the three Royal Society medals. His chief work is *Meteorological Essays* (1823), besides which he wrote an *Essay on Artificial Climate* (1824), an *Introduction to Chemical Philosophy* (1839), and several valuable papers read before the Royal Society.

Dan'ish Language and Literature. The D. L., an offshoot of the Scandinavian branch of the Teutonic family of speech, though spoken only by the Danish people, has been for 400 years past the written language of Norwegians also. Runic inscriptions, &c., prove that in the 10th c. one language, called the 'Danish tongue' (*dönsk tunga*), prevailed in the three Scandinavian kingdoms, Iceland, the Faröe, Orkney, and Shetland Isles, and some parts of England and Scotland. This separated in the 11th c. into two main divisions: a Norwegian-Icelandic and a Dano-Swedish, the latter distinguished by its rejection of the *h* sound before *l*, *r*, and *n*, and the substitution of single long vowels for the old diphthongs. The Danish side of this Dano-Swedish already in the 13th c. showed three dialects: (1) 'Skaansk' (Scanian), which most resembled the old language; (2) 'Sjœllandsk' (that of Zealand); and (3) 'Jydsk' (of Jutland), which differed most from the old, owing to its weakening or changing many vowel-sounds and word-forms. In the two last, inflectional endings fall off, final vowels are lost, *a*, *i*, and *u* are gradually reduced to a less distinct *a* or *æ*, while the hard mutes *p*, *k*, and *t* still remain after vowels in the 13th c., as is yet on the whole the case in Norwegian and Swedish. At this time the vocabulary was entirely of native origin, except some Greek and Latin words introduced along with Christianity; but in the 13th and 14th centuries the language reached what is essentially its present form. Based on the dialect of Zealand, it preserves the character of a distinct and homogeneous speech, whose chief characteristics are that *t* or (in pronouns) *d* is substituted for the soft *th*, and the softer *b*, *g*, *d* for the hard, *p*, *k*, *t*, and that the inflections are reduced to a few forms, substantives presenting only the possessive in *s*, and merging masculine and feminine in common gender. Verbs lose person, and generally (except in the imperative) number also, as the singular was already beginning to supplant the plural. The vocabulary of prose writers in this period received considerable additions from Low German, especially nouns in *-hed*, and verbs with the prefixes *be-*, *for-*, *und-*, and sometimes *er-* and *an-*. But these, unusual in the poetry, were even more rare in the spoken language of the 14th and 15th centuries. The influence of High German began chiefly in the 16th c., and appears in various words formed anew after the German fashion, which yet bear but a small proportion to the portion of the D. L. that has sprung from purely Scandinavian sources.

Literature.—Before the Reformation the softer and weaker dialect of the Old Norse, spoken by the people of Denmark, was not to any extent a written language, for the clergy, then almost the only educated class, naturally preferred Latin to the yet unformed mother-tongue. Of these, Saxo-Grammaticus (q.v.) wrote in the end of the 12th c. a valuable history of Denmark. The writings intended for the laity were in Danish, and consisted of (1) laws, and (2) uninteresting chronicles, partly in prose and partly versified. But, on the whole, the literature of Denmark in the Middle Ages is only of antiquarian interest, except some works of genius called *Kæmpeviser* ('Hero Songs'), which, though unwritten, passed in song from generation to generation, and are easily recognisable as true and beautiful popular poetry.

At the close of the 15th c. a university was founded and printing introduced into the country, but for a time little activity was shown, except in the printing of the laws, class-manuals, and Catholic service-books that had been used in the Middle Ages. The intellectual movement, however, that preceded and accompanied the Reformation, issued in a far more widespread literary interest, and in the publication of Danish translations of Scripture and devotional books, as well as numerous theological and polemical writings. The language, being incessantly employed, became more plastic, though, at the same time, it was greatly impregnated with Germanic ingredients. The greatest names are those of Hemmingsen in the 16th and Brochmand in the 17th c. Theology was not now confined to the clergy, but was cultivated by many of the nobles, and especially by Rosencrantz. Physical science had the celebrated Tyge Brahe, whose observations and discoveries excited the admiration of Europe; medicine, the two Bartholins and Ole Worm, also famous as a naturalist. The poetry of this whole period was of less value than its prose, for the hymns of the Reformation were more pious than poetical; but towards its close there appeared a highly-gifted poet, Arrebo.

From the Peace of Roeskilde in 1660, which gave to Sweden the Danish provinces on the other side of the Sound, the literature becomes somewhat poorer. The old nobility that had favoured learning now lost their influence, and the court showed little interest in it. Science, however, was still cultivated, and versifiers abounded, but there were two who rose above the rest, and wrote in better Danish and with purer art—Bording and Kingo.

It was Holberg who, in the first half of the 18th c., created a new era in literature and popular thought. In the separate fields of poetry Reenberg, Falster, and Helt were his successful rivals; and to this period belong also the original, though unequal, *Heltesanger* ('Songs in Praise of Heroes') of Sorterup, the lyrics of Stub, and the hymns of Brorson.

With the accession of Frederik V. in 1746 begins a higher development in literature and language, due partly to Latin being more restricted to learned works, and partly to the study of foreign models. In the Academy of Sorö, restored in 1747, Sneedorff edited the weekly *Patriotisk Tilskuer* ('Patriotic Spectator'); Kraft wrote philosophy; Schytte, political works; and Schöning, a learned history of Norway. Encouraged by the patronage of many public and private societies, and the steady liberality of the Government, every department of knowledge was now cultivated, but no one can be said to have made an epoch in any particular science.

The 19th c. inherited from the 18th great enlightenment, facility, and culture, but also a monotonous elegance of style, mock-sentiment, superficial science, and recklessness in religious and political thought. In Denmark, the last decade in particular was marked with these blemishes, but about the opening of the century there appeared a tendency towards a truer perception of nature and human life, due partly to the fresh philosophy and poetry of Germany, and partly to the influence of the French Revolution. This had already effected much in the first fourteen years of the century, which are more striking for a widely diffused scientific spirit than for any large number of learned men.

From 1380 to 1814 Norway was politically united to Denmark, and an independent, though often scarcely distinguishable, Northern element was merged in Danish literature; but since their separation, Norwegian literature has successfully claimed independence. Since 1814 Denmark has seen the complete development of the views of Grundtvig, while other theological schools have been well represented. Especially noteworthy are the remarkable Christian philosopher Martensen, the sarcastic but deeply earnest S. Kjerkegaard, the acute and orthodox Rudelbach, and the clear rationalist Clausen. Kolderup-Rosenvinge, Larsen, and Scheel wrote ably on law; Kayser and David on political economy. Grundtvig, P. E. Müller, and the learned Finn Magnusen (q.v.) have been of great service to early Danish history and mythology, as also Rafn (q.v.), Petersen, Thomsen, and Worsaae (q.v.). Mediæval and modern history were further treated by the writers belonging to the earlier part of the century, as well as by many younger men, of whom Wegener, Schiern, and Estrup merit notice. In philology, the Danish lexicographer Molbech, the Orientalist Westergaard, and the great Latin scholar Madvig (q.v.) are famous. Philosophy has been cultivated by Sibbern, Nielsen, and Brochner, and the natural sciences have had numerous students. Among the poets of this period we find Oehlenschläger, Grundtvig, and Baggesen (q.v.). Ingemann has had great power as a lyrist, dramatic poet, and novelist, and Heiberg's fine taste and keen insight are evident in his poems, but especially in his dramatic works. The latter was the father of the Danish *vaudeville*, but his *Elverhöi* ('The Hilltop of the Elves') displays quite different talent. Blicher's sketches of common Jutland life, and Fru Gyllenbourg's and 'Carl Bernhard's' tales have had great popularity. Winther, especially admired as a lyrist since the 'Ghost Letters,' has been conspicuous in all fields of poetry. Andersen (q.v.) is naturalised in every part of the civilised world. Paludan-Müller's *Adam Homo* is a striking and original work. We may also mention the comic dramatist Bögh, and among recent novelists H. F. Ewald, Goldschmidt, and the still greater Bergsöe.

Dankali′, or **Danakil** (*Afâr*), an independent Abyssinian state, to the E. of the Zabul mountains, extending along the coast of the Red Sea from the Peninsula of Buri to the Gulf of Tajura. The land is mostly flat and barren, and the inhabitants consist of 63,800 nomads and fishers. They are indolent, cruel, and fanatically devoted to Islamism.

Dann′ecker, Johann Heinrich von, a celebrated German sculptor, was born near Stuttgart, 15th October, 1758. His father was a groom in the service of the Duke of Würtemberg, who became his patron, and gave him an education. D. had early success in his art; he went to Paris in 1783, and to Rome two years after. At that city he remained till 1790, when he returned to Germany, and was appointed Professor of Sculpture in the Academy at Stuttgart. There he resided till his death, 8th December, 1841. Heathen mythology supplied D. with his earlier subjects, among which are the 'Dryad' and 'Love and Psyche.' Of his later works, chiefly Christian, the principal is his colossal 'Christ,' which the sculptor was eight years in completing. His portrait-busts are also admirable. No one could make stone express the physical lineaments of character better than he. His 'Schiller,' 'Lavater,' 'Gluck,' won him a great popularity.

Dan′té (contracted from **Durante**), **Alighie′ri,** born at Florence, 8th May, 1265, was the son of a Guelph lawyer, who was banished from Florence during the government of Novello, the *podesta* of the Ghibelline Manfred of Hohenstaufen. D. was educated by his mother, Donna Bella, and Brunetto Latini, Secretary of the Florentine Republic, and subsequently at Bologna, the '*Mater Studiorum*,' and the great Law College of Padua. In 1290 Beatrice di Portinari, whom D. had tenderly loved, but who had married into the Bareli family, died. D. then produced his *Vita Nuova*, which, with his other canzonets (he was intimate with three eminent troubadours), procured for him the name of 'the poet.' D. served in the wars against Arezzo and Pisa. After an unhappy marriage, in 1291, with Gemma, daughter of Manesso Donati, which resulted in a separation, he rose to office in the Supreme Council of *Priori* (six in number), when the civil wars between the Bianchi and Neri broke out. Charles of Valois, called in as mediator in 1302, sentenced D. to exile and an oppressive fine. Shortly after, a revolutionary tribunal sentenced him to be burned alive along with the other Bianchi, who wished to resist the extreme pretensions of the Pope. In 1309 he wrote his treatise *De Monarchia*. After wandering from one city to another, and joining in one or two forcible attempts to re-enter Florence, D. died at Ravenna, 14th September, 1321. At his death he belonged to the party of the *Verdi*, or *Democratic* Ghibellines, as distinguished from the *Secchi*, or pure Imperialists. Doubts exist as to the part actually taken by D. in public affairs at Florence, and in diplomatic missions at Rome and Paris. To the year 1305 belong *Il Convito*, in which Beatrice appears as Philosophy, and a treatise on the Italian language, *De Vulgari Eloquentia*. The *Divina Commedia* was begun in 1300, but not completed for many years. Hence events subsequent to 1300 are prophesied. Sismondi asserts that D., who was ignorant of the drama, used the word 'comedy' merely because he thought Virgil alone entitled to the word 'epic.' The poem is divided into the *Inferno*, the *Purgatorio*, and the *Paradiso*. Virgil and St. Bernard conduct D. through these divisions of the invisible world, with the view of enabling him to write a poem which shall show to Italy the true source of its misery. The extremely allegorical nature of the whole may be seen in the first canto of the *Inferno*, where a panther represents Florence, or Envy; a lion, France, or Ambition; a she-wolf, the court of Rome, or Avarice; a greyhound, our Saviour or his vicegerent, the Emperor of the Romans; Virgil, Human Wisdom; and Beatrice, Heavenly Wisdom. Hell is represented (quite differently from Milton's conception, and from the early Christian conception, which placed it in the centre of the earth), as an inverted cone from the surface to the centre of the earth, with a dark valley at the mouth called Limbo, and nine circles appropriated to different degrees of crime. Like Michael Angelo, D. uses the traditions of classical mythology to furnish these regions. He is a good Catholic, and represents the wise and good of antiquity as lying in tears and groans, caused, not by actual torture, but by the irrevocable want of baptism. Purgatory is a steep mountain in the hemisphere opposite to hell: seven rounds have to be climbed through before the seven stains of sin are washed away; the sea washes its base; at its top is the garden of Eden. Here D. meets a number of his friends (some who had been excommunicated by the corrupt Church), with whom he discusses various questions, political, social, and metaphysical. He seems to look forward to some apocalyptic judgment on the temporal power of the Pope as a cure for the ills of Italy. From Eden D. ascends with Beatrice to Paradise through the various heavens of the Moon, Mercury, Venus, the Sun, Mars, Jupiter, Saturn. The eighth heaven contains the triumph of Christ, and the Virgin and Adam also dwell there. In the ninth, or empyrean, is a manifestation of the divine essence, veiled by three hierarchies of angels. This wonderful poem is written in the *terza rima*, in which three verses are so arranged that the middle one of each set rhymes with the first and the third of the succeeding set. The verses are all endecasyllabic, generally consisting of five *iambi*, followed by a short syllable. The *Divina Commedia* speedily became a national book in Italy. The Prince of Milan in 1350 caused a public commentary to be written, and two professorships were founded to promote the study of it. Among his chief commentators are Landino, Bargigi, Bianchi, and Cotterill. Four editions of the work (those of Foligno, Jesi, and Mantora, each of date 1472, and an undated one of Naples) in the British Museum formed the basis of a magnificent reprint, published under the care of Lord Vernon and Sir A. Panizzi. The original readings of another Naples edition (1477) are given in *Sei Cento Lezioni della Divina Commedia*, &c., by Dr. Enrico C. Barlow (Williams and Norgate, 1875). The best-known translations into English are those of Cary (1814), Wright (1833), Pollock (1854), and Longfellow (Lond. 1867). One may also note an excellent prose translation of the *Inferno* by Dr. John Carlyle (1849). The *Vita Nuova* has been admirably translated by D. G. Rossetti in his *Early Italian Poets from Ciullo d' Alcamo to D.* (Lond. 1861). The *De Monarchia* (Eng. trans. by Church, 1878), written to prove that universal dominion should belong to the head of the Holy Roman Empire, is a valuable source of information regarding the Guelph and Ghibelline controversy. See Balbo's *Life and Times of D.*, translated by F. Banbury (1852), and Dean Church's *D., an Essay* (1878).

Dan′ton, Georges Jacques, was born 28th October, 1759, at Arcis-sur-Aube. The Revolution found him a briefless advocate. He joined Marat and Desmoulins in the Cordelier Club, and enjoyed the confidence of Mirabeau. His eloquence made him a power; 'his rhetorical tropes are all gigantic, energy flashes from his black brow, menaces in his athletic figure, rolls in the sound of his voice, reverberating from the domes.' He had the courage to defy the arrest issued by Le Chatelet, to denounce the ministers, and call for the deposition of the King. In 1792 D. became Deputy-Procureur of the Revolutionary Commune, incited the Marseillese to attack the Swiss Guard of the Tuileries, an event which made him Minister of Justice, in which capacity his 'Mirabeau of the Sans Culottes' and *Enfant Perdu* of the Revolution sanctioned the September Massacres. He observed that 'a revolution could not take place according to geometrical principles!' Entering the National Convention, he undertook various missions to the Netherlands, and did what he could to forward the death of Louis. He constantly urged the levy of fresh troops, and created the Revolutionary Tribunal. In the Committee of Public Safety he definitely sided with Robespierre against the Girondins, whom he wished to save from extremities. He opposed the Feasts of Reason, and passed the law for payment of forty sous per diem to the poorer deputies. After the fall of the Hébertists, Robespierre found it necessary to get rid of D., and accordingly, on the proposition of the Committees of Public Safety and General Security, the Convention sent him, along with the two Desmoulins, Hérault de Séchelle, Fabre d'Eglantine, Delacroix, Westermann, and Philippeaux, before the Revolutionary Tribunal, which condemned them to death for a conspiracy against the national representation and the Republic, and tending to restore the monarchy. D. was guillotined 5th April, 1794. The charges of private immorality and public peculation against D. have to some extent been refuted by Robinet in his *Mémoire sur sa Vie Privée* (Par. 1865), and *Procès des Dantoniens*, published in *La Politique Positive*, 1872. The notes of D.'s trial were taken down by the painter Topino-Lebrun, afterwards executed for complicity in the infernal machine.

Dan'ube, a French form of the Lat. *Danubius*, from a Celtic root *dan* or *don*, meaning water, according to Adelung, is 'the upper water' (Ger. *Donau*, Hun. *Duna*). The Greek name Ister, applied by the later Roman poets to the entire river, was given originally only to the lower part. The D. rises in the Black Forest, in Baden, 2665 feet above the sea-level, and is formed by the confluence of the brooks Brege and Bregach at Donaueschingen. Its general direction is from W. to E., its length about 1750 miles, and its basin about 250,000 sq. miles. After the Volga it is the largest river in Europe. It flows at first E. by N. through Würtemberg and Bavaria, past Ingolstadt and Regensberg, and at Passau enters the Austrian dominions. Passing Linz and Vienna, it reaches Hungary near Presburg, whence to Waitzen it continues to flow E.; then turning S. past Buda-Pesth, it holds on in this direction until joined by the Drave, when it flows S.S.E. to Belgrade, from which point to Orsova it separates Servia from Hungary. A little below Orsova it passes the 'Iron Gate,' where till 1847-49 the water formed a rapid that obstructed navigation, but by blasting the rocks this hindrance was in a great measure removed. During the remainder of its course it forms the boundary between Bulgaria and Roumania, entering the Black Sea by three main branches, of which the Sulina is commercially the most important. Till it reaches Ulm, where it becomes navigable, the D. is hemmed in by abrupt slopes. In its lower course it expands greatly, and in many places on the borders of Bulgaria is studded with islands. Its delta is covered with reeds and trees. No fewer than sixty navigable rivers contribute to swell the volume of its water, which is nearly as great as that of all other streams that empty themselves into the Black Sea. The principal affluents on the right are the Iser, Lech, Drave, Save, and Marava; on the left, the Ens, Theiss, Sereth, and Pruth. The trade of the D. is chiefly in wheat, timber, hides, tallow, and maize.

The Iron Gate of the Danube.

Danu'bian Principalities. See ROUMANIA.

Dan'zig ('the port of the Danes,' Pol. *Gdansk*), next to St. Petersburg the most important haven in the N. of Europe, and the capital of a district of the same name in the state of Prussia, German Empire, lies on the left bank of the Vistula, 2 miles from its mouth, on D. Bay, and 216 N.E. of Berlin, with which it is connected by railway. It has many fine buildings, and is intersected by the two streams of the Mottlau, a branch of the Vistula, which has previously received the Radaune—and hence it has been called 'the northern Venice.' D. is a fortress of the first rank, and one of the chief stations of the German navy, having extensive wharves, arsenals, marine depots, &c. It is an entrepot for Poland, Hungary, and parts of Lithuania, as well as for W. Prussia. Its port is Neufahrwasser, on the coast. The bar at the mouth of the Vistula impedes navigation; but, by a canal, large vessels can now approach the city. Between the two arms of the Mottlau lies the Speicher Island, which has stores capable of containing half a million quarters of grain, and which is kept uninhabited as a precaution against fire. The city is divided into the Vorstadt, Speicherinsel, Niederstadt, Langgarten, Altstadt, and Rechstadt. The older houses, which are richly ornamented with sculpture, are old-fashioned, irregular, and unique, giving to D. an appearance of quaint originality. D.

has a large Gothic townhouse, built in the 14th c., and containing a fine collection of paintings. Its Protestant Marien Kirche dates from 1343-1503, and has a clock-tower 338 feet high, 10 smaller towers, 37 beautifully painted windows (1845), and the famous so-called D. picture, a 'Last Judgment,' attributed to Jan van Eyck, but more probably the work of Hemling. The other public buildings of D. include an admiralty college, a school of navigation, a public library of 60,000 volumes, a fine Gothic exchange, several literary and art societies, and theatres. D. has large manufactures of brandy, liqueurs (*Danziger Goldwasser*), sugar, chemicals, cloths, beer, tobacco, &c., and an active trade, chiefly in grain, seeds, spirits, and timber. Petroleum is largely imported from the United States, and herrings, coals, and pig iron from Great Britain. D. has railway connection with Moscow, and *via* Warsaw with Odessa on the Black Sea. Pop. town, 120,338; district 589,176, of whom more than half are Protestants. It is mentioned as early as the 6th c., and in 995 was made the capital of Pomerania. Long an object of contention between Danes and Swedes, it was captured by the Teutonic knights in 1310, and was soon after a flourishing member of the Hanse League. From 1454 till 1793 it belonged to Poland; at the latter date it came into the possession of Prussia, and has since remained so, except during the period 1807-14, when it was one of Napoleon's short-lived duchies. The district of D. resembles Holland in its general aspect, and in the occupations and character of the people. Besides D. the chief towns are Thorn and Elbing.

Daoudnugar', or **Daudnag'ar**, a town in the executive district of Gaya, Bengal, British India, on the Son, 90 miles E. of Benares, has manufactures of coarse woollen and cotton fabrics. On the road to Gaya, about four miles distant from D., there is a splendid temple, the carving of which is very beautiful and was made at Mirzapur. Pop. 9851.

Daph'ne, a genus of shrubs or small trees belonging to the natural order *Thymeleaceæ*, the species of which are widely distributed over temperate and tropical Europe, Asia, America, and Australia. The flowers are fragrant, but the berries are poisonous, and the whole of the plants possess an acidity which in some cases even amounts to causticity. The mezereon *(D. Mezereum)* is a common shrub in gardens, and is rarely found wild in this country. The bark has been used in medicine as a sudorific and alterative. *D. Laureola*, the spurge laurel, also occurs in woods of this country, and is as acrid as the preceding, but is not used in medicine. In Nepal, the tough fibrous inner bark of *D. cannabina* and *D. Edgworthii (Edgworthia Gardneri)* is employed in making paper of a very superior quality, which does not suffer from the attacks of insects or from damp, and is tough, and not liable to break when folded. In India and China, deeds and records are made of it; as in Madagascar is the bark of *Dias Madagascarensis*, belonging to a closely allied genus. That of *Gnidia daphnoides* and *G. (Lasiosephon) eriocephala*, allied species (the bark of the latter being also used in India to poison fish), is made into ropes.

Daphne.

Among the other species cultivated in this country are *D. pontica*, *D. alpina*, *D. Cneorum* (all hardy), *D. odora*, *D. indica*, and *D. chinensis*, which can only be grown in a greenhouse. D. is pronounced *Daphné*.

Daphne, a maiden daughter of the river-god Peneus in Thessaly, was associated in numerous traditions with Apollo. When the god, enamoured of her beauty, pursued her, D. was saved by her mother, Ge, opening and receiving her, and on the spot where she disappeared the evergreen laurel-tree sprang up. According to Ovid, D. herself was changed into the laurel-tree.

D., a magnificent grove and sanctuary situated 5 miles S.W. of Antioch, was formed by Seleucus Nicator, who built in the midst of it a celebrated temple to Apollo and Diana, and around it there rose 'a stately and populous village.' The traditions of the mythological D. were interwoven with the place; the tree into which she was changed was pointed out, and one of the springs was named after that on Mount Parnassus. For many ages the grove was the resort of innumerable pilgrims, who, amid its sensuous gratifications, combined the pursuit of pleasure with the rites of religion. By the zeal of the Christians of Antioch its altar and oracle were deserted, and its complete destruction was effected, perhaps by Christian incendiaries, in the reign of Julian. Its correct site is probably at *Beit-el-Maa*, as fixed by Pococke and Richter.

Darabgherd', or **Darab'**, an old town in the province of Fars, Persia, 150 miles S.E. of Shiraz. It stands amid orange and lemon groves in a fine plain, and is encircled by some 30,000 date palms. Numerous ruins evince its former importance. A mild tobacco, celebrated throughout India and Western Asia, grows in the neighbourhood. D. sends lemon-juice and fruits to every port of Persia. Pop. 3800.

D'Ar'blay, Madame, whose maiden name was Fanny Burney, was born at Lynn Regis in 1752. She was the second daughter of Dr. Charles Burney (q.v.), the musician. Her novel of *Evelina*, published anonymously in 1778, won the young authoress great repute; and this was sustained by *Cecilia*, which appeared in 1782. After holding a post at court for some years, she married a French officer. Her later works are much inferior to the early ones, though they procured her large sums from the publishers. Madame D'A. died at Bath in 1840. Her *Diary and Letters* (1842 and 1846) preserve a picture of contemporary society, as well as of her own life. See Macaulay's *Essay on Madame D'A*.

Dardanelles' (named from the towers that guard the entrance), are the straits joining the Archipelago to the Sea of Marmora. The ancient name was Hellespont (Helle's Sea), from the fable of Helle and her brother Phryxus. The channel is 50 miles long, of an average breadth of two miles, and at one point it is only half a mile broad. The current from the Black Sea flows through it at the rate of a league an hour, and the consequent difficulty to an enemy approaching Constantinople is greatly increased by strong defences most favourably placed. In 480 B.C., Xerxes crossed the D. by two bridges from Abydos in Asia to Sestos in Europe, and in 334 B.C. it was crossed by Alexander the Great. The feat of swimming across the D. is associated in ancient times with the name of Leander, and in modern times with that of Byron.

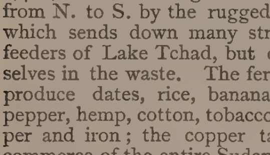
Dares, the reputed author of a pseudo-history of the fall of Troy, popular in the Middle Ages, and even in the 16th c. Chaucer places D., with Homer and others, on the highest pedestal in the house of fame, and refers to D., not to Homer, for the deeds of Troilus. The Greek version of D., at one time attributed to the D., priest of Hephæstus, mentioned in the *Iliad*, is supposed to have been the work of a

Sophist, and was extant in the 3rd c. B.C., but is now lost. A Latin prose work, *Daretis Phrygii de Excidio Trojis Historia*, has been preserved. This is either a fabrication of the 5th, 6th, or 7th century, or perhaps an abridgment from the Latin epic by Joseph of Exeter, who flourished about the 12th c. It was translated into French verse in the 12th c., and was first printed at Cologne in 1470. This work, which is of no value, was said to be a translation, by Cornelius Nepos, from the original Greek. It is generally printed along with Dictys' Cretensis. The best edition is by Diederich (8vo. Bonn 1837).

Dar Fur (*i.e.*, 'Fur land'), formerly an important native state, which became an annexed territory of Egypt, but since the Mahdi's revolt, appears to have reasserted its independence. D. F. is situated in the E. of the Sudan, and is bounded N. by the Sahara, S. by the Bahr-el-Arab, a tributary of the White Nile, E. by the Steppe of Kordofan, and W. by the forests of Wadai. Area, 198,000 sq. miles; pop. 1,420,000. It is in general an oasis-land, and is traversed from N. to S. by the rugged granite range of the Marrah, which sends down many streams, forming on the W. the feeders of Lake Tchad, but on the E. shortly losing themselves in the waste. The fertile valleys in the Marrah Hills, produce dates, rice, bananas, citrons, onions, cucumbers, pepper, hemp, cotton, tobacco, &c. There is also much copper and iron; the copper takes a prominent part in the commerce of the entire Sudan. Among the wild animals are the lion, panther, hyæna, elephant, rhinoceros, wild ox, gazelle, and monkey. The Furs are an intelligent, active, well-built people, with straight hair and thin lips, speaking a language that contains a large infusion of Arabic words. Mohammedism has prevailed in D. since the middle of the 18th c. El-Fasher is the capital (pop. 10,300), and the other chief towns are Dara, Shekka, and Gija.

Dar'gan, William, a projector of railways, born about 1800, at Carlow, Ireland. After working in a surveyor's office, and under Telford in England, he returned to Ireland, where he engaged in the chief engineering schemes, and amassed a large fortune. He was the contractor for the Dublin and Kingstown Railway, the first line laid in Ireland, and was the main promoter of the Dublin Exhibition of 1853, to which he contributed £20,000. D., who was an enterprising and public-spirited man, died 7th February, 1867.

Daric (Gr. *dareikos*), a gold coin in use in ancient Persia. On one side an archer was represented in a kneeling posture, while on the other was the royal palla. The Jews are said to have used it as money on their return from Babylon to Judæa, and reference is made to it as having been brought to Greece and Rome. The value is estimated to have been about 16s. 3d. of our money at the present day. While some hold that the name of D. is derived from Darius, others assert that it comes from Persian words signifying bow and king.



Daric.

Da'rien, or **Uraba, Gulf of,** the most southerly arm of the Caribbean Sea, United States of Colombia, 170 miles from N. to S., and 125 across. On its western side, near its southern extremity, its chief tributary, the Atrato, empties itself into the Bay of Choco. The **Isthmus of D.,** more generally known as the Isthmus of Panama (q.v.), of which, however, it is properly a continuation, is in one point only 30 miles across. Two schemes have been proposed to traverse it by a ship-canal, and thus afford direct communication between the Atlantic and Pacific Oceans, but only one has as yet been attempted. See CANAL. A railway across the Isthmus was completed in 1854. See ASPINWALL.

Darien, Scheme, The, a disastrous commercial enterprise projected on behalf of Scotland by William Paterson, founder of the Bank of England, who hoped, by planting a colony on the Isthmus of Darien, to form a connecting mart between the eastern and western hemispheres. In the year 1695, when Paterson disclosed his grand scheme, Scotland was the poorest country in Europe. The occupation of D. promised to render it a warehouse for the wealth of the East. The magnificence of the project greatly excited the people, and led them to overlook the obstacles to its execution. Colonists unaccustomed to a high temperature even in summer were unfit to endure labour under a tropical sun. It was improbable that Spain would tolerate a Scotch colony in the heart of its transatlantic dominions, or that England would incur a war with Spain for the benefit of Scotland; nor could Scotland, without the help of England, successfully oppose Spain in America. To do so, a navy required to be created, and an armed force sufficient to defend the isthmus against the vice-royalties of Mexico and Peru must be sent out. However, the Company was constituted by Act of Scotch Parliament, to which the Lord High Commissioner gave the Royal sanction on 26th June, 1695. The shares were fixed at £100 each. £400,000 was immediately subscribed for, of which £220,000 was paid. This may seem a small sum considering the national excitement; but if it be remembered that the whole amount expected to be paid into the imperial exchequer by Scotland at the date of the Union (1707) was but £151,000, the £220,000 seems sufficiently large. The Duke of Hamilton, the Duke of Queensberry, and Lord Belhaven took £3000 of stock each. The Duke of Argyll took £1,500 worth. The cities of Edinburgh and Glasgow took each £3000 worth, and the city of Perth £2000.

On 25th July, 1698, five ships with 1200 men sailed from the Forth, and on the 1st of November following anchored near the isthmus. For a few months matters went fairly; but with the approach of spring the malignity of the climate began to tell with fearful effect. Supplies gradually failed, and none were to be had from neighbouring colonies. The Spaniards began to arm against the new settlement. The French dependencies eagerly offered assistance to the Spaniards. In England, both Houses of Parliament petitioned the King against the scheme. In consequence, the governors of the English colonies prohibited all intercourse with a swarm of adventurers. Meanwhile in Scotland the mania was rising still higher. The riches of the country, in the words of a newspaper of the day, were great beyond imagination. In August, 1699, four ships with 1300 men were despatched by the Company to the New Caledonia. These were charged by the General Assembly to divide the colonists into congregations, to appoint ruling elders, to constitute presbyteries, and to labour for the propagation of divine truth among the pagans of Darien. This second expedition found, in place of a colony, a wilderness. The castle of New Edinburgh was in ruins. The huts had been burned, and the site marked out for the new capital was now a jungle inhabited by wild beasts. A fleet of eleven Spanish vessels anchored off New Edinburgh, while an army of Spaniards and Indians blockaded the fort by land. Before the end of March a treaty was signed, by which the Scotch bound themselves to evacuate Darien in fourteen days; and on the 11th April, 1699, they departed. Few of the survivors saw their native land again. Many hired themselves as labourers to the planters of Jamaica. Two of the ships were lost on the voyage home. The books and documents of the Company may be seen in the Advocates' Library, in Edinburgh. See Burton's *Account of the D. S.*, printed for the Bannatyne Club.

Dari'us (Gr. *Dareios*, anc. Per. *Dareush* or *Daryush*; the mod. Pers. *Dara* or *Darab*, means 'lord'), was the titular designation of several Persian kings, and probably meant *the ruler*.—**Darius I.,** eldest son of Hystaspes, satrap of Persia, with six fellow-conspirators, murdered the false usurper Smerdis the Magian. The conspirators determined to adopt the monarchical form of government, and D., by a well-known device of his groom, was chosen king, B.C. 521. D. strengthened his position by marrying the two daughters of Cyrus, the daughter of Smerdis, and the daughter of Otanes, the chief conspirator. He divided his empire into twenty satrapies, and settled the tribute to be paid by each—a work of great difficulty, in consequence of the previous remission of taxes by Smerdis for a period of three years. The Babylonians revolted, but after a siege of twenty months, their city was taken by the stratagem of Zopyrus, about 516 B.C. Three years afterwards D. invaded Scythia, crossing the Thracian Bosporus with immense forces, but the expedition completely failed. Incensed at the aid given by the Athenians and Eretrians to the Ionian provinces in their revolt against him, D., B.C. 492, sent Mardonius to subdue Greece, but the fleet was wrecked in a storm off Athos, and a great portion of the army was slaughtered by the Brygians in Thrace. A second expedition was despatched under Datis and Artaphernes, which reached Europe in safety, only to suffer complete defeat at Marathon, B.C. 490. D. made every effort to renew the war, but death ended his projects, B.C. 485.—**Darius II.**, surnamed successively *Ochus* and *Nothus*, was one of the seventeen bastard sons of Artaxerxes I., Longimanus. He declared war against Sogdianus, who had murdered Xerxes II., and was chosen to succeed him on the throne. D. was completely subject to his eunuchs and to his wife Parysatis; and his reign was a succession of insurrections, of which the chief was that of Amyrtæus in Egypt. D. died, B.C. 405-404.—**Darius III.**, surnamed *Codomannus*, owed his elevation to the throne to the murder of Arses by Bagoas, B.C. 336. He was distinguished alike by moral excellence and personal beauty. Bagoas, foiled in an attempt to poison his sovereign, himself perished by poison. D. vainly tried to oppose the advancing power of Alexander. After the battle of Arbela, B.C. 331, he fled before the Macedonian conqueror, and after renewed efforts to retrieve his fortunes, was perfidiously murdered by Bessus, satrap of Bactria, B.C. 330.

Darjeel'ing, or **Darjiling**, a sanitary station for British troops in an executive district of the same name, in the Rajshahi division of the province of Bengal, British India, 7167 feet above the level of the sea. Though the atmosphere is humid, and there is an annual rainfall of 120 inches, the climate is healthy. The Eden sanatorium was opened in 1883. D. has greatly increased of late years, and possesses numerous bungalows, chapels, and gardens, besides a public park. Pop. (including Jalapahar cantonment) 14,145. D. was acquired from the Rajah of Sikkim in 1835, in exchange for an annual allowance of £600.—The *district* of D. is noted for its extensive and profitable cultivation of the tea-plant, and has an area of 1164 sq. miles and a population of 223,314, of whom 171,171 are Hindus, 10,011 are Mahommedans, 40,520 are Buddhists, and 80 are Jains. The whole district is well known now for its magnificent scenery. Tea gardens are gradually covering the spurs of the lower hills, while splendid forest trees clothe the mountains up to the snow-line, above which in the background Mounts Everest and Kanchanjanga tower aloft. Coal, iron, copper, and slate are fairly abundant. Rice is the chief crop, but on the higher lands Indian corn, wheat, potatoes, and cardamoms are grown. Tea is, however, the staple product, the cultivation of which dates only from 1856. Cinchona is also successfully grown. Coarse cotton cloth is woven by the natives.

Dar'ling, a name of frequent occurrence in the geography of Australia, and derived from one of the early governors of New South Wales.—1. An important and remarkable river, formed by the confluence of the Bogan, Barwan, Bokhara, and Culgoa rivers, in about 30° S. lat., 146° 25' E. long. After its formation the D. receives scarcely any tributaries, the only noteworthy exception being the Warrego. The D. flows for 650 miles in a S.W. direction, till it unites with the Murray at Wentworth. Its banks are of soft earth, from 30 to 40 feet high, and are lined with lofty trees. The average breadth of the D. is 60 yards, but in flood time it has been known to overflow its banks for a couple of miles. It flows through a vast and arid plain of clay, varied by grassy patches and swamps. The area of its basin is about 198,000 sq. miles.—2. A pastoral county in the S.W. of New South Wales, watered by the rivers Darling and Murray, and estimated to contain an area of 1555 sq. miles, and a pop. of 2773 (white) and 111 (aborigines).—3. The D. Downs are an extensive district of splendid pastoral country, in the southern portion of Queensland. They measure about 120 miles by 50, are well watered, and will, in their best parts, carry one sheep to two acres in natural grasses.—4. The D. range of mountains in W. Australia extends N.W. from Point D'Entrecasteaux, in the extreme S.W., for 250 miles. Its highest point reaches an altitude of 3500 ft.

Darling, Grace, a heroic girl, daughter of the keeper of Longstone Lighthouse on the Farne Islands, was born at Bamborough, 24th November, 1815. When the *Forfarshire* was lost among these islands on the 7th September, 1838, Grace, then in her twenty-second year, persuaded her father to venture with her to the rescue. Amid imminent peril they gained the wreck, and saved the nine remaining on it. This noble action elicited general applause, which Grace did not long enjoy, as she died of consumption, 20th October, 1842. See *Life of Grace D.*, by Eva Hope.

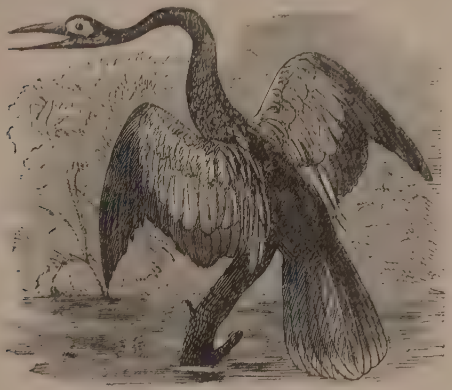
Dar'lington, or **Darn'ton**, a town in the county of Durham, on the Skerne, 17½ miles S. of Durham by railway. The streets diverge from a central market-place. The most noteworthy edifice is St. Cuthbert's Church, founded in 1169, with a spire 180 feet high. In 1874 there was established a British and Foreign School Society Training College at a cost of £15,000, and in the same year a fever hospital at a cost of £9225. The principal manufactures are carpets, flax, and wool-spinning; there are also tanneries, and brass and iron foundries. D. returns one member to Parliament. Pop. mun. bor. 38,060; parl. bor. 38,033; reg-sub-dist. 41,957; and civ. par. 35,899.

Darm'stadt, a town of Germany, the capital of the Grand-Duchy of Hessen, on the river D., 15 miles S. of Frankfurt-on-the-Main. It consists of an old and new town; the latter has two main streets, which cross each other at right angles, and contain many fine buildings; the former has narrow, ill-built streets. In the centre of the Luisenplatz, the finest public square, is a lofty Doric column, surmounted by a statue of the Grand-Duke Ludwig I. Other buildings of note are the old ducal palace, with a picture gallery containing many fine paintings, and a library of 460,000 volumes, the palace, the residence of the Grand-Duke, the opera house (burned in 1871), and the Roman Catholic church (a rotunda with twenty-eight Corinthian columns). There is a technical university which is attended by 614 students. D. has manufactures of carpets, carriages, tobacco, and machinery. Pop. with Bessungen, 56,399. D. is mentioned as early as the 5th c., but first came to Hessen in 1479, and became the residence of the Landgrafs in 1567.

Dar'nel, a genus of grasses common in cornfields in England and many parts of Europe. The grain has long been reputed poisonous, but recent researches have rather thrown doubt on this, and attribute its injurious properties to a parasitic fungus, or to some cause apart from the grain itself.

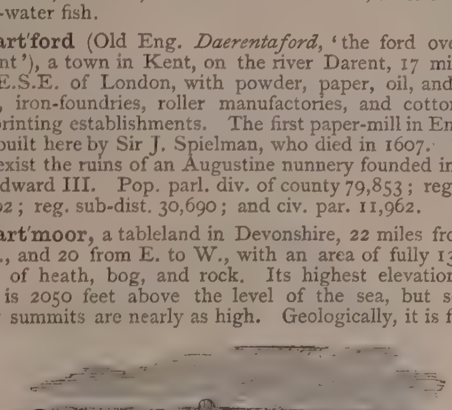
Darn'ley, Henry Stewart, Lord, eldest son of the Earl of Lennox, was born at Temple Newsome, in Yorkshire, 7th December, 1546, was carefully educated under the eye of his mother, and displayed a distinct turn for literature. In 1565 he married his kinswoman, Mary, Queen of Scots, who, it is commonly said, was attracted by his handsome appearance; but it is not improbable that the grand-nephew of Henry VIII. was reckoned a first-rate political match. He was nineteen when he arrived in Scotland to marry his cousin, she being then twenty-two and a-half. A son, afterwards James VI., was born to them, 19th June, 1566, and on the 9th February, 1567, before he had completed his majority, D. was murdered at the Kirk-of-Field, a lonely house outside the city walls, on the site of which stands the University of Edinburgh. A quaint, tender ballad ascribed to him is printed by Maidment in his *Scottish Ballads and Songs* (Edinb. Paterson, 1868). There can be little doubt that D. has been maligned by history.

Dar'ter, or **Snake-Bird**, a genus of Natatores or Swimming birds, belonging to the sub-family *Plotinæ* and family *Pelecanidæ*. Their popular name is derived from their habit of moving their snake-like head and neck very quickly about as they rest amid the foliage of trees. They are found in Africa and America. The common D. is deep green in colour, with a brownish-white stripe running from the eye down the sides of the neck. Its average length is three feet. The bill is straight and sharp. Levaillant's D. inhabits Africa. Both are expert fishers. The black-bellied D. occurs in the S. of N. America. It somewhat resembles the cormorant in appearance and habits, and is also known as water-crow, water-lady, and Grecian-lady. Rivers, lakes, and lagoons are its favourite haunts, although it may be seen at times near the sea, where, however, it never seeks its food, as it lives on fresh-water fish.


Black-bellied Darter.

Dart'ford (Old Eng. *Daerentaford*, 'the ford over the Darent'), a town in Kent, on the river Darent, 17 miles by rail E.S.E. of London, with powder, paper, oil, and corn mills, iron-foundries, roller manufactories, and cotton and silk printing establishments. The first paper-mill in England was built here by Sir J. Spielman, who died in 1607. There still exist the ruins of an Augustine nunnery founded in 1375 by Edward III. Pop. parl. div. of county 79,853; reg. dist. 68,702; reg. sub-dist. 30,690; and civ. par. 11,962.

Dart'moor, a tableland in Devonshire, 22 miles from N. to S., and 20 from E. to W., with an area of fully 130,000 acres of heath, bog, and rock. Its highest elevation, Yes Tor, is 2050 feet above the level of the sea, but several other summits are nearly as high. Geologically, it is for the most part of granitic formation, with rich veins of tin, copper, and manganese, and strata of Devonian slate and sandstone. Much of the soil is peaty, but it affords pasture to numerous cattle, sheep, and a small breed of horses known as Dartmoor or Exmoor ponies. D. is remarkable for the number of its British remains, including cairns, barrows, kistvaens, rock-pillars, and the Grey Wethers, a circuitous Druidical temple. D. Prison, erected in 1806 for French prisoners of war, is now an important convict depot. Numerous streams rise in D., among which are the Dart (from which it takes its name), Teign, Taw, Plym, and Avon.


Dartmoor Prison.

Dartmoor Sheep are a small, hardy race, wild and restless, whose original home is in the forest and heath lands of Devonshire and Cornwall. In size they are small, their average weight on killing being about 11 lbs. per quarter. Their mutton is highly esteemed for its flavour, and commands a ready sale. Their wool is soft and long, but of little bulk. They feed upon pasture too poor for the sustenance of other sheep, have white faces and legs; and when the ewes are crossed with Leicesters, heavy lambs are produced.

Dart'mouth, a seaport and market-town of Devonshire, 32 miles S.S.W. of Exeter, with which it is connected by railway. It is built in terraces on the face of a steep rock, and has its streets connected by flights of steps. The harbour is defended by a battery, and at its entrance are the remains of a castle built by Henry VII. The streets are narrow, and many of the houses are old, and decorated with wood-carvings. The harbour is commodious and safe. Many of the inhabitants are engaged in the herring, pilchard, and stock fisheries, and the town has a good Mediterranean trade. Shipbuilding, ropemaking, and the manufacture of paper are carried on. Pop. mun. bor. and civ. par. (each) 6025; reg. sub-dist. 7500.

Dartmouth College, New Hampshire, U.S., was chartered in 1769. It grew out of an earlier Indian school, and received its name from Lord Dartmouth, president of the original trustees. In 1815-19 the college became the subject of litigation, a result of which was that the United States Supreme Court decreed the inviolability of chartered property. D. C. comprises arts, medical, and scientific schools, with an observatory.

Daru', Pierre Antoine Noel Bruno, Comte, an author and politician of the earlier Napoleonic period. Born at Montpellier, 12th January, 1767, he became a soldier at an early age, and in 1791 was made intendant of the army of Brittany. He translated the Odes, Epistles, and Satires of Horace. During the Revolutionary period he was of little account, but became a favourite with Napoleon I., and was for a time his War Minister. After the return of the Bourbons, D. devoted himself to literature, producing excellent histories of Venice and Brittany. He died 5th September, 1829.—His son, **Comte Napoleon D.,** the godson of Napoleon I. and the Empress Josephine, was born at Paris, 11th June, 1807. Throughout life D., who was one of the best of French political economists, was an Orleanist. After the *coup d'état* he retired into private life, but keenly opposed the Second Empire. In 1870, however, he became Minister of Foreign Affairs under M. Ollivier, but retired from his post when the Emperor agreed to submit his fate to a *plébiscite*. D. did his best, as a member of the Committee of National Defence, and in his own department of La Manche, to drive off the German invaders, and in 1871 was returned to the National Assembly. He wrote an important treatise, *Des Chemins de Fer* (Par. 1843).

Dar'win, Eras'mus, was born at Elton, Nottinghamshire, 12th December, 1731. After studying at Cambridge, and taking the degree of M.D. at Edinburgh, he settled at Lichfield, where he became celebrated as a physician, physiologist, and poet. He died at Derby, 18th April, 1802. His scientific speculations are mostly erroneous but suggestive. His poetry, although occasionally brilliant, is in general tedious, fantastic, and mechanical. D.'s chief works are the *Botanic Garden* (1781), in two parts—first, the economy of vegetation, second, the loves of the plants (ridiculed in Canning's *Loves of the Triangles*); *Zoonomia* (1793-96); and *Phytologia, or Philosophy of Agriculture and Gardening* (1800). See *Life of D.* (Lond. 1804), by Miss Seward.—**Charles D.,** one of the greatest English naturalists, was born at Shrewsbury, 12th February, 1809. His father was Dr. Robert D., son of Erasmus D. After studying at Edinburgh University, and taking the degree of B.A. at Cambridge in 1831, he went round the world as naturalist in H.M.S. *Beagle*, returning to England in 1836. His interesting and popular *Voyage of a Naturalist* gives an account of this circumnavigation. In 1839 he published *Journal of Researches into the Geology and Natural History of the Various Countries Visited by H.M.S. Beagle;* in 1840-43, the *Zoology of the Voyage of H.M.S. Beagle;* in 1842, *The Structure and Distribution of Coral Reefs* (later ed. 1876); in 1846, *Geological Observations on S. America;* and in 1851-53, *Monograph of the Pedunculated and Sessile Cirrepedia.* These works gave him a wide and solid reputation, which was vastly extended in 1859 by the publication of a remarkable book *On the Origin of Species by Means of Natural Selection.* D. there contends that all existing species arose from pre-existing species, and probably from a primitive germ, through *natural selection;* the organisms best fitted for surrounding circumstances surviving, while the weaker disappeared in the *struggle for existence.* (See DARWINIAN THEORY.) He published *Fertilisation of Orchids* in 1862, *Variation of Animals and Plants under Domestication* in 1867 (later ed. 1876), and the *Descent of Man* in 1871 (later ed. 1874). In this work he seeks to prove that man is descended from 'a hairy quadruped with a tail, probably arboreal in its habits.' Other works were *The Expression of the Emotions in Man and Animals*, *Insectivorous Plants* and *Earthworms* (1882). D. was a member of many foreign and British scientific societies, and received the Royal and Copley medals from the Royal Society. He died at Beckenham, 19th April, 1882, aged 73.

Darwin Mount, 6800 feet above the level of the sea, on the S.W. side of King Charles's South Land, Tierra del Fuego.—**D. Sound** is a channel between York Minster and Sandwich Rochs, on the S.W. coast of Tierra del Fuego.

Darwin'ian Theory, the theory of the origin and modifications of animals and plants promulgated by Charles Darwin. It takes as its basis the tendency to *variation* observed in the species of living beings, in virtue of which new *varieties*, merging into permanent *races*, are produced. This principle of variation will in turn affect the races, and from the variation of these latter, new races—which are so different from the original species as to entitle them to rank as new *species*—are evolved. Thus the D. T. is one of *evolution*. It holds the evolving of new races, and through these of new *species*, and thus does not allow for any secondary causes, or any purely *creative* influence. Such is the primary idea of Darwin's theory, and, as subsidiary to this idea, he introduces the principle of *natural selection*, as that whereby the new races are first indicated. Thus 'nature,' according to Darwin, 'selects' and perpetuates the individuals of a species which have any peculiarities before those which resemble the species. And in perpetuating the points wherein such individuals differ from their neighbours, nature is initiating a new race and species, for the variations become reproduced and intensified as time passes. 'Artificial selection,' as practised by man in the breeding of cattle and sheep, in fact, imitates the 'selection' of nature. Again, the numbers of animals and plants produced are held to be far too numerous for preservation; and a perpetual 'struggle for existence' (*i.e.*, for food and the conditions of living) takes place amongst the various species of animals, and amongst the individuals of each species. The individuals which tend to variation are those which nature will 'select' for preservation before the others; and this variation results in the evolution of new races and species. Then, granting that time past has been definite, there can be theoretically no reason why all the diverse and existent types of life should not have been evolved from pre-existing types and species, or primarily from a few primitive beings, or from one primeval organism. The subsidiary theory of 'sexual selection' is founded on the belief that males and females may select their mates from advantages or peculiarities in colour, &c., and that this process will give rise to variation.

The chief objections to this ingenious theory are founded: (1) on the inability of 'natural selection' to account for the *origin* or *initiatory stages* of variations; (2) that variation may be *destructive* to individuals; (3) that variations, to be perpetuated, must not occur in detached instances, but in very many cases; (4) on the occurrence, without variation, in Darwin's sense, of differences in some species; (5) that variation cannot be proved to be of *indefinite* extent, but that it is highly probable that limits to the variation of every species exist; (6) that palæontology does not supply fossil organisms to fill up the structural gaps between living species, and so complete the continuous succession of organisms required by the D. T.; and (7) that past time, as calculated by physicists, would not have sufficed for the slow evolution of the existing races.

The whole matter is as yet hypothetical in its bearings and nature. Subsequent research and the lapse of years alone can prove its truthfulness or falsity. See the works bearing on the theory, as mentioned in article CHARLES DARWIN; also Herbert Spencer's *Principles of Biology* (1864) and *Spontaneous Generation*, &c. (1870), which show the extension of the principle of the theory; and St. George Mivart's *Genesis of Species* (1876), which sets forth the most feasible objections to the Darwinian hypothesis.

Dash'kov, Ekateri'na Romanov'na, a noted Russian princess, was born 28th March, 1744. When eighteen years old she shared in the conspiracy which set the Empress Catharine II. on the throne. Her independent spirit led eventually, however, to a quarrel with the Empress, and she left Russia for European travel. In England she became known to Garrick, Blair, Robertson, and other eminent men. Having reconciled herself to Catharine, she returned to court in 1782, and next year founded the Russian Academy. On the Empress's death in 1796, the Princess lost her offices, and lived in retirement till her death, at Moscow, 16th January, 1810. Besides composing several comedies and other works in Russian, she actively assisted in the publication of the Dictionary of the Russian Academy. See *Memoirs of the Princess D., Lady of Honour to Catharine II.*, by Mrs. Bradford (Lond. 1860).

Das'yure, in natural history, a group of carnivorous marsupials forming the family *Dasyuridæ.* They are now confined to Tasmania, though their fossil remains have been found on the mainland of Australia. They differ from the opossum in their dentition, in their feet being formed for terrestrial progression, and in the tail being clothed with hair, and not prehensile. *Dasyurus ursinus*, the typical species, is 18 inches long, without the tail, and covered with coarse black hair. From its intensely savage disposition it is colonially termed the Tasmanian devil. It is nocturnal, and preys upon the smaller marsupials, but in a larger degree upon sheep, on which account it is rapidly being exterminated, and is now confined to the less accessible parts of the island. The Tasmanian wolf or tiger is a larger species of D., and resembles *D. ursinus* in its character and habits.

Common Dasyure.

Date (Fr. *date*, Lat. *datum*, 'what is given'). To preserve an exact record of a succession of events, some fixed point of time or *epoch* must be assumed as the basis of the reckoning. In Scripture, time is measured by generations, or by the reigns of kings. Some Greek historians reckoned by the ephori and kings of Sparta, or by the archives of Athens. Three generations are usually held equivalent to 100 years. Newton counts the average of a reign or succession at twenty years. Before the invention of letters, the preservation of an exact record of the events which mark the lapse of time must have been impossible; to do so even now is difficult. The Christian era is universally employed in Christian countries. It begins on 1st January in the fourth year of the 194th Olympiad, and in the 753rd year from the legendary foundation of Rome. The Mohammedan era, called the Hegira (q.v.), begins with the flight of Mohammed, A.D. 622. A knowledge of the epochs at which the world has been held to begin in different countries and ages is indispensable to the student of history. For example, the English Revolution, known as the Revolution of 1688, would have been the Revolution of 1689 had the year then begun on 1st January; the event having taken place in February of the year which would have been 1689 but for the fact that then the year began with 25th March. There was but one calendar in use in Europe, until Pope Gregory introduced the 'Gregorian Calendar' in 1582. It rectified an accumulation of error by striking ten days—5th to 15th October—out of the year 1582. The new style was at once generally adopted in Roman Catholic countries, but the 'old style,' or Julian Calendar, remained in use for a long time in Protestant countries; it is still followed in Russia and Greece, and in many Eastern countries. In Great Britain, the alteration of the style was long successfully opposed by popular prejudice; but in 1751 an Act of Parliament was passed for the adoption of the new style in public and legal transactions. The difference of the two styles, which was then eleven days, was removed by ordering the day following 2nd September, 1752, to be counted the 14th September. At the same time the first day of the legal year was changed from 25th April in England to 1st January. In Scotland, by an Act of the Scotch Privy Council of 1599, the year 1600 was appointed to begin on the 1st January; 25th March having been previously held as the first day of the year in Scotland. The following are valuable works on the subject of dates—*L'Art de Vérifier les Dates*, compiled by the Benedictines (1783-1820, new ed. 1818-44); *Playfair's Chronology* (1784); *Blair's Chronology* (new ed. by Sir H. Ellis, 1844, and by Rosse in 1856); *The Oxford Chronological Tables* (1838); Sir Harris Nicolas' *Chronology of History* (new ed. 1852); *Hales' Chronology* (1830); H. Fynes Clinton's *Fasti Hellenici et Fasti Romani* (1824-50). Dates were affixed to grants and assignments by 18 Edward I., 1290, and the custom became very general in the reign of Edward III. Before this time it was usual at least to pass lands without dating the deed of conveyance (Lewes). Numerous instruments of assignments enrolled among our early records establish this fact (Hardie). See CHRONOLOGY, CALENDAR, YEAR, MONTH, DAY, CYCLE.

Date-Palm (*Phœnix*), a genus of palms, of which about a dozen species are known, all, with the exception of two found in South-Eastern Africa, confined to Northern Africa and tropical Asia. The D.-P. (*P. dactylifera*) is largely grown over Northern Africa, and more sparingly in Western Asia and Southern Europe. In some countries it is the chief food of the inhabitants, as well as of horses and camels. The poor construct huts of its leaves; ropes and coarse cloth are made of the fibre surrounding the base of the leaves; the stalks are used for crates, baskets, brooms, and walking-sticks; houses are built of the wood; the buds are eaten as potherbs; *lagbi*, an intoxicating drink, is made from the sap, and the date-stones are ground into food for camels. *P. sylvestris*, common over India, is the 'wild date,' and by some is believed to be the parent of the cultivated one. 'Toddy' is obtained from it by cutting off the young flower-spike, and date-sugar, much used in India, by boiling this juice. It is said that 130,000,000 lbs. are annually extracted from it in India, and that 220,000,000 lbs. is the annual quantity of palm-sugar obtained. *Arrack* (q.v.) is toddy distilled. *P. paludosa*, a gregarious Indian species, covers considerable tracts. *P. acaulis*, *farinifera*, and *spinosa* are dwarf species, the first being found in the damp valleys of the Himalayas, at 5000 feet elevation. From *P. farinifera* an inferior kind of sago is extracted. The name is derived from the Fr. *datte*, Gr. *daktulos*, from its supposed resemblance to a *finger*.

Date.—Spathe, Flowers, and Fruit.

Date-Plum, a genus of Deciduous trees of the Ebony order. Above a hundred species are known, mostly natives of Asia and the Mauritius, while about a dozen are found in America, and three or four in Africa. Nearly all are confined to the tropics—a few extending as far N. as 44°. Ebony (q.v.) and the various kinds of wood known as ironwood are the produce of this genus. Others are valued for their fruit. The common D.-P., pishamin, European lotus, or date of Trebizond, is a tree 20 to 40 feet in height, a native of the coasts of the Caspian, and now cultivated in the S. of Europe for its yellow, sweet, astringent fruit, about the size of a cherry. It bears well in the S. of Britain. The persimon (probably a corruption of *Pishamin*), or Virginian D.-P. attains a height of 50 or 60 feet, and produces wood hard and elastic, though liable to split. The fruit is astringent, but when mellowed by frost is eatable. It is pounded and made into cakes with bran, from which, by adding yeast and water, a kind of beer is brewed, or by fermenting, a spirituous liquor. The bark is bitter, febrifugal, and has been employed with success in infantile cholera and diarrhœa. The Chinese D.-P., or *Kaki*, is dried and cured by the Chinese to make sweetmeats, called *Figues-caques* in France.

Datisca'ceæ, a small natural order of Dicotyledonous plants, containing four species and three genera of herbs and trees, distributed over N. America, Northern India, Siberia, the Malayan Islands, and the S.E. of Europe. Except the *Datisca cannabina* of Crete, &c., the root of which is employed in Cashmere as a yellow dye, the order has no economical qualities.

Daubenton, Louis Jean Marie, a French naturalist, born at Mont Bar, in Burgundy, 29th May, 1716. After a youth spent in the study of theology and medicine, he was associated with Buffon (whose sight was now failing) at the Jardin du Roi. D., who was made curator and demonstrator in the Cabinet of Natural History, did the measurements, the dissections, the calculations, in fact, the whole anatomical description in the part of the *Histoire Naturelle* relating to mammalia—*i.e.*, the first fifteen volumes. A coolness then arose between the two friends, which was afterwards removed. D.'s laborious accuracy was a useful check on the brilliant generalizations of Buffon. Besides arranging the large collections of the Cabinet, D. took up the subject of fossil remains. He wrote the general subject of natural history for the *Encyclopédie Méthodique*, and communicated, between 1754-64, many papers on minerals to the Academy of Sciences. He held chairs of Natural History and Mineralogy under the Revolution. He died 1st January, 1800. He interested himself in rural economy, and the introduction to France of Spanish sheep. His character was very simple and modest, but his scientific eminence is undisputed. See Cuvier, *Notice sur la Vie et les Ouvrages de D.* (in the *Mémoires de l'Institut*, t. iii).

Dau′beny, Charles Giles Bridle, M.D., F.R.S., Professor of Botany and Chemistry in Oxford University, is best known for his investigations into the chemistry of volcanic action. Most of his works relate to such phenomena, and those most worthy of mention are *A Description of Active and Extinct Volcanoes* (1826), *A Notice of the Thermal Springs of N. America* (1838), and *A Sketch of the Geology of N. America* (1838). His *Lectures on Agriculture* (1841) and *Climate* (1862) are the most valuable of his other publications. D. died 12th December, 1867.

Daum′ier, Henri, was born at Marseille in 1810. He became known in France as a telling caricaturist. Many of the happiest sketches in *Charivari* have been due to his fertile and playful genius. Among his productions are *Les Philanthropes du Jour, Idylles Parlementaires, Les Bons Bourgeois, Les Représentants Représentés*, inspired by the Revolution of 1848. He died at Valmondois, 10th February, 1879.

Daun, an old and illustrious Austrian family, originally from the neighbourhood of Trier. The ancestral castle occupied a rock near the little town of D., whence the family name. As early as the 11th c. the Dauns were conspicuous in political life. One branch of the family settled in Austria in the 17th c. Its most famous member was **Leopold Joseph Maria, Graf von D.,** Austrian field marshal, who was born at Vienna, 25th September, 1705. In the war with the Turks (1737-39) and in the later war of the Austrian succession he greatly distinguished himself, and was made field marshal for his services in the campaigns against the French in the Netherlands in 1746-48. D. reorganised the Military Academy at Vienna, and materially modified the Austrian military system. As imperial commander-in-chief in the war with Friedrich II., D. showed himself a truly great commander, triumphing over the Prussians at Kollin, Hochkirchen, &c., and compelling Friedrich to raise the siege of Prague, Dresden, and Olmutz. Ultimately D. suffered defeats at Leuthen, Torgau, Burkersdorf, Reichenbach, &c. Carlyle (*Friedrich*, vol. vi. p. 375) calls him 'an honourable, imperturbable, eupeptic kind of man.' D. died 5th February, 1766.

Dau′phin (Lat. *Delphinus*), formerly the title of the eldest son of the King of France, but originally given in the 12th c. to Guigo, lord of Vienne in Dauphiné, and continued to succeeding Comtes de Vienne. In 1349 the childless Humbert II. made Charles of Valois, grandson of Philippe VI. of France, his heir, on condition that the heir-apparent to the crown should bear the title of *Dauphin de Viennois*. The title was abolished after the Revolution of 1830.

Dau′phiné, formerly a province of France, comprising the present departments of Hautes-Alpes, Isere, and Drôme. After forming a part of the first Burgundian kingdom, the monarchy of the Karolings, and the second Burgundian kingdom of Arles, it was in 1032 bequeathed by Rudolf III. to the German Emperor, and remained along with the rest of Burgundy in the closest union with the German Empire till 1349, when Humbert II., the territorial lord, transferred the sovereignty to France. See DAUPHIN.

Dauphin's Crown, a circle of gold surrounded by eight fleurs-de-lis, and surmounted by four dolphins.

Dauw, Peechi, or **Burchell's Zebra,** a species of *Equidæ* or Horses, allied to the true Zebra (q.v.), and found in S. Africa, particularly S. of the Orange River. The stripes on the body are not so black as those of the zebra, and do not extend all down the limbs as in the latter, but are confined to the head, body, and upper portions of the legs. The D. cannot be thoroughly tamed or domesticated.

D'Av′enant, Sir William, poet and dramatist, born in 1605 at Oxford, where his father was an innkeeper, was educated at Lincoln College, and became page to the Duchess of Richmond. His first play, *Albovine, King of the Lombards* (1629), was followed by other dramas and masques. On Ben Jonson's death, in 1638, D. became laureate. He lived a chequered life until the Restoration, which secured his fortunes; and he continued to manage the theatre and write plays till his death, 7th April, 1668. D.'s merits as a poet have been somewhat overlooked. His epic, *Gondibert*, contains ingenious thinking happily expressed, and some of his lyrics are graceful and spirited. See Wood's *Athenæ Oxonienses*, and Maidment and Logan's edition of his *Dramatic Works* (Edinb. 1872-74).—**Dr. Charles D'A.,** son of the preceding, a writer on political economy, was born in 1656 and died in 1714. Among his works (a selection of which was published by Whitworth in 1771) are *A Discourse upon Grants and Resumptions* (1700), *An Essay upon the Balance of Power*, &c.

Dav′enport, a city of Iowa, U.S., on the right bank of the Mississippi, below the upper rapids. It is built at the foot of a bluff opposite to Rock Island City. The river is here spanned by a railroad bridge 1582 feet long, and 21 feet above high-water mark. D. has two colleges, one for males and another for females, flour and saw mills, breweries, foundries, coach, locomotive, soap, and candle works. The place was settled in 1836. Pop. (1840) 600, (1850) 1848, (1890) 26,872.

Davenport, Rev. John, a distinguished Puritan divine, was born at Coventry, in England, 1598. He was educated at Oxford, became minister of St. Stephen's, London, and went over sea with the first Puritan settlers of New Haven, Connecticut, in 1638. He remained their minister for thirty years, and died in Boston in 1670.

Dav′entry (Celt. *Dwy-avon-tree*, 'the town of the two rivers'), also **Daintree** ('the town of the Danes'), a municipal borough in Northamptonshire, 13 miles W. of Northampton, between the rivers Avon and Nen, and near the Grand Junction Canal. Whipmaking and shoemaking are the chief industries. Before the time of railways it was a great thoroughfare for the N.W. of England, and as many as eighty coaches passed through it daily. At Danes' Hill, half a mile from the town, is one of the largest encampments in England. In the neighbourhood is the battlefield of Naseby. Pop. mun. bor., civ. par., and ecc. par. (each) 3939; and reg. sub-dist. 7623.

Dav′id (Heb. 'the beloved'), King of Israel, was the youngest son of Jesse. He first appears on the scene when he was anointed king by Samuel (1 Sam. xvi.), and about the same time was sent for to soothe King Saul (q.v.) by playing on the harp. Yet there is another account of his *first* introduction to Saul in chap. xvii., apparently by another writer, who was ignorant of the events recorded in chap. xvi. According to the narrative, D. was admitted into the palace, received Michal, Saul's daughter, to wife, and contracted a remarkable friendship with Jonathan, his son; but owing to the jealousy and hatred of Saul, was soon obliged to flee. He fled first to Achish, King of Gath, and being discovered by the Philistines to be the slayer of Goliath, escaped their vengeance by feigning madness. After staying there about sixteen months (1 Sam. xvii. 7), he betook himself to the Cave of Adullam, gathered a band of from 400 to 600 outcasts, and led the life of a freebooter for about twenty years. (Samuel, who was alive at the time of his flight, 1 Sam. xix. 18, died in the eighteenth year of Saul's reign—Jos. Ant., vi., 13, 5; and Saul reigned forty years, Acts xiii. 21—which gives at least twenty-two years.) On the death of Saul, D. became king of his own tribe of Judah (2 Sam. ii. 4), while the other tribes elected Ishbosheth, Saul's son. Chiefly through the influence of Abner, the general of Ishbosheth's army, who deserted his master, and then by the assassination of that prince, D. became King of Israel seven years after. He fixed his capital at Jebus, hitherto held by the Canaanites, under the name of Jerusalem (q.v.), where he reigned till his death, thirty-three years after. Under D. the empire of the Israelites rose to the zenith of its power, being extended, by the conquests of neighbouring tribes, from the Euphrates to the Mediterranean, and his reign was ever afterwards looked back to by his countrymen as the golden age of the national history. D.'s complex character is the grandest in the Old Testament, though there are stains on its glory. He leaves on us the impression of a nature aglow with religious, poetic, and patriotic enthusiasm; he was capable of the tenderest and most romantic sentiments, though inflexible, and at times even cruel, in the execution of his purposes. He combined the chivalry of the hero-king with the clear insight of the statesman and the rapt fervour of the poet, the prophet, and the devotee. His lyrics hold the foremost place in devout literature. One cannot imagine a time when they will cease to be an inspiration and a solace to Christendom. The variety, breadth, and depth of religious experience which they contain furnish the best reason for regarding David, with all his imperfections, as the truest and noblest type of Christ in Old Testament history. In deep tragic knowledge of the human heart none of the Hebrew saints and sages come so near to the 'Man of Sorrows.' The whole Christian Church has practically admitted this, for, next to the words of our Lord himself, it has always reckoned the 'Psalms' (q.v.) to be its most precious heritage of spiritual truth. See Ewald's *Geschichte des Volkes Israel* (Eng. transl. 1869).

David I. (sometimes called **St. David,** though never canonised), King of Scotland, was the third son of Malcolm Canmore by the English Princess Margaret, sister of Eadgar Ætheling. He was born about 1080, and passed his youth at the English court, together with his sister Eadgyth, who was married to Henry I. of England. D.'s eldest brother, Eadgar, who died in 1107, and was succeeded by his next brother, Alexander, separated the principality of Strathclyde from the rest of the kingdom, and conferred it on D., who by his marriage in 1108 with Matilda, heiress of Waltheof, Earl of Northumberland, became Earl of Huntingdon, and was thus not only heir to the Scottish crown, but a powerful English noble. He now became intimate with the Norman knights of England, which in the sequel powerfully influenced the course of Scottish history; for having quelled an insurrection of the men of Moray, he dealt with the territory of the subjugated chief as a feudal forfeiture, and portioned it out among Norman strangers, who thus became crown vassals. In 1124 he succeeded his brother Alexander on the Scottish throne. In 1127, as Earl of Huntingdon, he swore to Henry I. to support the right of Henry's daughter Matilda to the English crown, and when Stephen of Blois seized it, D. invaded England, and took possession of all the strongholds of the N. except Bamborough. Stephen advanced to meet him with a formidable force, but an agreement was made, by which David's son Henry was invested with his English fiefs, and the claim to Northumberland left open. An insult to Henry at the English court induced D. to ravage the northern counties in 1138; but being deserted by Bruce, Baliol, and other Norman barons, his motley force of Scots, Picts, Orcadians, Strathclyde Britons, English of Lothian, and Normans, was signally defeated at the famous 'Battle of the Standard,' near Northallerton. In 1139 peace was concluded at Durham, and Prince Henry made Earl of Northumberland. Two years later D. invaded England in favour of his niece, and narrowly escaped being taken prisoner. The close of his life, otherwise tranquil, was saddened by the death of his son Henry. D. died at Carlisle, 24th May, 1153, and was buried at Dunfermline. D., like all the children of St. Margaret, was devoted to the Church. He began the establishment of the bishopric of Glasgow while he was yet Prince of Strathclyde. In his reign were founded or enlarged the bishoprics of Dunkeld, Moray, Aberdeen, Ross, Caithness, Brechin, Dunblane, and Galloway; and to the same time also belong the religious houses of Holyrood, Melrose, Jedburgh, Kelso, Dryburgh, Newbattle, and Kinloss. He increased the number of royal burghs, and granted many privileges and immunities to the burghers. Latin culture first found a home in Scotland under his munificent patronage, and to him may be ascribed the decisive completion of that civilising policy, begun by his father, which saved Scotland from the rude rule of the Celt. See *Eulogium Davidis Regis Scotorum*, by Æthelred, Abbot of Rievaulx, printed in Pinkerton's *Vitæ Antiquæ Sanctorum Scotiæ* (Lond. 1789).

David II. See BRUCE.

David, Jacques Louis, born at Paris, 31st August, 1748, was trained to be an architect. He learned painting in the studios of Boucher and Vien. In 1775 he gained the grand prize of Rome, in which city he spent the next five years, chiefly drawing from the antique. He then began to paint subjects chiefly classical: his 'Horatio' being his best before the Revolution. The Constituent Assembly and the National Assembly (of which he was a member) commissioned pictures from him for the nation, and he arranged the artistic effects in the fêtes. His friendship for Robespierre caused his imprisonment for a year in 1794. The murders of Marat and Pellétier were commemorated by D. in two pictures. In 1799 his 'Rape of the Sabines' was completed. Napoleon made D. his first painter, and sat for the famous portrait in which he is ascending Mount Bernard on horseback. His official pictures for the throne-room at the Tuileries were of inferior merit. Banished by the law of 16th January, 1816, and expelled from the Institute, D. went to Brussels, where he painted 'Mars Disarmed by Venus,' 'Cupid and Psyche,' &c., and where he died, 29th December, 1825. See Miel's *Notice sur J. L. David* (1834), and Deleçluze's *David et son École* (1855).—**Pierre Jean D.,** born at Angers, 12th March, 1789, first came into notice about 1810, when he carried off the Academy prize by a bass-relief of 'Epaminondas.' After studying at Rome, he established his reputation as a sculptor by the statue of the 'Grand Condé' for Versailles. In 1826 he became Professor at the School of Painting, and in 1831 commenced the sculptures of the Pantheon. He sat in the Constituent Assembly of 1848, and was banished temporarily in 1851. He died 5th January, 1856. Among his bass-reliefs may be mentioned the 'Marches Militaires' for the Hôtel de Ville, Paris; among colossal medallions, 'Casimir Delavigne' and 'G. St. Hilaire'; among busts, 'Washington,' 'Béranger,' 'Bentham,' 'Humboldt,' 'Göth,' 'Rossini'; among statues, 'Cuvier,' 'Jean Bart,' and 'Talma'; the tombs of Generals Foy and St. Cyr at Père la Chaise, and the monument to Botzaris at Missolonghi.—**Félicien D.,** a French musical composer, was born 8th March, 1810, at Cadenet, Vaucluse. He was educated among the Jesuits at Aix, where he became a chorister, and in 1830 was admitted to the Conservatoire, Paris, having shown his compositions to Cherubini, who was then director of that institution. D. advanced rapidly in his musical studies; and in 1831 quitted the Conservatoire, and joined the Saint-Simonians, for whom he composed several hymns. On the breaking up of that fraternity D. travelled to the East, and on returning to Paris in 1835, published unsuccessfully *Mélodies Orientales*, which he had composed during his travels. His succeeding works, such as *Le Pirate* and *Les Hirondelles*, attracted slight notice; but in 1844 his *Ode-symphonie*, *Désert*, had a brilliant reception, and spread his fame through Europe. Later he composed *Christophe Colombe* (1847); *L'Eden* (1848); *La Perle du Brésil*, a comic opera (1851); *Herculaneum*, an opera (1859); and *Lalla Rookh*, a comic opera (1862). In 1869 he was made librarian to the Paris Conservatoire de Musique. He died 29th August, 1876.

David, a prosperous town on the left bank of a river of the same name in Panama, United States of Colombia, on the frontier of Costa Rica, with exports of rice, coffee, hides, and gold-dust. Pop. 7,800.

David, St. or **Dewi,** the patron saint of Wales, was born about the end of the 5th c., and, according to Giraldus Cambrensis, was the reputed uncle of King Arthur. He succeeded Dubricius as Archbishop of Caerleon, the head of the Welsh Church, but to avoid the inroads of the English, transferred the see to Menevia, thence called St. David's (q.v.). D. founded several churches in Wales, strongly combated Pelagianism, and was famous for sanctity and eloquence. Many miracles are recorded of him, as of the ground rising beneath him while he was preaching, and of a spring at St. David's gushing forth in response to his prayer. He died about 600. Many Welsh churches were dedicated to him. See *Historia S. Davidis* by Giraldus Cambrensis.

David's, St. (the British *Mynyw* and Roman *Menevia*), a very old episcopal city, Pembrokeshire, Wales, near the rugged promontory of St. David's Head, the westmost point in Wales. About 519, St. David, the patron saint of Wales, transferred the metropolitan see from Caerleon to St. David's, which during the Middle Ages was an important city, from the numerous pilgrims attracted to it by the sanctity of the shrine, and the rich offerings brought by them. The cathedral, the bishop's palace, St. Mary's College, and some ruins, occupy a space surrounded by a lofty embattled wall more than three-fourths of a mile in circuit. The cathedral, founded in 1180, is cruciform, and generally in the Transition Norman, though Early English and later styles occur in portions. It contains the tomb of the Earl of Richmond, father of Henry VII., and monuments of Giraldus Cambrensis, Anselm, and other early bishops. Not the least distinguished of its many eminent bishops was the late Connop Thirlwall, the historian of Greece. Pop. reg. sub-dist. 5803; civ. par. 1816; and diocese 496,009. See the *History of the Cathedral of St. D.* by E. Freeman and Basil Jones.

Da'vies, Sir John, son of a lawyer at Westbury, Wiltshire, was born in 1570. He studied at Oxford, and was called to the bar in 1595. Next year he published a poem on dancing, called *Orchestra*. In 1598 his irregularities led to his expulsion from the Middle Temple, when he went to Oxford, and wrote his chief poem, *Nosce Teipsum*, treating of the immortality of the soul. In the reign of James I., D. filled the highest legal offices in Ireland, and in 1613 was Speaker of the Irish House of Commons. He sat in the English Parliament in 1620, and died 7th December, 1626. D.'s legal and political works, of which the chief is *A Discovery of the True Causes why Ireland has never been Subdued until the Beginning of this Reign*, are of high value, but his poems more markedly display his ability. His verse is harmonious, the language choice, and the thought just and often philosophic.

Dav'ila, Enrico Caterino, born near Padua, 30th October, 1576, belonged to a family driven from Cyprus by the Turks. Catharine de Medicis was his godmother. After the death of Henri III. and the capitulation of Paris, D. served five years under the banner of Henri IV. He then occupied a high military and civil post at Venice. D. was assassinated in 1631. The best edition of his *Historia delle Guerre Civili de Francia* is that of Milan (6 vols. 1807). There is a French translation from the Italian by Mallet de Grosley (1757). Although biassed in favour of his godmother, D. gives an elegant and truthful account of the period (1559-98). He stands below Machiavel and Guicciardini, but above Sarpi and Bentivoglio.

Da Vin'ci, Leonardo, the chief of the Florentine painters, and, according to Hallam, 'the first name of the 15th c.,' was the illegitimate son of Piero Antonio, a notary, and was born in the Val d'Arno in 1452. Noted from early youth for his beauty and artistic promise, he was trained by Verocchio, then the greatest artist in Florence, whom he soon surpassed in painting; and, moreover, devoted himself to sculpture, poetry, music, architecture, and mechanics. In 1483 he visited Milan, where he became designer of pageants for Ludovico Sforza, and painted his 'Last Supper' in the refectory of a Dominican church. This fresco, finished in 1497, is now only faintly visible. In 1498 the French took Milan, and D. returned in poverty to Florence. Henceforth his life was one of wandering. To the years 1498-1502, his most actively creative period, belong the works 'La Giaconda'—the 'Vierge aux Rochers' of the Louvre—his masterpiece, and the 'Battle of the Standard,' produced in competition with Michael Angelo, Raphael watching both artists as they worked. In 1514 D. revisited Rome, where, though a supreme political indifferentist, he was suspected of French sympathies by the anti-Gallican party, and accordingly turned to France at the invitation of François I., who gave him the Château de Clou in the valley of the Masse, where he died, 2nd May, 1519. There is an indefinable charm and mystery in his life and works; his genius is enigmatical as well as versatile and fascinating. He often trifled with his superb powers, losing himself in strange fancies and intricate designs. He was the leader of the return to nature in the painting of the 15th c. (see Renaissance), and fixed for ages the pictorial type of the Saviour. His paintings are marked by fondness for bizarre effects, by patient refined execution, by the subtle exotic beauty of his female faces, the modelling of which is said to be unequalled. His favourite subjects are moving waters and faces with a perplexing smile. D. undertook various architectural and engineering labours, led the water of the Adda to Milan, made a navigable canal 200 miles long, and planned vast schemes, such as the perforating of mountains and raising of great buildings. He carefully studied plants, crystals, and the stars, and anticipated many recent discoveries and inventions. His thirteen books of MSS.—written from right to left—are still unedited. See Vasari's *Le Vite de piu eccellenti Pittori, Scultori e Architette*, the first edition of 1550, and also the later edition, Florence, 1846-57, in which the history of D. is modified; Arsène Houssaye's *Histoire de Léonard da Vinci* (Par. 1867), an admirable book, the chief authority on D.; and Pater's *Studies in the History of the Renaissance* (Lond. 1873).

Da'vis, Jefferson, the leader of the greatest civil war of modern times, was born in Kentucky, 3rd June, 1808. He graduated at West Point Military Academy in 1828, and served in the Black Hawk War, 1831-32. D. became a cotton-planter and a keen advocate of that interest, entering the arena of Congress in 1845 as a 'Democrat.' He fought with distinction in the Mexican War, entered the U.S. Senate in 1847, and became Secretary of War under President Pierce (1853-57). D. had long championed state rights and slaveholding interests, and at length led on the secession of 1861. He was chosen President of the Confederate States for six years. After the collapse of the South he was taken prisoner at Irwinville, Georgia, 10th May, 1865, and detained in Fortress Monroe for two years, but was included in the amnesty of 1868. D. subsequently followed business pursuits, eschewing politics, and wrote a history of the war in which he played so conspicuous a part. He died 1890.

Davis, John, a celebrated navigator of the latter part of the 16th c., was born in the parish of Strake-Gabriel, near Dartmouth, Devonshire. He made three voyages between 1585 and 1588 in search of the N.W. Passage, discovering, in the first, the strait which bears his name. He subsequently accompanied Cavendish to the South Sea, made five voyages to the East Indies, in the last of which he was killed, 29th December, 1605, by pirates off the coast of Malacca. D. invented a quadrant, which was subsequently superseded by Hadley's, and was the author of *The World's Hydrographical Description* and *The Seaman's Secrets* (both 1595). An account of his discoveries is given in Hakluyt's *Voyages* and in Harris's *Collection of Voyages*.

Davis, Sir John Francis, born in London, 1795, went to China in the suite of Lord Amherst, 1816, joint commissioner with Lord Napier in 1834 in arranging affairs with China, and British plenipotentiary to China, and governor and commander-in-chief of Hong-Kong, 1843-48. He was created a baronet, 1845, and K.C.B., 1854. D. was one of the most authoritative writers on China, its people, and its recent history. His chief works are *Chinese Novels Translated* (Lond. 1822); *Chinese Moral Maxims* (Macao, 1823); *The Chinese, a General Description of the Empire and its Inhabitants* (Lond. 1836-57); *China during the War and since the Peace* (Lond. 1852); *Chinese Miscellanies* (1865).

Davis Strait, discovered by John Davis (q.v.) in 1585, is the southern half of that great inlet of the Atlantic running N. between Greenland on the E. and Baffin's Land on the W. It is in lat. 60° to 70° N., and it varies in width from 160 to over 300 miles. It is the gate from the Atlantic to Baffin's Bay, Smith and Lancaster Sounds, &c., and though its western shores are hampered with heavy ice throughout almost the whole year, it is freely navigated (along the Greenland coast) by fleets of whalers during the summer months.

Da'vison, John, the author of the well-known *Discourses on Prophecy*, was born at Morpeth, 28th May, 1777, and educated at Oxford, where, between 1810 and 1817, he was tutor of his college (Oriel), public examiner, and preacher at Whitehall. In 1826 he was made prebendary of Worcester, and shortly after rector of Upton-upon-Severn. He died 6th May, 1834. D. had great learning and clearness of judgment. His *Discourses* were published in 1812.

Da'vit, on shipboard, a sort of crane, with a curved arm projecting outwards, placed in pairs at the sides and stern of a vessel to facilitate the raising and lowering of boats, and on which the boats are slung ready for any emergency. A stout beam of timber, fitted to the fore channel, for hoisting the anchor to the top of the bow without injury to the ship's sides from the flukes of the anchor, receives the same name.

Davout' (commonly, but inaccurately, written **Davoust**), **Louis Nicolas,** a celebrated French marshal and lieutenant of Napoleon, was born of a noble family at Annoux, in the old province of Burgundy, 10th May, 1770. He studied at the military school of Brienne at the same time as Bonaparte, and entered the army in 1785. D. distinguished himself on numerous occasions, accompanied Bonaparte to the East, and contributed greatly to the victory of Aboukir (1799). In the Napoleonic campaigns (from 1805 to 1809), including the battles of Jena, Austerlitz, and Wagram, he played a most brilliant part, being rewarded with the titles of Duke of Auerstadt and Prince of Echmühl. Appointed Governor of Poland, he obtained an evil reputation by the harshness of his military despotism and by his personal rapacity. In the Russian campaign he gallantly supported his chief, and after the retreat from Moscow became Governor of the Hanse Towns, which office he held till the restoration of the Bourbons. After Bonaparte's return from Elba, D. was his War Minister, and commanded the army which capitulated under the walls of Paris. He was made a peer of France in 1819, and died 1st June, 1823.

Da'vy, Sir Humphry, a celebrated chemist, was born at Penzance, Cornwall, 17th December, 1778. After a preliminary education he was apprenticed to a surgeon and apothecary in his native town in 1795, occupying his leisure time with the study of science, mental and physical. His first published experiments, upon the decomposition of carbonic acid by plants, appeared in the *Contributions to Physical and Medical Knowledge, Principally from the West of England*, edited by Dr. Beddoes, who in 1798 made D. the superintendent of his Pneumatic Institute, then recently established at Clifton. Here he made his famous experiments in the respiration of nitrous oxide, nitric oxide, marsh gas, and carbonic acid, which, communicated to the Royal Society, obtained for him a great reputation as a chemist, and an appointment in 1801 as lecturer of chemistry in the Royal Institution at London. In 1806 his Bakerian lecture, *On Some Chemical Agencies of Electricity*, gave the results of his experiments in what is now known as electrolysis, and the following year witnessed the decomposition of the so-called fixed alkalies, and the discovery of the substances constituting their bases. In 1808 D. demonstrated that what Berthollet had supposed to be a compound of oxygen and muriatic acid was in reality a simple substance, which he called chlorine; and at the same time overthrew Lavoisier's theory of acids, which was in general acceptance among the chemists of that day. In 1814 he also discovered and experimented upon iodine, a substance resembling chlorine in many of its properties. D. was knighted in 1812, and received a baronetcy in 1818, while he was making his second tour on the Continent. In 1815 his attention was directed to the subject of mine explosions, and he was thus led to the invention of his Safety Lamp (q.v.), an invention which alone would entitle him to a high position among British men of science. In 1820 he succeeded Sir Joseph Banks as President of the Royal Society, but resigned in 1827, in consequence of failing health. A visit to Italy did not restore him; and he died at Geneva, 29th May, 1829, his death being no doubt hastened by his early experiments on gases. His collected works (1839-40) were edited by his brother, Dr. John D., who also published *Fragmentary Remains* (Lond. 1858). His last work was entitled *Consolations in Travel, or the Last Days of a Philosopher*. See *Life of Sir H. D.*, by J. A. Paris (Lond. 1831).

Dawall'a, a Teleostean fish belonging to the family of the *Siluridæ* or Sheat-Fishes. It occurs in the rivers of Guiana, and averages about two feet in length. The snout is elongated, and the teeth are numerous and of minute size. No scales exist. Its flesh is highly esteemed for its nutritious qualities and delicacy.

Dawk, or **Dâk,** literally the mail-post, but applied to an Indian mode of travelling in palanquins carried from station to station by relays of men, usually consisting of eleven, the stations being from 9 to 11 miles apart. There are now Government post-waggons, or the horse-D., seated for four and serving as a bed for two.

Daw'ley Mag'na, a town in Shropshire, 3½ miles S.E. of Wellington, with blast-furnaces, bar-iron mills, collieries, lime and tile works. Pop. civ. par. 6996.

Daw'lish, a village on the S. coast of Devonshire. It was formerly an insignificant fishing hamlet, but from its beautiful situation in a valley between the mouths of the Teign and the Exe has now become a favourite watering-place. Pop. civ. par. 4925.

Daw'son, Sir John W., LL.D., naturalist, was born at Pictou, Nova Scotia, in October, 1820. After studying for some years at Edinburgh University, he returned home, and wholly devoted himself to the study of natural science. He greatly increased our knowledge of the palæontology of Canada, and was the discoverer of the oldest known form of organic life, the *Eozöon Canadense*, which belongs to the Laurentian formations. D. was Vice-Chancellor of the M'Gill University at Montreal, and a member of many scientific societies of Europe and America. Among his principal works are his *Archaia, or Studies of the Cosmogony and Natural History of the Hebrew Scriptures* (1858), his *Acadian Geology* (2nd ed. 1868), and, most important of all, his *Devonian and Carboniferous Flora of Eastern N. America* (2 vols.), published by the Geological Survey of Canada. His latest works are *The Story of the Earth and Man* (1872), in which he combats Darwin's views on the origin of man, his *Dawn of Life* (1875), and *Science in Bible Lands* (1888). In 1884 D. was knighted.

Dax (the *Aquæ Augustæ Tarbellicæ* of the Romans), a town in the department of Landes, France, on the left bank of the Adour, 20 miles N.E. of Bayonne, with manufactures of pottery and liqueurs, and a trade in wine, corn, timber, hams, honey, wax, &c. Its hot saline springs, with a temperature of 158° Fahr. at their source, are efficacious in rheumatic complaints. The name D., formerly *Acqs*, is a corruption of *Aquæ*. Pop. commune 10,240; arrond. 108,801.

Day (Old Eng. *dæg*, Ger. *Tag.*, allied to Lat. *dies* and *divum*, from a Sansk. root, *div*, 'to shine'), commonly denotes the time during which the sun is above the horizon, being thus opposed to night; but the term is also applied, in astronomy, to one complete rotation of the earth, taken with reference to some celestial body. Thus the *sidereal D.* is the time which elapses between two successive culminations of the same star; and from the earliest historic period this interval of time has not appreciably altered. Its consistency recommends it to the astronomer, who divides it into twenty-four sidereal hours, and these again into minutes and seconds. The *solar D.* is similarly measured by means of the sun; but owing to the orbital motion of the earth giving rise to the apparent motion of the sun among the stars, it is longer than the sidereal D. This difference is never twice successively the same, a circumstance which arises from two causes, viz., the varying velocity of the earth in its orbit, and the obliquity of the ecliptic. The *civil* or *mean solar D.* is the solar D. which would be given by the earth moving with its *mean* velocity in a circular orbit and making 365·24235 revolutions in one Gregorian year. This mode makes the days all the same length, and the noon of the civil D. sometimes precedes, sometimes follows, the true solar noon. Most modern nations place the beginning and end of the D. at midnight—an arrangement somewhat inconvenient to the astronomer, whose observations thus frequently extend over a time embracing parts of two days.

Day, in law, is twenty-four hours, beginning at midnight. Most European nations reckon so. Every day, on which a court may sit, is called a *lawful* day. No legal execution against person or property can be done except on a lawful D. But criminal warrants, or, in some circumstances, warrants for apprehending a debtor, may be granted and executed on any D. Under statutes, various acts and contracts are rendered illegal if done or entered into on Sunday. See LORD'S DAY ACTS, SABBATH, PUBLIC-HOUSES.

Day, Thomas, a pamphleteer and tale-writer, and a man of very whimsical character, was born in London, 22nd June, 1748; studied at Oxford, and afterwards entered the Middle Temple. He sympathised with the Americans in the war of independence, and was an advocate for the abolition of the slave trade and for parliamentary reform. But he is remembered now only for his *Sandford and Merton* (1783-89) and *History of Little Jack*. He died 28th September, 1789. An interesting and amusing sketch of D.'s character and ludicrous mishaps in search of a model wife is to be found in the *Saturday Review* of 13th May, 1876.

Day-Fly, a genus of insects belonging to the order *Neuroptera* (q.v.), and not to the order *Diptera*, or that including the common flies. See EPHEMERA.

Day-Lily, a genus of Liliaceous plants, of the species cultivated in our gardens. The D.-L. of Hungary, France, Siberia, and China, and that of the Levant and France, both fibrous-rooted perennials, producë abundant foliage, which is eagerly eaten by cattle.

Day'lesford, a borough, in Talbot county, colony of Victoria, 78 miles N.W. of Melbourne. It was the centre of an important gold-mining district, but in this respect the locality has much declined; the form in which mining operations was chiefly carried on being quartz-crushing. Pop. 3839; of the electoral district, 9174. The inhabitants are engaged in agriculture and mining.

Day-Nursery, a building set apart for the reception of very young children during the day-time, while their parents are away from home on work. The system is known as the crêche system, which was first established in France, where, more than a century ago, Madame Marbeau opened a building for the purpose. This was in Paris. The system spread to Belgium, and several crêches were opened in Brussels. Mrs. Hilton, of London, visited these institutions, and on her return to England introduced the system here. She was supported by the Society of Friends, of which she was a member, and her endeavours were successful not only in England, but also in the United States, where her example was followed shortly afterwards. There are now numerous establishments of the sort throughout the kingdom. On 29th April, 1893, the Duchess of Westminster opened St. Mary's D.-N. in West Ham (London Road, Plaistow), which is believed to be the largest of its kind in this country. The building accommodates 150 children, who are fed and taken care of during the day by fifteen nurses, and is fitted with every suitable comfort.

Days in Bank are, in England, certain days in term when writs are returnable, or when the party shall appear in court upon the writ served. They are so called in contradistinction to days at *Nisi Prius* when trial by jury took place.

Days of Grace are the three additional days formerly allowed by custom, and now by the law of the United Kingdom, for payment of a Bill of Exchange (q.v.) which has come to maturity. If the third day fall on a Sunday, Christmas-day, Good Friday, or a public fast or thanksgiving day, the bill is payable the day before. If it fall on a bank holiday (other than Christmas-day and Good Friday) it is payable the day after, or when the second day is a bank holiday, and the third day a Sunday, it is also payable on the fourth day. The number of D. of G. allowed for payment of a bill in different countries varies.

Day'ton, a flourishing city in the S.W. of Ohio, at the confluence of the Mad and Great Miami rivers. Its streets are well laid out and adorned with many fine residences and public buildings; among others, the marble courthouse, after the Parthenon. It has flour, saw, oil, paper, and cotton mills, breweries, farming implements and railroad cars factories. The prosperity of D. had its origin in the Miami Canal, connecting the city with Lake Erie (1829). Pop. now 57,978, reduced by 3242 since the census of 1890, owing to the decision of the Court of Common Pleas of Montgomery County, in respect of some territory, which has been declared to be outside the limits of the town.

Days'man, an umpire. The word occurs once in the authorised version of the Scriptures, in Job ix. 33—'Neither is there any D. betwixt us, that might lay his hand upon us both.' It occurs also in Spenser in a similar sense. The word so translated in Job comes from a root meaning 'to rebuke.' The origin of the English word is found in the old meaning of *Day*—the day, *i.e.*, of settling a cause judicially.

D'Aza'ra, Don Fe'lix, a Spanish naturalist and traveller, born at Barbunales, Aragon, 18th May, 1746. After obtaining the rank of brigadier-general in the Spanish army, he was sent to S. America, as one of the commissioners to settle the boundaries of the Spanish and Portuguese possessions there. He remained in S. America for twenty years, devoting his leisure to the investigation of the natural history of the New World, and published, on his return to Europe, *Apuntamientos para la Historia Natural de los Pajaros del Paraguay y Rio de la Plata*, of which an English translation by W. Percival Hunter was published at Edinburgh in 1838. D'A. died in Aragon in 1811.—His brother **Don Joseph Nicholas D'A.** (1731-1804), was a distinguished diplomatist.

Dea'con (Gr. *diakonos*, 'an attendant'), a certain kind of minister in the Christian Church. It is generally assumed that the institution of the office is described in Acts vi., and that the duties of it in the Apostolic Church were entirely connected with temporal affairs. According to another view, the seven whose appointment is described in Acts vi. were merely special commissioners to meet a special emergency, and a class of deacons or servants existed from the first in imitation of the constitution of the synagogue with its ministers (Luke iv. 20), or even as a necessity; which seems to be indicated by the 'young men' of Acts v. But the qualities of the D., almost equal to those required for a bishop described in 1 Tim. iii., indicate that he was more than a mere lay attendant. In the Post-Apostolic Church, at any rate, deacons were regarded as ministers of the same kind as the presbyters and bishops, though of an inferior kind; they were not called priests, but ministers or Levites. Before the institution of the inferior orders—readers, exorcists, &c.—the D. performed all the duties afterwards distributed to these. His duties were—(1) to take care of the sacred utensils; (2) to receive the offerings of the people; (3) to distribute to the people the elements at the Eucharist, after these had been consecrated; (4) to direct the people in their devotions; (5) sometimes to read the Gospel, and baptize; (6) to preach when licensed by the bishop; (7) to be the bishop's almoner, secretary, and sometimes his representative, and generally to be his eyes, ears, and right hand. His dress was the alb and stole, then the colobium, and finally the dalmatic. In modern Episcopal churches the D. ranks as the lowest of the three sacred orders, and acts as the priest's assistant in divine service, but has no independent cure of souls, and is debarred from ecclesiastical promotion, so long as he continue D. Statutes 13 Eliz. c. 12 and 44 Geo. III. c. 43 provide that a man must be twenty-three years of age before he may be ordained deacon, but the Archbishop of Canterbury may admit at an earlier age by faculty or dispensation. The Bishop of London or his appointee may ordain aliens (see Statute 24 Geo. III. c. 35) to be deacons, but not to serve in the Crown's dominions.

Deaconess.—Whether or not the institution was as old as that of the deacons, there existed very soon in the primitive Church a class of female servants who performed all those offices towards the females of the congregation which the deacons did for the men. According to the primitive regulations, they had to be widows who had borne children, been once married, and sixty years of age; later they were allowed to be virgins, and only forty years old. The order gradually died out in the Western Church from the 5th c., but was retained in the Greek till the 12th. See Bingham's *Ecclesiastical Antiquities*.

Deacon of a Trade. The president for the time of certain corporations in Scotland is so called. Before the passing of the Burgh Reform Act, the deacons of the crafts were *ex officio* members of the town council in royal burghs, and represented the trades. But by the Act above mentioned it is provided that the D. shall no longer be a member of the town council in virtue of his office. The D.-Convener of the Trades in Edinburgh and Glasgow continues to be a constituent member of the town council. The D. is preses of the incorporation, and signs the record of its acts.

Dead, a word used in nautical phrases or names, and in general indicating fixedness or passivity; as *D.-eyes*—immovable blocks used for tightening rigging; *D.-lights*—wooden shutters used to replace glass windows in stormy weather, &c.

Dead, Judgment of the. In ancient Egypt the belief seems to have been that immediately after death the spirit of the departed was led before Osiris, the judge of the dead, who examined into the past conduct of the deceased, with the assistance chiefly of Thoth and Anubis, the scribe and the scale-holder. The form of trial is symbolised in the papyrus rolls found among the mummies. An ostrich feather, as a symbol of truth, is seen in one scale of a balance, and a vessel in form of a human heart in the other. Forty-two gods, each presiding over a special sin, appear as judges, while a female hippopotamus appears as prosecutor. The scales are watched by the gods Horus and Anubis, the result in each case being noted by Thoth-Hermes, the justifier. According to Diodorus there was a form of human trial. If the result of this was unfavourable, funeral rites were withheld.

Dead Freight. A merchant who freights a whole ship must pay the shipmaster for unoccupied space. This due is called the D. F. It is, strictly speaking, a sum owing as damage for loss of freight; therefore, the shipmaster has no lien over the goods on board in security of his claim, which can only be made effectual by a personal action against the freighter. But lien may be constituted by stipulation in the charter-party.

Dead'ly Night'shade. See BELLADONNA.

Dead Nettle, a genus of Labiate plants. The white D. N. and the purple D. N. are common British wayside and hedge weeds. They are sometimes used as potherbs in Sweden. The name is also applied to the allied genera *Galeopsis* and *Galeobdolon*, some species of which (*G. tetrahit* and *G. versicolor*, or hemp-nettle) share with the D. N. proper the reputation of having stinging hairs, capable of causing great irritation, especially when the plant is drying, though they are as yet unknown to the botanist.

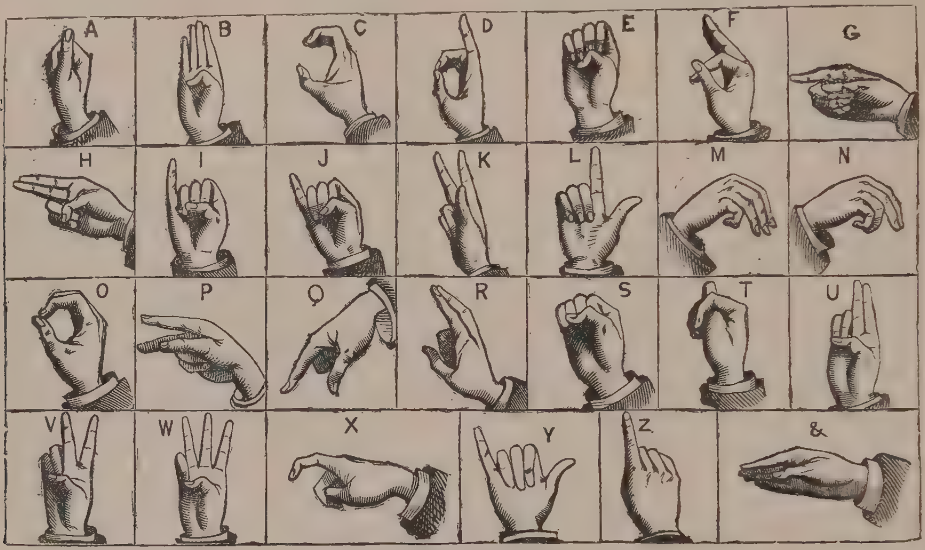
Dead Reckoning, in navigation, the calculation of a ship's position relatively to the point from which she started, by a series of consecutive observations of speed and direction independent of astronomical observations. See NAVIGATION.

Dead Sea, the *Lacus Asphaltites* of the Greeks, the *Salt Sea*, the *Sea of the Plain*, and the *East Sea* of Scripture, and the *Bahr Lût* ('Sea of Lot') of the Arabs, is situated in the S.W. of what was anciently Palestine, now comprised in the vilayet of Jerusalem. The name D. S. first occurs in Justin (*Mare mortuum*) and Pausanias (*Thalassa nekra*). The greatest length of the lake is 46 miles, its greatest breadth 10, and its area 290 sq. miles. Soundings of about 250 fathoms have been taken in its northern part; but the southern half is shallow, one-fourth of its length not exceeding 3 fathoms. At its northern end it receives the Jordan, and small variable streams enter it on each of the other sides; but as it has no outlet, its surface being 1312 feet below the level of the Mediterranean (and therefore 'the most depressed sheet of water in the world'—Stanley), its superfluous waters are carried off by evaporation, which accounts in some measure for the D. S.'s excessive saltness. The average of nine experiments, made at different times by eminent chemists, shows a specific gravity of 1·1556, that of pure water being 1·000. The water is so saturated with salt that it can take up only one-eleventh of its own weight, while that of the Atlantic can take up one-sixth. The depression occupied by the D. S. is now proved to be a volcanic crevice, and in the northern part of the region volcanic formations are found in considerable number. It is believed to be the seat of those 'Cities of the Plain' that were consumed by fire; and in the Middle Ages credulous pilgrims believed that they could catch a glimpse of Sodom and Gomorrah through the depths of the penal waters. But the Scriptural narrative forbids us to believe that the catastrophe was caused by submersion. The geology of the district, no less than the names Sodom and Bela (Zoar), suggests an earthquake or a volcanic eruption. The limestone cliffs forming the sides of the depression exhibit a remarkable regularity of height throughout their course, the western side having an elevation of 1000 feet, and the eastern of 2000. Both are nearly destitute of vegetation, except where a spring bursts from the foot of the mountain, or where a perennial stream fills the rift in the precipice with acacias. The epithet *Dead* was applied to this sea from the belief that its atmosphere was inimical to life; but there is nothing unhealthy either in the lake or its shores beyond what naturally arises from the excessive heat of the climate; and the picturesque myths that once circulated among Christians have now disappeared from literature. See Stanley's *Sinai and Palestine* (Lond. 1866).

Dead's Part is, in Scotland, that part of a man's *moveable* (personal) estate which he is entitled to dispose of by will. If he be survived by neither wife nor children, the whole moveable estate is D. P. If he leave a widow and no children, one-half goes to the widow as *Jus Relictæ* (q.v.); if he leave a child or children, but no widow, one-half goes to the children as *Legitim* (q.v.); and in either event the other half is D. P. If he leave a widow and a child or children, the moveable estate is equally divided into *jus relictæ*, *legitim*, and D. P. These legal divisions may be altered by marriage-contract, or by renunciations or discharges by the wife or children. Legacies or other gratuitous rights granted by the deceased on his death-bed affect only the D. P.

Deaf and Dumb, The, or, more correctly, **Deaf-Mutes** (Fr. *Sourds-muets*, Ger. *Taubstummen*), are those who suffer simultaneously from the want of the powers of speech and of hearing. A popular fallacy regarding this affliction is that it is twofold in its nature, implying malformation or incapacity in the speaking as well as in the hearing organs, whereas the power of articulation is undeveloped in the deaf-mute, or, in other words, he is dumb merely in consequence of his deafness. It will be observed that a perfect ear is necessary in acquiring the power of expression, since the primary means of so doing is by imitating the sounds we hear uttered by others. If a person, therefore, be unable to hear from infancy, it is impossible for him to learn the constituent elements of oral language; and if unaided, he must remain dumb even though possessed of the perfect organs of speech. Thus dumbness is the inseparable accompaniment of a congenital deafness. Also if a child lose the power of hearing before acquiring the faculty of speech, it inevitably incurs dumbness. But when the deafness is accidental, and occurs in an adult, it is not necessarily followed by a loss of utterance. The deaf man continues to speak as before; but even in such a case, when the ear no longer performs its controlling function, if great attention be not paid by others to the regulating of his voice it rapidly changes character; he speaks in a lower tone, accentuates his words badly, and eventually becomes all but unintelligible. Congenital deafness most often, perhaps, results directly from deficient action of the auditory nerve, and is generally incurable. That accruing from accident may be due to various causes; its curability depends on the nature of the cause, and the particular character and extent of the injury. See DEAFNESS.

The *statistics* bearing on the subject of deaf-dumbness, now comparatively full and authentic, do not reach further back than the year 1850. Since that year various commissions have inquired into the causes of deafness, the localisation of deaf-mutes, their social condition, education, &c. (See *Reports on the Status of Disease.*) Social science also has been directing attention to the possibility of reducing the extent of the evil by stricter conformity to hygienic discipline. It is impossible indeed to say what share the good done in this way may have had already in bringing about the favourable state of affairs to be noted in a comparison of the returns for 1851 with those of 1871-81-91. The total number of the deaf-dumb in Britain, according to the census of 1851, amounted to 17,300, or 1 in every 1590 of a population of 27,511,801; in 1871 they amounted to 18,150, or 1 in every 1742 of a population of 31,629,293.



One-handed Alphabet.

The following are the numbers as given in the census of 1881, compared with those given in the last census:—

Division.	Deaf and Dumb.		Proportion to the Population.	
	1881.	1891.	1881.	1891.
England and Wales	13,295	14,192	1 in 1953	1 in 2043
Scotland . . .	2,142	2,125	1 in 1744	1 in 1894
Ireland . . .	3,993	3,365	1 in 1296	1 in 1398
British Isles . .	88	82	1 in 1577	1 in 1803

In the United Kingdom the average in 1881 was 1 in 1794, and in 1891 it had sunk to 1 in 1916. Each division maintains its relative position with regard to the others. In 1881 Ireland and the British Isles showed the higher averages, and these they maintained, though somewhat modified, in 1891.

The distribution of deaf-mutes in England, as clearly shown by the returns, is not only disproportionate in the various districts, but is fixedly so, in a manner indicating a connection between the prevalence of deafness and the physical character of a country. And on a closer examination of the statistical evidence, it is at once seen that deafness is decidedly more common in mountain regions than in level districts, in rural parts than in cities and industrial centres. It would also appear that one of the commoner causes of its prevalence is the malaria arising from swamps or stagnant waters, or, indeed, any general impurity of the atmosphere. The elucidation of such facts as these is all-important, as showing that the evil is not altogether inevitable, and as pointing out a path for modern science and philanthropy.

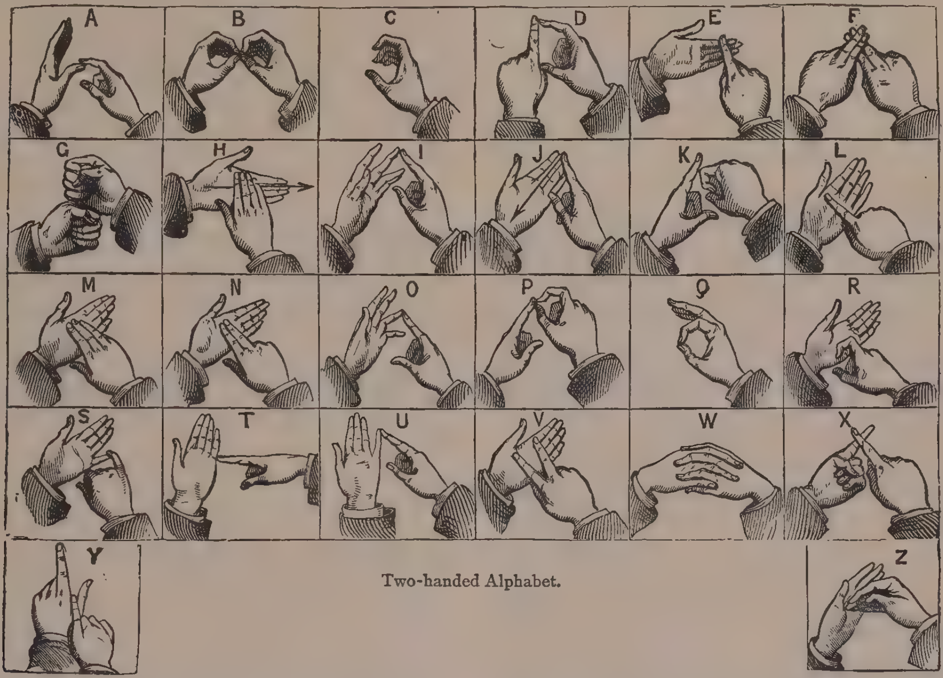
The number of institutions for the education of the deaf and dumb in each country, and the dates of the foundation of the earliest institutions, are as follow:—

	No. of Institutions.	Earliest foundation.
Australia and New Zealand .	4	1860
Austria (including Hungary) .	17	1799
Belgium	10	1822
Brazil	1	1867
Canada	6	1848
Denmark	4	1807
France	62	1765
Germany	90	1817
Italy	36	1801
Japan	2	1878
Mexico	2	1873
Netherlands	3	1790
Norway and Sweden . . .	24	1812
Portugal	1	1870
Russia	8	1806
Spain	7	1805
Switzerland	11	1822
United Kingdom of Great Britain and Ireland	40	1792
United States of America .	55	1817

From this it appears that France was the first country to recognise the necessity of supplying an educational establishment for the deaf and dumb, and five-and-twenty years elapsed before the lead was followed by the Netherlands. Two years later the Old Kent Road institution was opened in England, and in 1799 a similar establishment was founded at Vienna.

The *education* of deaf-mutes is encompassed by inconceivable difficulties. Not only is the deaf-mute destitute of all ideas derived from or connected with sound, but he is deprived of the very means by which instruction is usually conveyed, and is entirely ignorant of the power of words. To him the speaking voice is a nonentity. He can only hold converse by means of a few imperfect natural signs. His knowledge is confined to what he may have seen; the conception of past ages, distant countries, of a future world, or of a Deity, are all beyond his grasp. In the education of such an one the teacher has to communicate the medium of a complete language, as well as the entire mass of ideas, to a mind in a state of utter infancy.

The methods employed in the education of deaf-mutes are principally three in number—as named by the French, *mimique, phonologique, graphique*. Of these, the first deals in signs, and consists of (1) dactylology, or the art of spelling with the fingers; and (2) mimology, or the language of gestures. The second method is distinguished by the employment of oral means of instruction; it is divided into (1) phonology, or 'artificial speech;' and (2) labiology, or 'reading on the lips.' The graphic method, which is not less important as an end than as a means, comprehends alphabetic writing and the notation of gestures. The advocates of the sign-system can point to its great practical success, and are supported by the fact that instructed deaf-mutes generally employ it when conversing among themselves. The oral system is viewed by many as a higher form of tuition, inasmuch as it enables the deaf-mute to hold intercourse with society at large. Germany, the home of the latter system, is, however, almost the only country in which it extensively prevails, although it is also taught in a modified manner in a few of the schools of England, France, &c.



Two-handed Alphabet.

The language of natural signs or gestures, the 'mother-tongue' of the uneducated deaf-mute, is an important auxiliary of the teacher. The deaf and dumb take evident delight in its use, and by its means they can give life and force to their ideas. Their only resource when unprovided with instruction, it is carried to a wonderful degree of expressiveness, capable of rapidly conveying question and answer, or even the sustained flow of ideas in a lengthy narrative. 'To this rude though powerful mode of intercourse, which all the deaf possess in a higher or lower degree, those who are intelligent add signs of description by which they are able to explain facts and circumstances that have been brought under their observation. The teacher takes advantage of this method of communication to add to their stores of knowledge, to enrich and extend the sphere of their thoughts. . . . Thus a conventional language is formed which assists in their intellectual culture.' But such intercourse leaves the pupil entirely ignorant of the structure of sentences, and therefore it must be made subsidiary where the object is to teach a syntactical language.

Dactylology, or the finger-language, is based on the 'manual alphabet,' and, in the words of Degérando, gives to material writing the movableness of speech. There are a one-handed and a two-handed alphabet; the latter is that in common use in England, the former on the Continent of Europe and in America. George Dalgarno (q.v.), a Scotchman, issued the first English alphabet in his *Didascotocophus* (1680). Either of those now employed may be learned by an hour's practice; they are often taught to the deaf and dumb, together with the written alphabet, in a few days.

The office of phonology is to give to the deaf-mute the power of articulating the language that he cannot hear. To impart this power is a task requiring the greatest patience, and a knowledge of the vocal organs. Only one pupil can be taught at a time. The teacher proceeds by slowly uttering the vowel and consonant sounds, carefully showing how the mouth and tongue are disposed, and, as progress is made, gradually rising to syllables, words, and short sentences. At first the pitch and intonation are faulty, the high sounds amounting to a scream, the low ones little better than a growl, while others are nasal or drawling. In a report on the subject, the Rev. George E. Day, of America, says, 'This process is correctly called by German writers *mechanical speaking;* much time must necessarily be devoted to it, and with the greatest efforts only a defective utterance can be reasonably expected.' It is certainly true that those who are born deaf rarely if ever acquire correctness or fluency.

Reading on the lips is the counterpart of phonology, as it enables the deaf-mutes to ascertain what is said by others. It is performed solely by the assistance of the eye, and is liable to certain restrictions, *e.g.*, that the deaf-mute be near the speaker, that there be plenty of light, &c. Dr. Johnson, at the close of the *Journey to the Western Islands*, speaking of Braidwood's pupils, remarks that 'it is an expression scarcely figurative to say that they hear with the eye.' The manner of teaching to read on the lips is somewhat similar to that of training the deaf to speak, and it may be said that the process is more successful as a rule. But the aptest pupil is unable to take part in a general conversation, or to follow a public speaker.

After all, it is of far greater importance that the deaf and dumb can be taught to read and write than that they should be able to speak or follow the conversation of others imperfectly. Reading alone will bring within their reach the hidden treasures of knowledge, while writing affords an accurate means of communication where finger-language fails.

The *history* of the educational treatment of the deaf and dumb is little else than a page from the record of modern philanthropy. Various nations of early times regarded the deaf as labouring under the curse of heaven. Aristotle declared that they could not participate in knowledge. The Roman code incapacitated those born deaf of making a will, and placed them under various other civil disabilities. St. Augustine in the 4th c. excluded this class from the Church, interpreting in too literal a sense St. Paul's *fides ex auditu*. We are told by Bede that a deaf man was taught to repeat words and sentences by St. John of Beverley in 685. Eight centuries elapse before we read in the works of Rodolphus Agricola of Groningen of another deaf-mute who was taught to read and write. Fifty years later the versatile Professor of Pavia, Jerome Cardan (1501-76), founded the theory on which the education of the deaf and dumb rests, announcing that, as written characters and ideas may be connected together without the intervention of sounds, as in hieroglyphics, the instruction of the deaf is not impossible. Soon afterwards, Pedro de Ponce, a Benedictine at Oña (1520-84), gained a wide reputation for teaching deaf-mutes to speak and write. In 1620, Juan Paulo Bonet, a Spaniard like Ponce, and a monk of the same order, invented a one-handed alphabet. Henceforth the subject began gradually to receive more attention; various systems were tried and discarded, and fresh books continued to announce new theories. Among the more distinguished writers and workers in connection with the subject were Dr. John Bulwer (1648), Dr. William Holder (1669), Dr. John Wallis (1670), and George Dalgarno (1680), in England; Van Helmont (1667), and Johann Konrad Amman, a Swiss physician (1690), in Holland; Karger (1710), Georg Raphel (1718), Arnoldi (1778-1841), and Samuel Heinicke (1729-90), in Germany; Rodrigue Péreire, a Portuguese (1715-80), the Abbé Deschamps (1779), the Abbé de l'Epée (1784), and the Abbé Sicard (1742-1822), in France. The earliest schools established were those of L'Epée at Paris (1760), and of Thomas Braidwood at Edinburgh (1760). These were followed by the foundation of similar institutions at Vienna, Berlin, Prague, &c. Heinicke, like Braidwood, was an able teacher of the articulation school. The management of the schools of Paris and Bordeaux was transferred to the state in 1791. See Dr. Joseph Watson, *Instruction of the Deaf and Dumb* (Lond. 1820); Rev. George E. Day, *Report on the Various Systems in Europe*, &c. (1846); Pickard, *Théorie des Signes pour l'Instruction des Sourds-muets* (Par. 1808, new ed. 1828); Bébian, *Manuel d'Enseignement Pratique des Sourds-muets* (Par. 1827); Dr. Blanchet, *La Surdimutité* (1850); Reish, *Der erste Unterricht des Taubstummen* (Leipz. 1834); and Heil, *Der Taubstumme und seine Bildung* (Hildburgh 1865). The *Organ der Taubstummen und Blinden Anstalten* has been issued by Mathies since 1855.

Deaf and Dumb, Law Regarding. By the Roman law, those born deaf were held incapable of entering into a contract. In England and in Scotland their legal capacity (see CAPACITY, LEGAL) is a question of fact which will be determined, if necessary, by a jury. By the law of England, a child born deaf and blind is regarded as an idiot. But it is not to be supposed that the law would continue to hold this view if the child was capable of education and received it. For a complete account of the legislation relative to the deaf and dumb from the earliest times down to 1824, with a list of authors, see the work, in Latin, of C. Guyot of Groningen. As to when a deaf and dumb person may be competent as a witness, see *Taylor on Evidence*.

Deafness can only be understood by careful study of the anatomy of the ear and of the complicated organs of hearing. It is very common, and may exist at any age. It is sometimes congenital—often results from fevers, especially measles, scarlet fever, &c., and is generally present to a greater or less degree in the aged. All degrees of D. occur, from the slightest impairment of the sense of hearing to complete insensibility to the vibrations of sound. Speaking generally, it may be caused by anything which interferes with the consciousness of the impression of sounds, by some obstruction in the auditory passages, by disease of the organs of hearing, or of the brain, rendering the person unconscious to the impression produced on the Auditory Nerve (q.v.). A common cause is some obstruction in the *external* ear, as any foreign body, introduced by accident or otherwise, interfering with the passage of the air to the *membrana tympani*. A still more frequent cause is a Polypus (q.v.) growing in the external ear. But the most frequent cause of all is accumulation of wax (*cerumen*). This is fortunately one which is easily removed, by syringing the ear with tepid water, and not by using the finger, a twisted towel, or any hard instrument, which only causes the wax to cake. In some cases, it is desirable to previously soften the wax with almond oil or an alkaline lotion. Inflammation of the membrane of the ear, or *drum* as it is popularly called, is another cause of D., especially when the inflammation ends in ulceration and perforation of the membrane. Such inflammation is to be treated by appropriate remedies; and when there is rupture of the membrane from this or any other cause, a simple but very effective remedy is to introduce daily a small piece of cotton wadding, or to use an artificial *membrana tympani*. This artificial membrane consists of a thin piece of caoutchouc, round which is attached a small silver wire. In either case the ear requires to be washed out daily and the substance reintroduced. Not unfrequently the cause of D. is some defect in the tympanum or middle ear. This cavity is normally filled with air through the Eustachian Tube (q.v.), and during each act of swallowing air enters into the middle ear, so that when this tube is obstructed by inflammation, the sense of hearing is greatly destroyed. Disease of the bones of the middle ear, or impairment of their mobility, due to rheumatism or gout, sometimes causes D. The obstruction in the Eustachian tube may be removed by passing the Eustachian catheter, or by other appropriate means. Again, D. may result from disease of the *internal* ear, inflammation spreading to it from the middle ear. The term *nervous D.* is applied to all obscure forms of D. It ought to be limited to that kind of D. due to an affection of the auditory nerve or disease of the brain. Probably in old age the nerve of hearing becomes incapable of transmitting to the brain impressions produced by sound—a paralysis of the nerve not unlike that condition of the optic nerve causing that kind of blindness called amaurosis. This kind of D. is incurable. More frequently, however, it is due to functional disorder of the nerve caused by a blow, a fall, by a loud noise, by a medicine, or by congestion of the brain.

Deák, Francis, the constitutional liberator of Hungary, was born of a noble Magyar family, at Kehida, in Szalad, 17th October, 1803. He studied at Komorn and Raab, and after gaining some reputation as a barrister, became a member of the National Diet in 1832. In breaking down the exclusive privileges of the Magyar aristocracy, and in opposing the extension of imperial absolutism to Hungary, he first attained distinction as a sagacious and patriotic statesman. As Minister of Justice in the liberal Batthyanyi ministry, he strove vainly to avert the revolutionary war of 1848. While the conflict raged, and the Empire seemed crumbling to pieces, he held aloof, siding as little with Kossuth's republican violence as with the Austrian Government and its Slavic malcontents. On the suppression of the Hungarian insurrection D. withdrew into private life, and did not return till the Franco-Italian war extorted concessions from the fears of Austria. Solferino and the loss of Lombardy are traceable to the just disaffection of Hungary. Following on the peace came

(1860) the offer, through the Schmerling Ministry, of a constitution common to the whole monarchy. But for five years this was unflinchingly resisted by D., now representative of Pesth, and leader of the Moderate party. His claims were the constitution of 1848, a Hungarian ministry responsible to the National Diet alone, the release of the revolutionary exiles, and the restitution of their property. After the further lesson of Sadowa (1866), and acting on the advice of Baron von Beust, Franz Joseph at last granted the whole of these demands. The ancient independence of his country was recognised, and D. asked no more. The last ten years of his life were spent in loyal service to that Austro-Hungarian monarchy which in no small measure owes to him its harmonious prosperity and strength. D. died 28th January, 1876. His obsequies were attended by the legislature, by representatives of the Emperor, and by all ranks and sections of his countrymen. His chief characteristics were honesty of purpose, sagacity, and strength of will, rather than the more brilliant qualities of the diplomatist and orator. But above all, he was inspired by a love of justice and of his country.

Deal (the 'valley,' a form of *Dale*), a municipal borough, seaport, and watering-place in Kent, 8 miles N.N.E. of Dover, on the coast between the N. and S. Forelands, and consisting of Upper and Lower D. The inhabitants are mainly occupied in boatbuilding, for which D. is famous, sailmaking, piloting, and victualling. D. is one of the Cinque Ports, and the official residence of the Lord Warden of the Cinque Ports is Walmer Castle, a mile to the S., which, with D. Castle, built by Henry VIII. in 1539, and Sandown Castle, at the N. end of the town, defended the neighbouring coast. Until 1885 D. united with Sandwich and Walmer in returning two members to Parliament. The borough is now included in the Eastern or St. Augustine's parliamentary division of the county of Kent. Pop. reg. sub-dist. 15,135; mun. bor. and civ. par. (each) 8891.

Deal'fish, the name of a genus of Teleostean fishes included in the family *Trachypteridæ*, and distinguished by an elongated body destitute of scales and of compressed form, by a single long dorsal fin, by the absence of a hind fin, and by the tail fin not being in a line with the axis of the body, but rising vertically. Large ventral fins exist. The body is so compressed that a specimen three feet long may not exceed a paper knife in thickness. The colour is silvery-white. Six feet is not an uncommon length of these fishes. The best-known species is the Vaagmär of the Northern Seas.

Deals (Old Eng. *dælas*, 'parts,' from *dælan*, to 'deal' or 'divide'), a term properly applied to the thicknesses to which any piece of timber is cut up, but now generally restricted to pine wood, and to the particular sizes in which it is imported from Baltic ports. The size of such D. is 3 inches thick and 9 inches wide. They are sold by the 'hundred,' in which there are 120 pieces.

Dean and Chapter are, in England, the council of the bishop to advise him in religious matters, and to confirm leases of the temporality and offices made by the bishop in the diocese. The chapters, consisting of canons or prebendaries, are sometimes appointed by the sovereign, sometimes by the bishop, and sometimes elected by each other. Deaneries and prebends may become void, like a bishopric, by death, deprivation, or resignation. Statute 3 and 4 Vict. c. 113 gives the direct appointment of deans on the *old* foundation to the Crown and enacts that a priest must have been at least six years in orders before he can be appointed dean, and must 'reside' eight months at least in the year.

Dean, Forest of, comprises 22,000 acres, between the Severn and the Wye, Gloucestershire. It belongs to the Crown, and about the half of it is enclosed for the growth of navy timber. It is divided into six walks. The inhabitants, who had formerly many privileges, and have still the liberty of pasturage and fuel, and the right of mining—a royalty on the produce being reserved for the Crown—are chiefly miners. D. F. is in the hands of the Commissioners of Woods and Forests who have the control of the mining, timber privileges, &c., and under whom various officials are appointed and serve in reference to the woods and the mines beneath them.

Dean of Faculty. The corporation of advocates or barristers in Edinburgh is called the *Faculty of Advocates*, and the D. of F. is elected annually to preside at their meetings and to sign their acts. Usually the dean is re-elected till he is promoted to the bench. See ADVOCATE.

Dean of Guild, in Scotch burghs, was originally the head of the guild brethren or merchant company. He was also a judge in mercantile and marine causes within the burgh. His duty is now limited to the care of buildings. He must see that they are sufficient, and that they are erected according to law. His judgments are liable to review by the Court of Session. In Edinburgh the D. of G. court consists of the dean and the former dean, and a council of merchants and tradesmen annually chosen. No building can be erected, taken down, or materially altered, without sanction of this court, which has also jurisdiction in regulating weights and measures.

Deans of the Chapel Royal. The chapel royal in Scotland was a collegiate church founded by the Scottish kings for their own use, the superior of which was called Dean of the Chapel Royal. This benefice was after the Reformation conferred first on the Bishop of Galloway, and afterwards annexed to the See of Dunblane. On the abolition of Episcopacy in 1690, the revenues fell to the crown, the sovereign bestowing them on one or more of the clergymen of the Church of Scotland, who were called *deans* and *chaplains*, and held the appointment at the royal pleasure. In accordance with the recommendation of the Universities Commission (1858), the revenues have been divided, and have been attached to the chairs of Divinity and Biblical Criticism in the Universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews.

Death (Ger. *tod*, allied to Gr. *thanatos*). The body is composed of various tissues and organs, each of which acts to a certain extent independently of the others. In the performance of its functions, each tissue undergoes a certain waste of material, and each organ undergoes a certain loss by the D. of its component tissues. Each tissue may also be said to have a life of a certain definite duration. It is developed, grows, reaches maturity, declines, and dies. It is evident therefore, that we may have two forms of D.—(1) *Molecular* or the D. of individual tissues; and (2) *somatic*, or the D. of the whole body. Molecular D. is the consequence of the stoppage of that interplay between the tissue and the fluid pabulum, the blood, containing not only nutritious matter, but also oxygen, without which the maintenance of life is impossible. This form of D. is continually taking place in the body, and, unless it affects a large portion of the fabric, it does not interfere with the general life of the body, or what may be termed the *somatic* life. At some period or other, however, somatic or general D. takes place from the failure of action of some important organ or organs. Thus *somatic D.* will follow stoppage of the heart's action; but the tissues live for some time afterwards, and *molecular D.* slowly supervenes. The various forms of somatic D. are as follow:—

(1) *Syncope*, or failure in the propulsive power of the heart. This occurs, for example, in D. by fainting. The individual becomes suddenly pale, drops down, and expires.

(2) *Asthenia*, or slow failure of the heart's action from deterioration of its tissue by fatty degeneration, or from deficiency of blood, as after excessive hæmorrhage.

(3) *Asphyxia*, or D. resulting from some obstruction to the aëration of venous blood in the lungs. This may be caused in many ways. For example, occlusion of the air passages, pressure on the chest so great as to prevent its expansion, puncture of the pleural cavities, or the breathing of irrespirable gases. In asphyxia venous blood is sent to the brain, and so affects its functions that unconsciousness speedily ensues.

(4) *Coma*, or D. resulting from interference with the functions of the brain. Pressure on the brain, or the circulation through its capillaries of certain poisons, such as alcohol, may cause D. by coma.

(5) *Necræmia*, or D. of the blood, as happens occasionally in malignant fevers.

Thus D. may commence at the heart (sudden, syncope; gradual, asthenia); at the lungs (asphyxia); at the brain (coma); or in the blood (necræmia).

D. may sometimes be simulated, as in 'trance' or 'catalepsy,' where we find all the functions of the body so feebly performed as to be scarcely perceptible. The surest test by which to distinguish real from apparent D. is the condition of the muscular system. After real D., muscle gradually loses its irritability, so that it does not contract when excited by electrical or other stimulation. Loss of irritability is followed by cadaveric Rigidity (q.v.), and this in turn is followed by putrefactive changes. So long as a muscle remains irritable it is not dead; loss of irritability and stiffening is a sure indication that D. has taken place.

Death, Legal. See CIVIL DEATH.

Death, Punishment of. See CAPITAL PUNISHMENT.

Death-Bed, Law of (in Scotland). By this law, which was peculiar to Scotland, the heir of the heritage was entitled to reduce any deed by which he was injured, if granted by his predecessor within sixty days of D., provided he was suffering from the disease of which he died at the date of the deed, and did not subsequently go unsupported to kirk or market. If the maker of the deed was, at its date, suffering from one disease, and died of another or by accident, the deed was not reducible. In counting the sixty days, the day of signing the deed was not reckoned; but it was sufficient that the grantor had survived until the running of any part of the sixtieth day. It 1871 it was enacted that no deed, made after the date of the Act, should be liable to challenge or reduction on these grounds.

Death's-Head Moth, a species of moth belonging to the family *Sphingidæ* or Hawk-Moths, and distinguished as a genus by the non-angulated sharp wings, by the short proboscis, and by the antennæ or feelers being hooked at their tips. The hinder wings are small. The popular name of the moth is derived from the whitish patch on the back of the thorax, resembling exactly a human skull and collar-bone. The front wings are blackish-brown above, with stripes and markings of black and red colour at the edges. The hinder wings are yellowish, with two bluish-grey bands. The chest is blackish-brown, with the skull-like marking. The caterpillar of this moth, which may attain a length of five inches, is yellow, with a tuberculated body, and is marked on its sides with seven oblique bands of a green colour. The back is spotted black and blue, and the tail bears a prominent horn-like process. The moth, which is found in almost every part of the Old World, attains an expanse of wing measuring five or six inches. It makes a grating noise, probably by grating the abdomen against the chest, and has long been dreaded by the ignorant and superstitious.

Deaths, Registration of. See REGISTRATION.

Death-Watch, the name properly given to certain insects belonging to the *Coleoptera* or Beetles, and to the family *Ptinidæ* (section *Pentamera*) of that order, from their producing a rapping sound by knocking their heads against woodwork. This sound, dreaded by the superstitious, is the signal of the insect to its neighbour. The striated, the tenacious, and tesselated D.-W. are familiar species, and are also termed Borers (q.v.) from their habit of infesting wood. The tesselated attains an average length of a quarter of an inch, and is of a dull grey colour. Its rapping is heard most frequently towards the end of spring.

Death-Watch.

1, Striated; 2, Tesselated; 3, Tenacious.

Débâc'le (Fr. 'a breaking up') is used in France to denote the breaking up of the ice in a river or harbour, and by English geologists to denote the sudden irruption of a flood which leaves its path strewn with promiscuous debris.

Deba'table Land. A tract of country on the border of England and Scotland was so called, from having formerly been the subject of contention between England and Scotland. In 1542 commissioners, appointed by the two crowns, divided it by a line drawn between the rivers Esk and Sark, the northern division being given to Scotland and the eastern to England. It continued for long to be the haunt of freebooters.

De Be'ne Ess'e, a term of English law, signifying the admission that something done may be allowed to stand for the present; but that it must ultimately stand or fall by the result of future examination. The Rules of the Supreme Court, 1883, Order 37, provide that a witness or person may be examined on oath before an officer of the court or any other person duly appointed at any time and in any place when the court or judge so orders it, being of opinion that the purposes of justice demand it. This evidence so taken must be filed in court and may be produced in evidence according as the court or judge directs.

Deben'ture (lit. 'the acknowledgment of a *debt*,' from *debēre*, 'to owe'). A written instrument charging Government with payment of a specified sum is so called. A *Customhouse D.* is a certificate authorising an exporter of excisable goods to receive a Drawback (q.v.) equal in value to the excise duties which have been paid on them. To forge a customhouse D. is felony. A *Railway D.* is a deed of mortgage given by a railway for borrowed money. Again *D. Stock* may be issued by a public company pretty well on the same terms as D.; it is often irredeemable, and (by any special act or by statute 26 and 27 Vict. c. 118) is preferable, both as regards payment of the interest as it falls due and as regards repayment of the principal sum at the stipulated date, to any claim on account of any kind of shares. Railway debentures are usually, therefore, a safe and legal investment for trust funds. They are transferable without trouble or expense, the original expense, including brokerage, being paid by the company. Interest warrants or Coupons (q.v.) are attached to the deed. The usual rate of interest on a railway D. is 4 per cent. in England.

Deb'itum Fun'di is in Scotch law a debt attached to land, and having a *lien* over it. A *Feu-Duty* (q.v.) and arrears of feu-duty are *debita fundi*. Rents, tithes (*teinds*), and similar burdens, though dues connected with land, are not *debita fundi*. Debts constituted by this title may be made effectual by Poinding of the Ground (q.v.), and 'may be ground of adjudication which is preferable to all adjudications or other diligencies intervening between the date of the right and of the adjudications deduced on it.' See Erskine's *Principles of the Law of Scotland* (edited by Rankine).

Déblai' (Fr. 'excavation,' from *déblayer*, 'to clear away,' originally corn from a field, but afterwards earth), in fortification, denotes the earth dug from the ditch to form the parapet. The *remblai*, again, is the earth and other materials used in constructing the rampart and parapet.

Deb'orah (Heb. 'a bee'), a prophetess who judged Israel (Judges iv. v.), and under whose direction Barak (q.v.) delivered the northern tribes from the oppression of Jabin, King of Hazor. She accompanied to battle the ill-armed band Barak had collected, and her exalted enthusiasm was the means of their gaining a great victory over the Canaanite host. The pæan which she and Barak sing together quivers at once with grateful devotion and vengeful glee. It is a miracle of Eastern poesy and passion.

Debou'ching (Fr. *déboucher*, 'to pass out,' from *bouche*, 'the mouth'), in military language, is to march out from a wood, defile, or other confined position.

Deb'reczin, the capital of the comitat of Bihar, and, next to Buda-Pesth, the chief trading town in Hungary, 120 miles E. of Buda-Pesth by railway. The streets, though broad, are filthy, and stately public edifices contrast oddly with surrounding hovels. There are several churches and a fine cathedral. The Reformed College has a library of 20,000 volumes, twenty-four professors, and 2000 students. The Honvéds who fell at the battle of D. in 1849 are commemorated by a monument, and a statue was erected in 1871 to the poet Csokonaij. D. is the seat of a Roman Catholic and of a Greek bishop. The chief manufactures are coarse woollens, leather, soap, tobacco-pipes, earthenware, and articles of cooperage. There is a large trade in horses, cattle, bacon, wine, corn, oils, ewe-milk cheese, tobacco, water-melons, &c. D. has four annual fairs and the largest swine-market in Hungary. Pop. 56,940, of whom two-thirds are Magyars, and the greater number are Protestants. D. was the seat of Kossuth's government in 1849.

Debruised', in heraldry, an animal or any other charge bruised out or debarred by a bar or any other ordinary. An ordinary may debruise an ordinary.

Debt. In English law, debts are classified as *specialty* debts and *simple* debts. The former are constituted by deed, or by a record or judgment of court, or by a Recognisance (q.v.). The latter are those arising without intervention of deed or of judgment. D. constituted by deed bears interest from its date. D. under judgment bears interest from date of judgment at 4 per cent.; it is effectual against land which a defendant may possess, and, if duly registered, it is effectual against a purchaser. The registration must be renewed every five years. Simple D. bears no interest. In Scotland, the main division of D. is into *heritable* and *moveable*. Regarding the former, see article BOND.

Moveable Debt is in Scotland *liquidated* (Scot. 'liquid'), *contingent*, or *future*. The first is D. constituted against the debtor by written obligation or by decree of a court; the second is D. depending on an event which may or may not happen (see CONTINGENT DEBTS); the third is when the liability is certain, but when the time for payment has not arrived.

Debt, National. The N. D. of England at the Revolution of 1688 was £664,263. It was chiefly in the form of terminable annuities, specially charged upon certain branches of the revenue. The system of borrowing on annuities for terms of years and lives was continued by Government until the magnitude of the debt rendered the method no longer practicable. At the Peace of Ryswick in 1697, the N. D. was found to be nearly £15,000,000, and the revenue was deficient £5,000,000. At this time, from the irregularity with which the interest on the floating debt was paid, Exchequer orders were at 40 per cent. discount. On the death of Queen Anne in 1714, the debt had increased to £36,175,460, bearing an annual charge for interest and annuities of £3,063,135. On 31st December, 1748, after the treaty of Aix-la-Chapelle, it was £75,812,132. During the short interval of peace which followed, Government was enabled, on 29th November, 1749, by the rise in the price of stocks, to reduce the interest on the 4 per cents. to 3 per cent. In 1751 various stocks were consolidated into one fund, and between 1748 and 1756 the N. D. was reduced by £1,237,107. This was the origin of the present consolidated 3 per cent. annuities, or *consols*. The Seven Years' War, beginning in 1756, added to the debt £58,141,024; and by the end of the American war in 1784, the total was £243,063,145. At the Peace of Amiens in 1802, it was £537,653,008; and at the Peace of Paris in 1815, it had reached the enormous total of £861,039,049. At the commencement of the Crimean War it had become reduced to £769,082,549, but during the war an addition of £39,026,173 was made to it. On 31st March, 1894, it was £669,104,024 (with an annual charge of £25,200,000), made up of Funded Debt £587,631,096, estimated capital of Terminable Annuities £57,076,898, and Unfunded Debt £21,446,300. On 16th September, 1895, a Parliamentary paper was issued, in which the N. D. (gross) was shown to have been reduced by £8,943,417 between 31st March, 1894, and 31st March, 1895. The enormous reduction had been brought about owing to the arrangements connected with Section 41 of the Finance Act, 1894, which specially provided for liquidating the debt incurred under the Imperial and Naval Defence Acts, and for that purpose, under the authority of the Sinking Fund Act, 1875, the N. D. commissioners held over until August, 1894, the greater part of the new Sinking Fund of 1893-94.

The difference between 'funded debt' and 'unfunded debt' is that the state does not undertake to pay the former. In place of repayment they give a perpetual or terminable annuity; nevertheless the name of the creditor is entered in the books of the Bank of England as holding so much Government stock. This stock is transferable by entry in the books of the Bank. The N. D. is, approximately, £17 per head of the population and the annual charge is about 12s. per head.

British Government stocks are as follow:—*Three per Cent. Consols.* (See above.) *Debt due to the Bank of England*, £11,015,100. (See BANKS, BANKING.) *New 3 per Cent. Annuities.* This stock originated in 1830 by the conversion of the new 4 per cents. which had been formed in 1822 from the navy 5 per cents. *New 5 per Cent. Annuities* originated at the same date and in the same way. *New 3½ per Cent. Annuities* were created in 1853, as were also *New 2½ per Cent. Annuities*, the *Irish Funds*, *Savings' Bank Annuities*, By the Act of 1864, £24,000,000 of 3 per cent. stock, standing in the names of the Commissioners for the reduction of the N. D. in the books of the Bank of England, was ordered to be cancelled, and in place of it was created a perpetual charge on the Consolidated Fund (q.v.). *Annuities of Terms of Years*, created under 59 Geo. III. c. 34. *Annuities Terminable in* 1885; these were created 16th April, 1855, and expired 5th April, 1885. *Red Sea Telegraph Company's Annuity* of £36,000 was created by 25 and 26 Vict. c. 39, and expires 4th August, 1908. *Life Annuities* under various Acts. See *Fenn on the Funds*, a new edition of which valuable work is issued every two years. In 1888 there was carried out an important conversion of the *New 3 per Cents.*, *Consolidated 3 per Cents.*, and *Reduced 3 per Cents.*; the new stock issued in their place to bear 2¾ per cent. interest till 1903, and thereafter 2½ per cent. On 5th December, 1893, was passed the N. D. Redemption Act, which provided for the redemption of the stock, created in 1853 and described in N. D. Act of 1870 as New £3 10s. per Cent. annuities (subject to redemption by Parliament at any time after 5th January, 1894). The stock amounted to about £225,000, and the money required for the redemption was authorised to be provided out of the New Sinking Fund.

Formerly Exchequer bills were the only form of unfunded debt. They were first used as currency to supply the want of metallic money during the great re-coinage of 1695. Another kind of unfunded debt, called *Exchequer bonds*, was introduced by Mr. Gladstone in his scheme for commuting some of the public stocks in 1853. The Exchequer bonds, to the value of £6,000,000, issued during the Russian war (1855-56), as well as those issued since, are of a different character; having been made absolutely payable at par, at fixed periods varying from three to six years. These have been properly treated as unfunded debt. Since the creation of the 3 per cent. consols, their lowest price has been in 1799, when they fell to £52 5s. 8d. In 1844, 1845, 1852, and 1853 they rose above par; the highest price, £102, having been in 1852.

For long the N. D. of the United Kingdom was the largest in the world. It is now exceeded by that of France, which on 1st January, 1893, was stated to be £1,224,467,405 (capitalised), or about £31 18s. per head of the population and with a charge of £1 6s. per head. The debt of the United States of America was (on 30th June, 1894) £184,546,600, rather more than half of which is at 4 per cent., while the remainder is at 2 and 5 per cent. The debt of Italy was £474,499,651 on 1st July, 1893, or £15 8s. 10d. per head of population, with a charge of 15s. 5d. per head. The debt of Austria and Hungary was estimated at £606,400,600 in 1893; while that of Spain on 1st January, 1893, stood at £285,455,804, the greater part of which was at 4 per cent. In September, 1893, the Ottoman debt stood at £164,555,958, which included £32,000,000 due as war indemnity to Russia; most of this is at 6-4 per cent. The debt of Russia is estimated at £523,240,809; that of Holland at £93,516,704; and that of the German Empire at £87,042,125.

Some regard the N. D. of England as a huge financial incubus, which ought to be got rid of at any cost of extra-taxation or reduction of expenditure; others, again, regard it as a national blessing, in so far as it is a safe means of investing trust funds. It would unquestionably have been better that the debt had never been incurred—that is, that state expenditure had always been fully met by revenue. But the debt represents the bygone fact of so much waste of human labour; and this fact can never be undone. In spite of the immensely greater debt, the country is immeasurably richer than it was two centuries ago; but it would have been so much richer still had it not spent so many hundred millions in fighting. Yet the one aim of a country ought not to be the accumulation of wealth. If our forefathers have bequeathed to us a huge debt, from them we inherit the British Empire, laws, and institutions, by whose means we have created a commerce and wealth never before known in the world.

The plan of paying the debt by a *Sinking Fund* (q.v.) is transparently fallacious. The expediency of paying it by extra taxation depends on the moral nature of the people. In so far as the extra taxation would be met by extra economy, there would be gain, but no further than this. See UNITED STATES.

Debtor and Cred'itor, Laws of. With the progress of civilisation the power which law gives to the C. over the D. diminishes. In the earlier stages of society, the view which the law takes of the relationship between a man and his family is that the latter is merely a part of the property of the former. Even in ancient Rome a father had power of life and death over his children. He could sell or resign them, instead of paying damages incurred through their fault. The acquisitions of a son were called Peculium (q.v.), the term applied to the portion of a slave. Hence it logically followed that the law which gave a C. power over the person of his D. gave him power over the D.'s family, the family being regarded as merely property. According to the law of Moses, a poor man might be sold to a rich one, and compelled to serve him as 'an hired servant' (Lev. xxv. 39).

With the progress of civilisation and commerce, these laws gradually relax, until in the final stage it is seen that a C. ought to have no direct power over the person of his D., and that this power ought to be vested in a judge. In commercial failures it is found that the fault is often with the creditors themselves quite as much as with their D. With regard to changes which have taken place in England in the L. of D. and C., see DEBTS, RECOVERY OF. See also STAPLE.

Debtors Abscon'ding. (See DEBTS, RECOVERY OF.) Absconding shareholders, or shareholders intending flight, may be arrested, or their effects seized, under the provisions of the Joint Stock Companies Act. Debtors in Scotland intending to abscond may be dealt with under a warrant of *Meditatio Fugæ* (q.v.).

Debtors, Impris'onment of, abolished in Scotland, except on failure to pay rates and taxes, to implement decree *ad factum præstandum*, and wilful refusal to payaliment.

Debts, Recov'ery of. The rule of law which allows only *taxed costs* to a successful litigant, leaving him to pay the difference between them and the law charges of his legal adviser, may be on the whole the best rule which can be adopted; but its operation often results in great hardship in the case of a person suing for a debt of moderate amount. He may gain his case *with costs* (Scot. law, *expenses*), and yet find the value of the subject of litigation greatly exceeded by his own share of the expense. And if his opponent who has lost is ruined by the result, he must pay even the costs which the law has awarded to him. In such questions the aim of the law should be simplicity and quickness of operation; because it is better that there should be a *chance* of some injustice being done in ascertaining on whose side the right is, than that injustice should *certainly* be done in making the party, on whose side the right is, pay more than the right is worth in order to make it effectual.

By 1 and 2 Vict. c. 110, the power to arrest in Mesne Process (q.v.) was abolished. The Act 7 and 8 Vict. c. 96, abolished the arrest on *final process*, and prohibited imprisonment upon any judgment obtained in any court where the debt recovered did not exceed £20, exclusive of costs.

These two Acts being found somewhat unfair in their operation towards certain classes of creditors, especially towards retail tradesmen, an improvement was attempted in the session following the passing of the last Act referred to. By 8 and 9 Vict. c. 127, it is provided that any creditor obtaining a judgment or order from any court of competent jurisdiction in England, in respect of a debt *not exceeding* £20, besides costs of suit, may obtain a summons against his debtor from any commissioner of bankruptcy or from any inferior court for the recovery of small debts having jurisdiction in the district in which the debtor resides. After procedure, if the court find for the plaintiff, it will order payment of the debt in instalments, or otherwise; and the court may, in case of fraud or contumacy, commit the debtor to prison. An Act passed in 1869 abolishes imprisonment for debt, except in certain cases, but it does not affect the power of the court to commit a debtor to prison as above noted; this power being not to imprison for the debt, but for fraud or contumacy; and the imprisonment is at the instance of the court not of the creditor. The Act of 1869 makes many other important provisions in the relationship of debtor and creditor. Any debt not exceeding £50 may be sued for in the county courts of England. If a plaintiff bring his action before a superior court for a debt not exceeding £20, or not exceeding £5 in an action of Tort (q.v.), he will have no costs awarded, unless by special order or certificate of the court. See COUNTY COURTS.

In Scotland, debts not exceeding £12 may be sued for in the sheriff's small-debt court. If a creditor or debtor appear by agent, it must either be by consent of parties, or by permission of the sheriff. No record of evidence is taken, and the whole procedure is rapid—we might say, often hasty and superficial. Doubtless it is better to have a question of £10 or £12 so disposed of—the expense of which, even to the loser, does not exceed a few shillings—than to have the value of the original question wholly merged by the first legal step in the question of expenses, as would surely be were the case entangled in a lawsuit before the superior courts. But might not there be a legal tribunal by which, in a small matter as well as in a great one, evidence could be exhaustively gone into and weighed with deliberation, without the intervention of a country agent, a town agent, and counsel—and without the enormous, and usually disproportionate, expense of so complex, and, as it seems to us, unnecessary machinery?

The Debts Recovery Act of 1867 has made many important alterations in the law of Scotland regarding R. of D. Debts between £12 and £50, which would prescribe if not sued for in three years (see PRESCRIPTION), may now be sued for before the sheriff's small-debt court. In actions of this class, agents are allowed to appear. If the debt does not exceed £25 there is an appeal from the sheriff-substitute to the sheriff; and if the debt exceed £25 an appeal may be made to the Court of Session. Where the debt does not exceed £12, there is no appeal from the judgment of the small-debt court.

Debts, Recovery of, Abroad.—It is a very common error that foreign tribunals take no cognisance of suits between persons who are not subjects of their country, and that a debtor may consequently reside abroad in defiance of his creditor. A debtor may be proceeded against in any country whose law allows it, and most Continental countries do so, and many others.

Débu't (Fr. *début*, 'the first throw at play'), a French word adopted into English, denoting the first appearance of an actor, public speaker, or any individual whose influence depends on personal presence. It is almost exclusively applied to appearance on the stage, the words *débutant* and *débutante*, for actor and actress making a D., having also been introduced into English.

Deca'dence (Fr., from Lat. *de* and *cadere*, 'to fall away'), a period in which the art or literature of a nation, after a brilliant maturity, begins to wane, is called a time of D. Thus Greek sculpture after the age of Pericles, Latin literature after the age of Augustus, and Italian painting from the 17th c. downwards, are said to belong to the Greek, Latin, and Italian decadences. In French literature, the years from 1770 to 1800, or, according to some, till the Romantic movement of 1830, are called the French D. A period of D. is generally marked in literature by an overstrained and over-coloured style, as in the late Latin poets, and in art by complicated refinements, as in the Byzantine school. Individual works belonging to a D. are not necessarily inferior to those of earlier times.

Dec'agon, a geometrical figure with ten sides and ten angles. A regular D. has all its sides and angles equal, and is inscribable in a circle. If r be the radius of the circle, the side s of the D. is $s = \frac{1}{2} r (\sqrt{5} - 1)$.

Decais'nea, a genus of plants of the natural order *Lardizabalaceæ*, named in honour of the French botanist Decaisne. There is only one species (*D. insignis*), found in the Himalayas at the height of from 6000 to 10,000 feet. Its fruit is sweet and wholesome, and eaten by the Lepchas and other Himalayan tribes.

Dec'alogue (Gr. 'the ten words') is the name given by the Greek fathers to the law of the two tables received by Moses from the hand of God on Mount Sinai. The commandments have been variously divided and distributed to the two tables. 1. In the catechisms of the Greek, Anglican, and all the Reformed Churches (except the Lutheran), following Origen, ver. 2 of Exod. xx. is made merely a preface; the first commandment is ver. 3; the second, 4-6; the third, 7; the fourth, 8-11; the fifth, 12; the sixth, 13; the seventh, 14; the eighth, 15; the ninth, 16; and the tenth, 17. 2. According to the Talmud and the modern Jews, Exod. xx. 2 is the first commandment; the second is 3-6, and the rest as above. 3. The Masoretic division, which is that followed in the Lutheran and Trent catechisms, makes vers. 3-6 the first commandment, and then divides the last into two; so that the ninth is, 'Thou shalt not covet thy neighbour's house' (otherwise 'wife,' which is first in Deut. v. 21); and the tenth, the rest. As to what belonged to each table, Philo gave five to each; the opinion in the Greek and Reformed Churches is that the one contained the first four, or our duty to God, and the other, the last six, or our duty to man; according to the Masoretic arrangement, the division being made at the same place, the tables contain three and seven respectively.

Decamps, Alexandre Gabriel, a French painter, born at Paris, 3rd March, 1803. He studied under Abel du Pujol, travelled in the East, was made a Chevalier of the Legion of Honour in 1839, and died at Fontainebleau, 22nd August, 1860. He painted landscapes, animals, and genre and historical subjects, and was remarkable for boldness, variety of style, loftiness of conception, and genuine humour.

Decandolle, Augustin Pyrame, an illustrious French botanist, born at Geneva, 4th February, 1778, was descended from an expatriated family of Protestant Provençals, to which the printer of the Caldorian Press belonged. He gave signs of poetical genius when young, but the teachings of De Saussure and Bonnet at Geneva inclined him to physical science. Coming to Paris in 1796, he was placed at the Jardin des Plantes, and devoted himself to the study of geographical botany and physiology. He enjoyed the friendship of Cuvier, Humboldt, Lamarck, Berthollet, and other distinguished *savans*. For Lamarck he edited the *Flore Française*, completed in 6 vols. in 1815. *The Histoire des Plantes Grasses* (1799—1803) was, however, his first important work. The popularity of his lectures on botany at the Collége de France, and an essay on the fertilisation of the Dunes on the Netherland coast, secured him an important Government mission (1806-12), viz., to report on the agriculture and botany of the territories on the Rhine and in Italy which had been added to France. In 1813 D. succeeded Broussonet in the chair of Botany at Montpellier, but was obliged, in 1817, to return to Geneva, where he taught natural history, and latterly became a member of the Representative Council and of the Helvetic Diet. He died 9th September, 1841. D. is the historical successor of Jussieu. Of wide scientific vision, he has left behind him, in his *Regni Vegetabilis Systema Naturale* (Par. 1818-21), a colossal attempt to describe all the varieties of plants, with their synonyms, and references for drawings and description of localities. His *Prodromus* of the same subject has been completed (1826-46) by his son **Alphonse** (born 28th October, 1806), to whom he bequeathed his herbarium of 70,000 specimens. See *Mémoires et Souvenirs* of the father by the son (1862). Alphonse, who has also written on the *Laws of Botanical Nomenclature* (1867), and on the *Geographical Distribution of Physical Groups in the Vegetable Kingdom* (1874), succeeded Agassiz as a member of the French Institute.

Decapita'tion. See CAPITAL PUNISHMENT.

Decap'oda (Gr. 'ten-footed'), the highest order of *Crustacea* (q.v.), represented by the crabs, lobsters, shrimps, &c. The D. are distinguished by the general development of the 'shell,' by the walking legs numbering five pairs, by the first and, sometimes, other pairs of legs being provided with *chelæ* or nipping-claws, and by the mouth appendages being numerous, and modified for mastication. The (1) *Anomurous* decapods are represented by the hermit or soldier crabs; and (2) *Brachyura* by the ordinary crabs; and (3) *Macrura* by the lobsters, shrimps, &c. See also CRAB and CRUSTACEA.

Decap'olis (Gr. 'the region of the ten cities'), a district of Palestine, lying chiefly E. of the Jordan, but including a small part of Galilee, was so named from containing ten cities, which are generally given as Damascus, Philadelphia, Rhaphana, Scythopolis, Gadara, Hippos, Dios, Pella, Gerasa, and Canatha. These cities probably held privileges from the Roman Senate, and seem to have been free from Jewish authority. D. was fully 200 miles long, with a breadth of 60.

Decazes', Élie, Duc, a French statesman, born at St. Martin-du-Laye, Gironde, 28th September, 1780. After holding various civil offices, he was made a cabinet-councillor by Napoleon in 1807; in 1814 became a captain in the National Guard, and fought at the siege of Paris; held office under Louis XVIII.; was made Comte in 1816, and in 1818 Minister of the Interior, in which capacity he gave great attention to commerce and manufactures. In 1819 he was made President of the Council, and shortly afterwards Duc D. After the Revolution of 1830 he devoted himself to the advancement of manufactures and art. He died 24th October, 1860. D. was sagacious, tolerant, and free from the intense party spirit of most French politicians.—His eldest son, **Louis Charles Élie Amanieu, Duc D.,** was born 19th May, 1819, served as French Minister and Envoy at the courts of Spain and Portugal, and was elected to the Conseil Général in 1867, and to the Assembly in 1871. In 1873 he was appointed Minister of Foreign Affairs, which post he held until 1877. Formerly a leading member of the Right Centre, he greatly contributed to the wise and moderate foreign policy of his country. He died 16th September, 1886.

Decazeville, a town in the department of Aveyron, France, not older than 1830. It owes its existence and prosperity to its ironworks, said to be the largest in France. Pop. of commune, 8871.

Decc'an (Sansk. *Dakschina*, 'the south'), the geographical name of the portion of the Indian Peninsula S. of the Vindhya Mountains, forming a plateau from 1400 to 3000 feet high between the E. and W. Ghâts. The principal rivers are the Kistna, Godavari, Pennar, and Kaveri (Cauvery). In 1338 the Mohammedans completed the subjugation of the D. In 1706 it fell to the Mahrattas, and later various

European powers established settlements on its outskirts. The D. is now the presidency of Madras, part of Bombay, and native states, such as Hyderabad, Mysore, Travancore, &c.

Deceb′alus, a title of honour among the Dacians, probably equivalent to the English *king*. The D. mentioned by Dion Cassius was, during the reigns of Domitian and Trajan, a dangerous enemy of Rome. Between 86 and 90 A.D. he defeated the Roman generals in Mœsia, and frightened Domitian into purchasing a dishonourable peace. Trajan, however, restored the honour of the Roman arms, and after suffering several disastrous defeats, D. committed suicide, A.D. 105.

Deceit′. See FRAUD.

Decem′ber (Lat. the 'tenth month' or 'period'), with us the last month of the year, but with the Romans, before the reformation of the calendar by Julius Cæsar, the tenth (hence its name), their year beginning with March.

Decem′viri, a title of various public functionaries at Rome. (1) The first and most celebrated, the *D. Legibus Scribendis*, according to the Roman legend which passes for history, entered on office, B.C. 451, for the purpose of framing a code of laws on the return of the three commissioners who had been sent to Greece to collect the laws of the different states, in accordance with the *Lex Terentilia*. Previous to their election, a dispute as to whether the 'Ten' should be patricians or plebeians, was settled in favour of the former. On their appointment all other magistrates were suspended, and the D. were intrusted, in addition to their legislative powers, with the sole government of the state, civil and military, during their year's tenure of office. They drew up a body of laws, which, after receiving the approval of the Senate and Comitia, were engraven on ten metal plates, and hung up in the comitium. At the year's end new D. were appointed, only one of the former ten, the notorious Appius Claudius, being re-elected. Their tyrannical conduct was in striking contrast to the moderation of their antecessors. Whereas before only the presiding magistrate had the fasces carried before him, each was attended now by twelve lictors, bearing not the fasces only, but also the axe, the emblem of sovereign authority. At the end of their term they refused to resign; but an unjust and shameful decision of Appius Claudius in the case of Virginia led to an insurrection of the Plebs and the downfall of the Decemvirs, B.C. 449. Two additional tables of laws were the result of their labours, which, with the ten above mentioned, formed the famous Twelve Tables—the basis of all the Roman law. (2) *D. Litibus* (or *Stlitibus*) *Judicandis*, magistrates who dealt with civil cases, were instituted about 292 B.C. Of the early history and jurisdiction of this court very little is known. Augustus gave them the presidency of the *Centumviri;* but they maintained a separate existence to the latest days of the Empire. (3) *D. Sacris Faciundis*, or *D. Sacrorum*, were members of an ecclesiastical college, and held office for life. Their chief duties were the care and inspection of the Sibylline books, and the celebration of the games of Apollo, and of the secular games. The number of these oracle-keepers was originally two (*Duumviri*), increased to ten, B.C. 369, of whom, after 367 B.C., five were patricians and five plebeians. Their number was increased by Sulla to fifteen. (4) *D. Agris Dividundis*, were occasionally appointed for dividing the public lands.

Decep′tion Island, one of the South Shetland group, Antarctic Ocean, so called from presenting to persons looking at it from a distance a striking resemblance to a ship. D. I., which is volcanic, and abounds in hot springs, is a mere ring of land, composed of alternate layers of ashes and ice, surrounding a deep circular lake, 5 miles in diameter, and communicating with the sea by an opening 600 feet wide.

Decid′uous Trees. See LEAF.

Decimæ Garbales, the tenth sheaf of the cut corn, which the rector of the parish had a right to take from the ground.

Decimæ Inclusæ, Teinds (q.v.), which have never been separated from the stock, and which are not demandable by the titular (see TEINDS) or minister.

Decimæ Restoriæ, parsonage tithes, due from all kinds of grain produced by culture.

Decimæ Vicariæ, vicarage tithes, due only, according to use and wont, from certain articles—wool, grass, fish, eggs, &c.

In England (by statute 6 and 7 Will. IV. c. 71, and other amendment acts) a charge was made on the land in place of the tithe or charge on the produce of the land formerly payable in kind to the Church as the tenth part of the annual increase arising from the profits of the land, or from the labour of the persons living thereon, or from their stock. The Tithe Act of 1891 makes this charge payable by the owner, not the tenant, of the land to the owner of the tithes.

Dec′imal Fraction is a fraction whose denominator is any power of ten. Thus $\frac{12345}{1000}$ is a D. F., and may be written $12\frac{345}{1000}$, or simply 12·345—in which latter case it is called a *decimal*, the *point* indicating where the digits stop. The decimal portion is a mere continuation of the integral portion. Thus, in the number above, we have tens and units before the point, and tenths, hundredths, thousandths, after the point. Accordingly, the ordinary rules for addition, subtraction, &c., apply as in the case of integers. A common fraction is reduced to a D. F. by multiplying numerator and denominator by such a number as will make the latter a power of ten; thus, $\frac{1}{2} = \frac{5}{10} = \cdot 5$; $\frac{3}{4} = \frac{3 \times 25}{4 \times 25} = \frac{75}{100} = \cdot 75$; $\frac{2}{3} = \frac{2 \times 333}{3 \times 333} = \frac{666}{999} = \dot{6}$. In this last case there is no power of ten divisible by three; but the farther we take the multiplier 3333 . . . we can make the denominator nearer a power of ten than by any given difference; and accordingly we say $\frac{2}{3} = \cdot\dot{6}$; where 6 means 6 repeated as often as necessary for the approximation.

Decimal fractions seem to have been introduced by Regiomontanus, in 1464; but the first treatise on the subject is the *Pratique d'Arithmétique* of Steirnus (1582). This mode of calculation is now almost universally practised in the civilised world.

Dec′imal Notation. See NOTATION.

Decimal Sys′tem of weights, measures, and coins, is a subject which has of recent years attracted great attention, both at home and abroad. On account of the facilities which it offers for calculation, it will no doubt in time supersede all the old and cumbrous methods; and when that is effected throughout Europe, it will be the first step towards establishing a universal and international system. The most perfect example of the D. S. is found in France, though the same principle obtains in the coinage of the United States, Belgium, Italy, Spain, Portugal, and other countries. The French unit measure of length is the *mètre* (= 39·3709 inches): the superficial unit is the *are* (100 sq. mètres); the solid measure, the *stère* (1 cubic mètre); the liquid or dry measure, the *litre* (1 cubic decimètre); and the unit of weight is the *gramme*, being the weight of a cubic centimètre of pure water at a temperature of zero centigrade. The *déca-*, *hecto-*, *kilo-*, *myria-gramme*, &c., represent respectively 10, 100, 1000, 10,000, &c., grammes; while *déci-*, *centi-*, *milli-gramme*, &c., are respectively 1, ·01, ·001 parts of a gramme. The same prefixes are similarly used with the other measures. The unit coin is the *franc ;* the *décime* and *centime* being respectively ·1 and ·01 of a franc. The former, however, is not now used—accounts being kept simply in francs and centimes.

Decima′tion (Lat. *decem*, 'ten'), a military punishment, by which every tenth man was selected by lot for death, when a large body of men had in concert committed some grave military offence.

Dec′imi, in music, a name sometimes used for the interval of a tenth, or octave and a third.

Deci′sion. The D. of a court is its pronounced judgment in a cause. In Scotland, the word is usually applied to the printed reports of cases decided in the Court of Session. In England the decisions of courts of law carry greater authority in determining the law than they do in Scotland; though in the latter country, two or more consecutive decisions of the Court of Session, not changed by the House of Lords, are held to determine the law—'an uniform tract of the judgments or *decisions* of the Court of Sessions is commonly considered as part of our (Scotland) customary law.'

De'cius, the name of a plebeian family famous in Roman legend through the heroic self-sacrifice of two of its members. **Publius D. Mus,** one of the consuls in the Latin war of 340 B.C., at a battle near Vesuvius, when his troops were wavering, sought death in the ranks of his enemies after solemnly devoting himself and them to the infernal gods. The sacrifice was accepted, and victory remained with the Romans. His son, also **Publius D. Mus,** imitated, with the same happy result, the paternal example on the battle-field of Sentinum, B.C. 295, and closed a brilliant career with a patriotic death. Among the later emperors one bore the name of D. His full name was **Cajus Messius Quintus Trajanus D.,** but he was a Pannonian by birth, and no relation of the old Roman family. Elected emperor by the soldiers of Mœsia in A.D. 249, he ruled vigorously for two years, but in 251 fell in battle against the Goths. His reign is chiefly memorable for a fierce persecution of the Christians.

Deck (Old Eng. *decan*, 'to cover'; comp. Ger. *decken*, allied to the Lat. *tegere*, and Gr. *stegein*), the planked floor or platform of a ship, laid on transverse beams and half beams, and longitudinal carlings supported on pillars, and intimately secured to the sides of the vessel. Besides providing accommodation and shelter, decks are of great structural value in binding together the sides of the ship, and in maintaining its proper form. They are slightly curved transversely to facilitate the free flow of water to the scupper holes. A large vessel is usually constructed with upper, main, lower, and orlop decks; the last named being lowest, and used for stowage of cables, &c.; and over the upper deck, at opposite ends of the ship, are the forecastle and quarter-deck.

Deck'er, Sir Matthew, was a Dutchman naturalised in London, where he began business in 1702, received a baronetcy for his commercial eminence in 1716, and entered Parliament in 1719. He died 18th March, 1749, having served only four years in Parliament. In 1739 D. wrote an essay on the causes of the decline of foreign trade, consequently of the value of the lands of Britain, and of the means to restore both. In 1743 appeared the pamphlet, which reached a seventh edition in 1756, containing what is known as D.'s scheme. It is best described by the title:—*Serious Considerations on the several High Duties which the Nation in General* (*as well as Trade in Particular*) *Labours under; with a Proposal for Preventing the 'Running' of Goods, Discharging the Trades from any 'Search,' Raising all the Public Supplies by one Single Tax.* This was a house-tax, which D. calculated would bring in £6,000,000 per annum.

Declara'tion, in English law, was the pleading in which a plaintiff in an action at common law stated his case against the defendant. A. D. is no longer made use of in actions; a *statement of claim* has taken its place.

Declaration, Dying. In England and in Scotland the general rule of law is that secondary or hearsay evidence is inadmissible in a trial; but testimony given by any one *in the belief of impending death*, who does not live to be examined at the trial, is an exception to the rule. The person must believe he is dying although not expecting *immediate* death. His evidence may be proved by parole evidence; but will probably have greater weight if written and duly tested. In case of murder the D. D. of the murdered man weighs heavily. Evidence of this kind is admissible in favour of the accused as well as against him.

Declaration in Criminal Procedure. In Scotland the statement, if any, made by a prisoner, on being apprehended and brought before a magistrate, is called his declaration. It is the duty of the magistrate to inform the prisoner that it is optional for him to make a declaration or not, but that, if he does, it may be used against him at the trial. If the prisoner chooses to make a statement, and be in a fit state of mind to do so, and does not appear to be under the influence of promises or threats, his narrative and answers on examination are written, and read over to him, who, along with the magistrate, must sign each page of the document. The accused may have his agent present at the time of making his declaration, and has a right to postponement, to give time for agent to be communicated with and to appear. If the prisoner cannot write, the magistrate must sign on his behalf. The examination is commonly conducted by the Procurator-Fiscal, but any magistrate may take it (q.v.). The declaration not being on oath, has no force against any one but the prisoner.

Declaration in Place of Oath. Quakers, Moravians, and Separatists objecting on religious grounds to take an oath were, in civil and criminal cases, allowed by statute to substitute a declaration or *Affirmation* (q.v.). Several statutes were enacted, from the reign of Geo. IV. down to 1871, in reference to the declaration in place of oath. Finally, in 1888, by statute 51 and 52 Vic. c. 46, every person is now allowed to *affirm*, when he objects to be sworn, for all purposes and in all places where an oath is required by law.

Declaration of Title. By Act 25 and 26 Vict. c. 67, persons having an interest in land (not of copyhold or customary tenure) in England may, under certain circumstances, obtain a judicial declaration of their title, so as to enable them to give an indefeasible title to a purchaser for a valuable consideration. The declaration is asked for by petition to the Chancery Division of the High Court of Justice. Appeal and petition against declaration are allowed. Similar procedure is competent under Scotch law by what is called Declarator (q.v.).

Declar'ator, a form of action before the Court of Session in Scotland, by which judicial recognition is sought of some right which the pursuer (plaintiff) supposes himself to possess. Where the declaratory conclusions regard property, they are generally, though not necessarily, followed by petitory or possessory ones. In an action of D., the pursuer must show the consequent right which will accrue to him on the court making the declaration asked for. The form of action is a common one in questions of constitution of marriage. (See MARRIAGE.) Declaratory action is a valuable and important form in the law of Scotland. See DECLARATION OF TITLE.

Declen'sion (Lat. *de*, 'down,' and *clino*, Gr. *klino*, 'I bend'; literally the *bending down* of a word's terminal letters), is the system of the changes of form or cases by which nouns, pronouns, and adjectives express their various relations to other words. These cases are distinguished by changes in the word to be declined, or by using separate words (prepositions); and from one point of view there might be as many cases as prepositions in a language. In the Aryan tongue the case-endings have been formed by the fusion of separate words, and their origin is almost unknown. Languages tend to simplify D. In the oldest Aryan (q.v.) tongues we find a rich system of declensional forms, which gradually disappears from more modern tongues. No fewer than eight cases occur: the *Ablative*, denoting the relation *from*, and ending in *t* or *d*—*e.g.*, old Latin *ecquod*, from a horse; the *Locative*, denoting the relation *in*, and ending in *i*; the *Instrumental*, denoting the relation *with* or *by*, ending in *a*; the *Dative*, the relation of *for* before a noun, ending in *ai*; the *Genitive*, denoting possession, ending in *asya* or *as*; the *Accusative*, ending in *m*, and denoting that the word is the object of the action of a verb, or is governed by a pronoun with the sense of motion towards; and the *Vocative* or interjectional case, identical in form with the Nominative, which originally ended in *s*. In Latin we find the Locative and Instrumental fused with the Dative and Ablative. In modern Romanic languages the declensional endings have almost vanished. Old English had Nominative, Genitive, Dative, Accusative, Vocative, and Instrumental cases (see

ENGLISH LANGUAGE), and several plural endings, *as*, *an*, *u*, *a*, *o*. Now there are only three cases—*Nominative* (Lat. *nomino*, ‘I name’), the form in which a noun is used when it is the subject of a sentence; the *Possessive* (Lat. *possideo*, ‘I possess’), the form denoting possession; and the *Objective* (Lat. *objicio*, ‘I throw towards’), used when a noun is the object of the action of a verb, or comes after a preposition. The Possessive expresses a relation by the suffix *’s*, a contraction from the Old English genitival ending *es*. The difference between Nominative and Objective is determined solely by the sense and position of the words. See Morris's *Historical Outlines of English Accidence* (1873), Whitney's *Lectures on Language*, and Latham's *English Language*, (Lond., 1865).

Declina′tion, in astronomy, is the angular distance of a heavenly body N. or S. of the celestial equator, and is measured along the arc of a great circle passing through the body and the poles. It corresponds to *latitude* in geography.

Declination of the Magnet′ic Nee′dle is the angle of deviation from the true astronomical end of a magnet, suspended so as to have free motion in a horizontal plane. This deviation is, of course, due to the change in position of the magnetic pole, and is undergoing a continual alteration for each locality. From observations made at Paris since the year 1580, the D. has altered from 11° 30′ E. to 20° 20′ W. in 1852, a total variation of 31° 50′. In 1663 the needle pointed due N., the D. being then zero. The magnetic meridians are so drawn that the tangent to the curve at any point represents the direction in which the D. needle points; and these meridians all converge towards the spot where Sir J. C. Ross found the angle of inclination to be 89° 59′, or nearly perpendicular. (See DIPPING-NEEDLE.) The D.-needle for measuring this variation is a highly-magnetised needle delicately suspended in a closed box, which is surmounted by a telescope for ascertaining the true astronomical N.

Declin′ature, a term of Scotch law denoting objection to the jurisdiction of a judge. This may be on the ground of his being interested in the suit, or of the case being beyond his province, or of his bearing enmity to one of the parties, or of his being too nearly related to one of them.

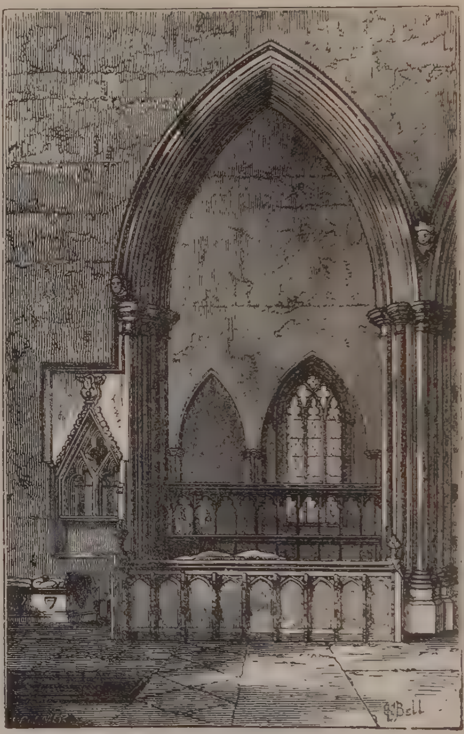
Decoc′tion (Lat. ‘a boiling down’), a medicinal preparation obtained by boiling, for a longer or shorter period, some vegetable substance in water. See INFUSION.

Decomposi′tion, in chemistry, signifies the breaking up of a compound into its elements, or into substances of a less complex nature than itself. Thus the passage of the electric current through water (slightly acidulated to make it conduct) causes its D. into the elements of which it is composed, viz., oxygen and hydrogen. Again, the action of a high temperature on chalk (carbonate of lime) is to cause its D. into lime and carbonic acid.

Double Decomposition is an expression used by chemists to signify the change which occurs when two compound substances act upon one another in such a manner that the groups of which each may be considered as composed are mutually interchanged. Thus, when solutions of nitrate of baryta and sulphate of potash are mixed, a white precipitate of sulphate of baryta is produced, and the solution (which may be filtered from this precipitate) contains nitrate of potash. The nitric acid, before combined with baryta, has now become transferred to the potash, before combined with sulphuric acid, whereas the sulphuric acid has left the potash, and has combined with the baryta. Both of the original compounds have been decomposed, and in their place two new ones have been produced. Such changes are of frequent occurrence.

Decomposition of Forces. See COMPOSITION, &c.

Dec′orated Style, also called the Middle, Pointed, or Edwardian style of Gothic architecture (Fr. *ogival secondaire*), arose naturally out of the Early English, First Pointed, or Plantagenet style, and as naturally led to the Perpendicular, Third Pointed, or Tudor style. These three styles of Gothic may be said—without meaning to affix precise dates—to have flourished in England during the 13th, the 14th, and the 15th century respectively. Decorated English, the architecture of the 14th c., flourished, according to Rickman, from 1307 to 1377, and according to Fergusson, from 1272 to 1377. During this period, and for some time previously, all the artistic genius of the country seems to have found expression in the noble buildings which arose everywhere. The amount of mental activity and enthusiasm striving after perfect architectural form during this time resulted in the erection, during the D., or Middle, period of Gothic, of the most perfect mediæval structures in England. From the D. period, Gothic architecture declined, and gave way, eventually, to the classical Renaissance. The arrangement of buildings remained the same in the period under consideration as in the First Pointed or Early English period, distinguished by the greater variety, freedom, and richness of the ornamentation. The arches of the windows were still pointed as in the First Pointed style, but the head of the arch was decorated with richer and much more intricate and delicate ornamentation. The vaulting was also richer and more intricate. This richness was obtained by the introduction of intermediate ribs, which, crossing each other, produced stars and other figures at the points of intersection. In the earlier part of this period the window tracery was geometrical, consisting of circles, triangles, &c.; in the latter, flowing curves were introduced into the window tracery. In D. Gothic, mullions were employed instead of pillars and shafts for windows, and in the carving of capitals a greater freedom of execution and wealth of lavish ornament are observable. New mouldings and new applications of carvings and foliage were introduced; decorations in colour, painted glass, and mural paintings were carried to an astonishing degree of perfection. This marvellous development of architecture in England took place by the exercise of



Decorated Arch (Gothic), Dorchester, Oxfordshire.

native genius alone, and was in no sense due to imported art or extraneous aid of any kind. In some instances, the traditions of French arrangements were adhered to, as at Westminster Abbey; 'but even there,' says Fergusson, 'the design is carried on in so English a manner, with details so purely English, as to make us feel even more strongly how essentially native the style had become.' Lincoln Cathedral, the W. front of York Minster, parts of Ely, Lichfield, Worcester, Winchester, Norwich, and Canterbury Cathedrals, and Hexham, Howden, Dorchester, Adderbury, Stanton-Harcourt, and Bloxam Churches, may be mentioned as characteristic examples of this style. See Fergusson's *History of Architecture in all Countries* (Lond. 1874).

Decou'plé, or **Uncoup'led,** in heraldry, means parted or severed; applying, for example, to the ends of a Chevron (q.v.).

Decree', in England, was the decision of a court of equity, and was the same as judgment at common law; but now, by the Judicature Acts of 1873 and 1875, *judgment* is used in all the divisional courts. In Scotland, D. or *decreet* is the final judgment of a court. Decrees are either *condemnator* or *absolvitor*; the former is the term when decision is in favour of the pursuer, the latter when in favour of the defender.

Decree in Absence, in Scotland, is equivalent to nonsuit against a plaintiff, or 'judgment by default' against a defendant in England. Where a D. in A., in the Court of Session, is sought to be reduced, the party seeking reduction must pay the expenses, £2 2s., within ten days; and if he obtains the reduction, he is not entitled to repayment of these previous expenses. The same rules, modified to some extent, are in force in the sheriff's court.

Decrees of God, in the language of theology, are 'his eternal purpose, whereby he hath foreordained whatsoever comes to pass.' The doctrine (as *dogma*) originated with Augustine, and rests on the two postulates of Original Sin inherited from Adam in consequence of the fall, and the irresponsible Sovereignty of God. From these premises Augustine argued that an absolute election of certain individuals to eternal life, though resulting purely from the divine will, is not unjust. For since, both by original and actual sin, all are transgressors of God's law, it were no injustice if all had been left to perish; therefore there is no injustice in the free election of some to eternal life. The complement of which is, that since the number of the elect can neither be increased nor diminished, all the rest of mankind are personally reprobated to eternal damnation. But, even among those who are agreed as to the nature of the D. of G., there have been two views as to the order in which they took effect: the one called the Supra-lapsarian, the other the Sub- or Infra-lapsarian. According to the first, Election and Reprobation preceded the purpose to create the world and permit the fall, and therefore God created some men to be saved and some to be lost. According to the second, God decreed—1st, the creation of the world; 2nd, the fall; 3rd, the election of some to eternal life; 4th, the redemption of the elect; 5th, to leave the residue of mankind to suffer the just punishment of their sins. See Hodge's *Systematic Theology*.

Decrepita'tion (Lat. *de* and *crepitare*, 'to crackle'), is defined in Johnson's Dictionary as 'the crackling noise which salt makes over the fire.' This crackling sound is often observed when other salts are heated. It is caused by the sudden conversion of small quantities of water contained within the crystals into steam, which bursts them in pieces.

Decrescen'do (Ital. 'diminishing'), a mark of expression used in music to indicate a gradual decrease of loudness unaccompanied by any alteration in speed.

Decre'tals, The, form the second and smaller part of the Corpus Juris Canonici of the Church of Rome. It was added in 1230 under Pope Gregory IX., and comprised all the additions to the canon law, in the shape of judicial replies by ecclesiastical authorities to cases submitted to them, which had been made since the publication of the *Decretum*, or first part, in 1150. See Blunt's *Dict. of Doctr. and Hist. Theology*.

Decretum et Decretalia. The body of the canon law consists, first, of the *Decretum*, which is a collection of the opinions of the fathers, popes, and Church councils made by a Benedictine monk towards the close of the 12th c., in imitation of the Roman Pandects; and secondly, of the *Decretalia*, which were collected by Pope Gregory IX. nearly a century afterwards from the decretal rescripts or epistles of the popes. See CANON LAW.

Decussa'tion, a term used in anatomy to denote the crossing of fibres from one side to the other. Thus we have the D. of the fibres of the optic nerves, and the D. of the motor fibres of the Spinal Cord (q.v.) in the *Medulla oblongata* (q.v.).

Ded'imus Potesta'tem ('we have given power') is a writ of Chancery authorising commissioners to take an examination. When a justice intends to act under a commission of the peace, he sues out a writ of D. P. from the clerk of the crown in Chancery, empowering persons named in the writ to administer the oaths previously required. Attorneys in any action or suit were not permitted to appear without D. P., but now either by the plaintiff or by the defendant an attorney may be appointed without the writ of D. P.

Deduc'tion is a species of reasoning, of which the most important examples are to be found in mathematics and general physics. D. starts from a known truth, law, or proposition, and passes to a previously unknown, *i.e.*, previously unexplained, truth. The premise in D. may be in the shape of a universal proposition: its generality, of course, varies with the more or less abstract nature of the subject-matter. The conclusion may be in the shape of a particular proposition, but may also be a principle of wide application; sometimes of precisely the same width as the premise. D. is generally opposed to induction, or the inference of a general conclusion previously unknown from a comparison and sifting of particular instances. Practically the modes differ, and are, indeed, opposite: but substantially, and in the end, the mental process is the same; it is the identification of similars under the variety of conditions. The assumption which underlies D. as well as induction, and which renders their conclusions true in fact as well as formal in logic, is that from identical conditions, positive and negative, the same result invariably follows. Hence the rules of the syllogism which have been contrived to test the validity of inferences, and which by Hamilton, Ueberweg, and others, are applied to induction as well as D., must not be confounded with the act of inference itself. By the use of symbols sufficiently abstract and significant the principal forms of inference may be adequately represented (as by Jevons) in the equation or substitution of similars by a logical engine (exhibited at the Royal Society), or (as by Boole) by means of a special mathematical formula. The type of D., however, will always be: All A is B; C is A, ∴ C is B. But the combination of two general propositions, where their joint result admits of being calculated, leads to still more important results. In such inexact sciences as history, all that D. can accomplish is to explain and make rational the previous empirical generalisations or inductions.

Dee (probably connected with the Cymric *dyfi*, 'smooth'), the name of several rivers in the island of Britain, of which the most notable are—1. The D. in England, which, rising in Merionethshire, traverses parts of Denbigh, Salop, Flint, and Cheshire. From Chester, where it is 100 yards broad, it is conveyed by an artificial tidal canal, 9 miles long, and navigable for ships of large burden, into the noble estuary which connects it with the Irish Sea. It has a course of 80 miles. Its waters were deemed sacred by the ancient Britons. Drayton, in his *Polyolbion*, calls it an 'ominous flood'; and Milton, who refers to it (in *Lycidas*) under the name of *Deva*, speaks of its '*wisard* stream.'—2. The Aberdeenshire D., which has its sources in five wells near the summit of Braeriach, and after a course of 96 miles falls into the German

Ocean at Aberdeen. About 6 miles above Castleton of Braemar it rushes through a narrow cleft called the Linn of D. Twelve miles of its course is through Kincardineshire, after which it retouches Aberdeenshire, and thenceforward forms the boundary between the counties. Balmoral Castle is on the D.—3. The Kirkcudbrightshire D., which rises in the N. of the county, pursues a south-easterly course of about 4 miles, and then unites with the Ken. After a further lake-like course of 10 miles, it falls into the sea at Kirkcudbright. It is navigable for 7 miles from its mouth.

Dee, John, a celebrated mathematician and astrologer, was born at London, 13th July, 1527, studied at Cambridge and Louvain, at the latter of which places he took the degree of Doctor of Civil Law. He returned to England, obtained Church preferment, and a pension under Edward VI., nearly lost his life in the reign of Mary, and acted as Queen Elizabeth's 'intelligencer' or political agent. Meanwhile he had gained the reputation of a sorcerer, and in 1574 his country residence of Mortlake was 'wrecked' by a mob, himself and his family escaping with difficulty. How far D. claimed to be an astrologer is doubtful, but it is certain that he was an alchemist, and along with a man named Kelly visited various Continental courts pretending to raise spirits. Returning once again to England, he became Warden of Manchester College, and held the office for nine years. D. died, December, 1608, in great poverty, leaving behind him many works, chiefly of a scientific character, which in manuscript are embedded in the Cottonian and other collections. In 1842 D.'s private diary was published by the Cambridge Society. See *Athenæ Cantabrigienses.*

Deed, in law, is a formal written instrument, executed and authenticated according to certain technical forms (see COMMON FORMS), setting forth the terms of an agreement. Every D. requires a party or parties capable of contracting obligation, and subject to no legal disqualification, actual or presumed. See CONSENT, IDIOT, PUPIL, MINOR, MARRIAGE; DEATHBED, LAW OF; BANKRUPT, CONJUNCT, CONFIDENT, FRAUD. A D. must be founded upon a valuable consideration (see CONSIDERATION), not on fraud or collusion to deceive purchasers or creditors. The last requisite to a D. is the attestation or execution of it in presence of witnesses, though this is in most cases only required for preservation of evidence, the attestation not being an essential part of the D. For manner of execution in England, see SIGNING, SEALING, and DELIVERY. For Scotland, see TESTING-CLAUSE, WITNESS, REGISTRATION OF DEEDS AND WRITS, HOLOGRAPH.

It is not essential to a D. that it should be dated, but it is necessary that the wording of the D. should be intelligible and clear without punctuation, &c., and legally sufficient. Where no date is inserted, the time will be reckoned from the delivery. See CHARTER, WILL, DISPOSITION, INDENTURE, DELIVERY OF A DEED.

Deed Poll, in the law of England, is a deed made and executed by one party. The etymological derivation of the term is that a D. P. is *close cut* or shaved, while an Indenture (q.v.) is indented at the top.

Deem'ster, Dempster, or **Doomster** (orig. *Demer* or *Demere*, 'a judge,' from *deman*, 'to judge,' mod. 'deem'-ster (orig. *stre*), being a feminine termination), the name given in Scotland to the officer who formerly pronounced the doom (Old Eng. *dom*) or sentence of death on condemned prisoners in the High Court of Justiciary. His office of D., to which was superadded that of public executioner, no longer exists. In the Isle of Man and in Jersey the word retains its primary meaning, for there the 'deemsters' are *judges*, chosen from among the parties themselves, and they decide all contested cases in those places without process or in any charge to the parties. *The Dempster* is the chief judge of a Tinwald Court in the Isle of Man.

Deer (Old Eng. *deor*, any wild animal or beast; comp. Ger. *thier*, Lat. *fera*, Gr. *thēr*), a family of *Ungulata*, or hoofed quadrupeds, belonging to the Ruminant (q.v.) division of that group. The D. are *Artiodactyle* ungulata, that is, possess an even number of toes. The horns or antlers of the D. are, firstly, of solid nature; and, secondly, are deciduous, or shed annually. This first character distinguishes them from the Antelopes (q.v.), which belong to the family *Cavicornia* or 'hollow-horned' ruminants, and which are not in any sense to be confused with the *Cervidæ* or D. The antlers are more or less branched; the number and complexity of the branches increasing as the animal advances in years. They are shed and reproduced at the breeding season, and are borne on the frontal bone. They are reproduced by a process resembling that of the production of new bone in man. A sensitive, hairy, and vascular skin, named the 'velvet,' at first covers the antlers, but as growth proceeds is worn off. The horns of the *Cervidæ* are borne, with the exception of the reindeers, by the males alone. The other characters of this group comprise the presence of a *tear-pit*, *larmier*, or *lachrymal sinus*, a gland of sebaceous nature, situated beneath each eye. This structure secretes a waxy substance, the function of which is undetermined, although from its strong odour it has been thought to be associated with the sexual instincts of these animals. The teeth generally number thirty-two, and, as in all ruminants, no upper incisors exist. The lower incisors number six, the lower canines two, the præmolars and molars six in each jaw. In some D. (*e.g.*, Muntjak), upper canines exist. D. are found all over the world, save in Australia and S. Africa. The antelopes, indeed, take the place of the D. in the latter continent. The more important species of D. will be described in special articles (*e.g.*, CARJACOU, REINDEER, STAG, ELK, &c.). The American D. is a very graceful and useful animal. Its colour in summer is tawny, in autumn lead-hued, in winter dark brown. The length of body averages about $5\frac{1}{3}$ feet and the height from the ear downwards is $5\frac{1}{2}$ feet. The flesh is very good eating. Good bow-strings are made of the sinews. All sorts of clothing are made from the hide, and the horns are fashioned into handles for cutlery. The Musk D. (q.v.), (*Moschidæ*), it may here be noted, form of themselves a distinct family. They are distinguished from the *Cervidæ* chiefly by the presence of canine teeth in both jaws, and by the absence of horns in both sexes. The canines of the males form tusks, but those of the females are of small size.

American Deer.

Deer, or **Deir, Old** (Gael. *dér*, now *deur*, 'a tear,' from Drostan's tears at parting with Columba; or more probably *dair*, 'an oak'), a parish of Buchan, Aberdeenshire. St. Columba and St. Drostan planted a church here about 580. Two miles W. of the parish church stood a Cistercian abbey, founded by William Cumyn, Earl of Buchan, about 1219. The land, now largely peat-moss, was once covered with oaks. For local culture, a Club of D. was formed in 1868. See Peter's *Peat-Mosses of Buchan.*

Deir, Book of. After the Reformation, some MSS. of the Abbey of Deir found their way to the library of Cambridge

University. H. Bradshaw, of that library, discovered in 1860 among them the B. of D., containing the Gospel of John, with parts of the other Gospels, in Latin, in the writing of the 9th c.; also Visitation of the Sick, with a Celtic rubric of a later date. In writing of the 12th c. are various Celtic notes, relating that Columcille and Drostan came from Hi to Aberdour, and received a grant of Deir. This rare and authentic Gaelic memorial sheds much light upon that period. See Stuart's *B. of D.* (Spalding Club, Edinb.).

Deerhound, or **Staghound,** a variety of dog closely allied to the Bloodhound (q.v.), and believed to result from the interbreeding of the latter with the greyhound. The D. is a large dog, with hair of moderate length, and generally of light-brown or tawny colour. It possesses great speed, strength, and powers of endurance. Its scent is also powerful, and it is courageous enough to often master an infuriated stag at bay. When stag-chasing was in vogue, this breed of dogs was much cultivated, but latterly it has been much neglected. The D. used in Deerstalking (q.v.) is either the staghound proper, or a breed in which this latter variety is represented.

Deer-Mouse, or **Jumping-Mouse,** a genus of *Rodentia* found in America, recognised by the great relative length of the hind-limbs, and by the want of hairs on the tail. They also differ from the ordinary mice in some insignificant details in their dentition. The best-known species—the Canadian J. M. and that of Labrador—hybernate in winter.

Deerstalking, the art of tracking deer for the purpose of shooting them. The hunter is obliged to resort to a series of manœuvres on account of the delicate sense of smell and cautious instincts of the game. Typical D. is only practised in the Scottish Highlands. A perfect knowledge of the entire 'forest' or deer-ground is the first essential in the sportsman or his guide, since advantage may sometimes have to be taken of the most apparently trifling feature which the ground may present. The dogs or deerhounds employed must be trained to perfect silence and obedience. The deerstalker is greatly at the mercy of the wind and weather. The fine scent of deer necessitates the hunter's advance up or against the wind; whilst concealment, through wearing a dress of much the same colour as the ground, and by cautiously moving about under shelter, must be attended to. Advance from *higher* to *lower* ground upon the game is generally preferred, as the deer are apt to look to the low ground as the source of danger; and in valley and low-ground stalking, frequently advance has to be made in the prone position. The deerstalker may at length arrive within a hundred yards of the quarry, and selecting the finest animal of the herd, aims for the shoulder, or slightly behind this point. When the deer is not mortally wounded, the hounds are slipped, and chase is begun. The attendant 'gillies' disembowel the dead deer; this process, termed *gralloching* in hunting parlance, being supposed to keep the flesh from becoming tainted. 'Driving' the deer towards certain points is employed when a large party of shooters are present, but this latter procedure has none of the finesse of true 'stalking.'

Deer-Stealing. This offence, if committed in the enclosed portion of any forest, chase, or purlieu, or in any enclosed land where deer are usually kept, is by statute felony, punishable by two years' imprisonment with hard labour, &c. If the deer be in unenclosed ground, the punishment for the first offence is a fine not exceeding £50; furthermore, a second offence is felony, and the penalty imprisonment for any term not exceeding two years, &c. Suspected persons found in possession of venison or deer-snares, and not accounting for such possession satisfactorily, are liable to a fine of £20, or, if they cannot be convicted, the person from whose hands the venison or snares originally came is liable to the same fine, if he cannot account for his possession satisfactorily. In Scotland, shooting deer in a park without permission is regarded as theft; if the deer is outside the park, the offence is punishable by fine. A proprietor is not entitled to kill deer trespassing on his property, but he may drive them off.

De Facto is, in law, a thing actually done or existing. A king *de facto* is one in possession of sovereignty. A king *de jure* is one who is considered to have a right to a crown, but is not in possession.

Defama′tion. See Libel.

Default′ is an English law-term usually held as expressing the fact of non-appearance in court on the day assigned, though the term is applicable to any omission. If a plaintiff makes D. in appearance, he will be nonsuited. D. on the part of a defendant ensues in 'judgment by default.' In either of these cases, the party may be reponed on payment of expenses within the time limited by the rules of the courts.

Defeas′ance, Deed of, in English law, is a deed which counteracts the operation of another deed. A provision in a deed which modifies the main provision is called a *condition*; when the modification is by a separate deed it is called a *defeasance*, which may be held fraudulent, but is not necessarily so. The Scotch deed, which was called absolute disposition with a back bond, effected a conveyance of land almost identical with D. of D. in England.

Defen′ces, in Scotch law, is the general name given to the pleas offered for the defender for cutting away the grounds of an action. Such pleas are generally all stated in the first paper put into process for the defender; and in the judicial procedure in ordinary actions that paper is called the D.

Defen′dant. In English law, he who begins an action is termed the *plaintiff*; the person against whom it is brought is termed the *defendant*. A person indicted for a misdemeanour is also called a D. In Scotch law, the name used is *defender*.

Defen′der of the Faith, a title conferred on Henry VIII. by Pope Leo X. in 1521 for the vigour of his orthodoxy. Though recalled on the King's espousing the cause of the Reformation, it has been confirmed by statute and used by English sovereigns ever since.

Defila′ding, in fortification, is divided into horizontal and vertical. The object of the first is to direct the faces of a work so that the enemy cannot enfilade the lines or take them in reverse; and of the last, so to arrange the height of the rampart that the enemy cannot see into it, and that the interior may be safe from direct fire.

Defile′ (Lat. *filum*, 'a thread'), in military language, any passage so narrow that troops can traverse it only in *file*, or with a small number abreast.

Defini′tion (Gr. *horismos*) is the complete and orderly statement of the contents of a notion. It must at least contain the superordinate or genus notion, and the specific difference which makes the species distinct. D. is so used as a powerful weapon of dialectic by Plato in the *Gorgias*, where he defines rhetoric, and in the *Republic*, where he defines the virtues. The Greek terms used in the *Theætetus* for genus and species are *koinon* and *diaphora*. Aristotle calls D. the exact knowledge (*gnōrismos*) of a substance. 'Specific difference' is a translation by Boethius from Aristotle's phrase *diaphora eidopois*. The rule is, that D. should mention the proximate genus, but this is not always followed—*e.g.*, a circle is never defined as a conic section, but as a plane figure. The connection in which a D. is given will often suggest that a remoter genus and a larger specific difference should be used. Opposite views of D. are to be found in Hegel, who merges D. in the dialectical genesis of the notion, and Mill, who maintains that D. is merely of the meaning of names, and not of things. All names, even those denoting a single abstract quality, which have a meaning, may therefore be defined, if not from their content or connotation, then from their causes. Mill, therefore, does not recognise the ordinary division of real and nominal definitions. The meanings of substantial and genetic, essential and attributive D. will be found in works on formal logic. D. obviously merges into exposition, description, and explanation, and different definitions of the same notion are possible where a reciprocal dependence of essential attributes exists; as in the various definitions of a circle by the curve of the straight line which produces it, by the equidistance of points in the circumference, and by the section parallel to the base of the right cone. The great faults of D. are too great width or narrowness, redundancy, tautology, figurative expression, or mere negations, or reference to subordinate notions. The circle or *dialēllon* occurs where A is defined by B, and then B by A—*e.g.*, 'A feeling is pleasant when it is desired because of itself.' Plato's D. of the idea of good as the sun in the kingdom of ideas is a splendid specimen of figurative D.

Deflec'tion, a name applied generally to mean a change of direction of motion. In optics it is synonymous with Diffraction (q.v.).

Deflux'ion. See CATARRH.

De Foe, Daniel, an English classic, was born in London in 1661. He was intended for the Dissenting ministry, but, after leaving Newington Green School, became an agent in the hosiery trade. He began writing pamphlets at the age of nineteen, joined Monmouth's rising in 1685, traded to Spain for wool, became bankrupt in 1692, started a pantile manufactory, and in 1695 was made accountant to the commissioners of glass-duties, an office which he held until 1699. In 1701 his *True Born Englishman,* a satire in favour of William III., won him that king's good-will, but in 1703, the irony of his *Short Way with the Dissenters* being misunderstood, he was imprisoned until 1704, when he was liberated through the influence of Harley, and taken into Government service. In 1706 he was sent to Edinburgh as a secret agent to promote the Union—a mission which he skilfully executed. On the accession of George I., D. did not, as was once supposed, retire from his connection with Government, but was employed to write under Jacobite colours, and thus, as he said, 'take away the sting' from an obnoxious journal. During his later years he betook himself to fiction, publishing *Robinson Crusoe* in 1719, and *Moll Flanders, Journal of the Plague, Colonel Jack, Captain Singleton, Duncan Campbell,* and *Roxana* between 1720 and 1724. He wrote also *Memoirs of a Cavalier* (undated). He died at London, 6th April, 1731. D. was a patriotic controversialist, honest in his aims, if not very scrupulous in his means. His voluminous writings amount to 210 works in prose and verse, but his fame as a novelist has led to forgetfulness of his labours as a pamphleteer. His style is homely, graphic, and perspicuous, and his vocabulary is of almost Shakespearian richness. His novels are autobiographic in form, and characterised by an irresistible air of veracity, due to his skilful manipulation of minute and prosaic incidents. *Robinson Crusoe* is a universal source of delight. See Lee's *Life of D.* (1869), Masson's *British Novelists,* and *D.'s Works,* edited by Sir Walter Scott, in Bohn's *British Classics.*

Deforce'ment, a term of English law, denoting the holding of any land or tenement to which another has the right. The party wrongfully keeping possession is called the *deforciant.* In Scotch law, D. is an act of contempt of the law, consisting in violent opposition of a duly empowered officer in the execution of his duty.

Defraud'ing of Credit'ors. Creditors may be defrauded by the funds of their debtor being concealed, by their being conveyed to favourite creditors, or by the undue increase of debts against the estate of the debtor. Creditors have redress by common law and under the bankruptcy statutes of England and Scotland. See BANKRUPTCY.

Defrauding the Revenue.—Any contrivance by which an imperial tax or duty is evaded constitutes this offence. By the treaty of Union between England and Scotland, the law regarding it is the same in the two countries.

Degeran'do, Jos. Marie, Baron, a French philanthropist and philosopher, was born at Lyon, 29th February, 1772, and after various vicissitudes served in the army of Massena as a common soldier. While thus employed he wrote, among other philosophical treatises, *Histoire comparée des Systèmes de Philosophie, relativement aux Principes des Connaissances Humaines* (Par. 1803), which is considered one of the best French works on the philosophy of history. In 1804 he was admitted into the Académie des Inscriptions et des Belles Lettres, while he also rose high in office under Napoleon. D. was a philanthropist as well as ethical philosopher, writing *Le Visiteur du Pauvre* (Par. 1820), *Éducation des Sourds-Muets de Naissance* (Par. 1827), and *Des Progrès de l'Industrie* (Par. 1841). He was made a peer in 1837, and died 10th November, 1842.—His son, **A. Degerando,** attained some repute as a writer on historical subjects.

Degg'endorf, a town of Lower Bavaria, on the Danube, near the spot where it is joined by the Kolbach, 29 miles N.W. of Passau. The river is here crossed by a wooden bridge 1200 feet long. To one of the fine churches of the Geiersberg thousands of pilgrims yearly repair, when its 'doors of grace' are opened. The town has linen and pottery manufactories, wax refineries, and trade in cattle, fruit, and wood, and some river traffic. D. was conquered and destroyed by Ottokar II. of Bohemia in 1266, was the scene of a massacre of the Jews in 1337, suffered severely in the 'Thirty Years' War,' and was reduced to ashes in 1743 during the Austrian War of Succession. Pop. town 7026; district 37,483.

Deglut'ition is the act of swallowing. Two stages are distinguished:—(1) The bolus of food is pushed backwards towards the anterior arch of the fauces by the application of the tongue to the hard palate. (2) When the bolus has passed between the anterior pillars of the fauces, these are closed by the contraction of two small muscles termed the *palato-glossi,* and at the same time the root of the tongue approaches the soft palate. Thus the bolus is prevented from passing forward into the mouth. The entrance to the posterior apertures of the nostrils is occluded by the closure of the posterior pillars of the fauces, the elevation of the soft palate, or *velum pendulum palati,* so that its free border touches the back of the pharynx, and by the uvula filling up the little chink or gap between the posterior pillars of the fauces. At the same time the hyoid bone and the larynx are approximated, and drawn forward and upwards by the action of various muscles, so that the root of the tongue is bent backwards and pressed, along with the epiglottis, upon the opening of the larynx. The food is prevented from entering the larynx by the approximation of the true vocal cords, and by the apposition of the epiglottis to the opening. Thus it is prevented from passing into (*a*) the mouth, (*b*) the nose, (*c*) the larynx, and it has no way left for it but to pass into the œsophagus or gullet, into which it is propelled by the action of the constrictors of the pharynx. While the bolus is in the neighbourhood of the tonsils, it is covered over with mucus, so as to facilitate its passage. D. is a purely automatic action. To excite it a stimulus must be applied to the fauces. Once the mechanism has been set agoing, no effort of the will can arrest it. D. is also performed when the will is in abeyance, as during sleep, in profound coma, or after removal of the cerebral hemispheres. It is an excellent example of a reflex action, the centre of which is situated in the *medulla oblongata.* The sensory impressions are conveyed to the centre chiefly through the glosso-pharyngeal nerves, branches of the fifth to the fauces, and the superior laryngeal branches of the pneumo-gastric to the pharynx. The motor impressions travel along the pharyngeal branches of the pneumo-gastric, branches of the hypoglossal to the muscles of the tongue, motor filaments of the recurrent laryngeals of the pneumo-gastrics, branches of the fifth to the elevator muscles of the lower jaw, branches of the facial, and lastly, branches of the cervical plexus.

Degrada'tion, a term of English law, denoting an ecclesiastical censure by which a clergyman is divested of his holy orders. *Summary D.* is by word only. *Solemn D.* is by stripping the offender of the insignia of his office. A nobleman or knight may be similarly degraded, when attainted of treason.

Degra'ded, in heraldry, having steps or placed upon steps; said of a Latin cross, or *cross calvary,* on steps, which diminish as they rise towards the centre.

Degree′, in angular measure, is the 90th part of a right angle; and, as a circular measure, is the arc comprised by two radii which make such an angle between them. A whole circumference, then, is divided into 360 degrees, each of which is made up of sixty minutes, and each minute is subdivided into sixty seconds. The French, however, have introduced the Decimal System (q.v.) here, as in all their methods of measure, a right angle being made up of 100 degrees, each D. of 100 minutes, and each minute of 100 seconds.

Degree, in music, a term sometimes used in reference to the relative position of two notes upon the staff.

Degree, University, originally implied a *licentia docendi*, or license to teach within the university, as is still the case with the *privat-docent* of modern German universities. The modern D. is recognised by public legislation outside the university as qualifying, when other conditions are fulfilled, for the exercise of certain learned professions; but *per se* it is merely a formal statement by the university that the graduate has passed through a certain course of study, and shown a certain proficiency, ascertained by examination. The conferring of degrees and the appointment of examiners were generally in the hands of the Chancellor, who, in the case of an Episcopal city, was often the bishop or his nominee. The *licentia docendi* in the schools sometimes attached to universities was a different matter, and was often sold to incompetent persons. The earliest degrees known are probably those in Arts conferred by the University of Paris, and which, according to De Boulay in his history of that university, were introduced by Iruerius into the University of Bologna in 1150, and thence transferred to Paris. In theory all degrees are conferred by the crown, or in early Catholic times by the Pope, through the universities empowered to that effect in bulls or charters; the qualifications being ascertained by each *Faculty*, or body of teachers or graduates, who were privileged to lecture and make statutes. The first degrees given at Paris were in Arts; the inferior D. (given with a robe to the medical student of two years' standing who had passed an examination, and to the student in canon law of three years' standing) was that of Bachelor (q.v.). The term is said to have been first introduced to universities by Gregory IX., and has been extensively adopted. The names *Master* and *Doctor* at first referred indiscriminately to all teachers in the university who had obtained graduation; but later Doctor was applied to the teachers of law, theology, and medicine, and Master restricted to teachers of philosophy, classics, mathematics, &c. It was a condition of even the imperfect D. of Bachelor to read a course of lectures under some Master of the Faculty in which the D. was taken. This obligation continued when a full D. was taken; hence the phrase of 'necessary regency' or period of compulsory teaching, after which graduates, if they pleased, might become honorary regents. At Paris there was an earlier stage than that of Bachelor—viz., that of *Determiner*, who, after two years' study in grammar and philosophy, made certain declarations that he would complete the three and a half years' study required for Bachelor in Arts. The Bachelor was distinguished from the Master by a round cap, in place of the academical hood. A second period of three and a half years' study was gone through before the full D. was obtained; and there was a further ceremony by which the *magister* became a *socius* of the Faculty. At Paris, peculiar solemnity attached to the D. of 'D.D.,' fifteen years' study being necessary. At Bologna, the granting of degrees had in the 12th c. been monopolised by separate colleges of canon law, philosophy, and medicine doctors, which had each a prior, and held public examinations and conferred degrees in the cathedral. In all universities the various Faculties must have attained some degree of similar organisation. Originally at Bologna the terms *magister*, *judex*, and *doctor* merely signified, as at Paris, teacher. Later a formal admission or ceremony of *co-optation* was used, but as the unrestricted exercise of the right to admit was abused by the doctors, Pope Honorius III. decreed that all promotions to degrees should be under the superintendence of the archdeacon. The name given to the second or public examination was *conventus;* prior to which the candidate, having passed the *examen* by vote of the Faculty, was called a licentiate, having a right to lecture with the permission of the rector. Even unlicensed students might after a period of study get license of teaching, and by an exhaustive thesis or exposition gain the title of Bachelor. Bologna is remarkable for the fact that women have there received degrees and lectured in several subjects. The graduates had to bear the expense of the magnificent procession which preceded graduation. The *legentes* of Bologna, or those who actually lectured, correspond to the regents of other universities. In modern times, the examination generally proceeds by public examiners together with representatives of the universities. Such degrees as the Oxford B.A., M.B., and B.C.L., are obtained by fees, residence, and examinations; others, as the Oxford M.A., M.D., and D.C.L., by fees and 'name on books.' Generally, at Oxford, a certificate is required from two of the schools of *literæ humaniores*, natural science, mathematics, law, natural history, &c.; *literæ humaniores* being one. In *Arts*, twelve terms' residence is required for D. of B.A., and when this is obtained the Bachelor may proceed to take his M.A. without further residence or examination in the 27th term since that of his matriculation, provided his name has been on the books of an University College or Hall for 26 terms. In *Music*, neither residence nor academical standing is required, and a Bachelor of Music may proceed to the Doctor's degree, provided he be able to produce a properly authenticated certificate that he has been studying or practising music during five years since he became a Bachelor. In *Medicine*, a B.A. may become a Bachelor of Medicine so soon as he passes the examination. A Bachelor of Medicine may take his degree of Doctor in the 39th term from his matriculation, provided his name has been on the books, &c., for 26 terms. In *Surgery*, a Bachelor of Medicine is *ipso facto* admitted also to the degree of Bachelor of Surgery, and he may become a Master of Surgery in his 27th term since his matriculation, provided his name has been on the books. In *Civil Law*, a B.A. may become Bachelor of Civil Law on passing the examination in his 27th term from matriculation, provided his name has been on the books, &c., for 26 terms. A B.C.L. may become a D.C.L. at the end of five years since he became Bachelor. In *Divinity*, a M.A. may be admitted to the degree of Bachelor at the end of three years from his admission to regency, and a B.D. may become D.D. four years after he has taken his Bachelor's degree. In Arts the examinations are responsions, 1st public exam. before Moderators, and 2nd public exam. before the Public Examiners; in divinity, two dissertations to be read before the Regius Professor; in medicine, 1st exam. in Organic Chemistry, Human Anatomy, Human Physiology, and Materia Medica and Pharmacy. 2nd exam. in Medicine, Surgery, Midwifery, Pathology, Forensic Medicine, and Public Health. In the latter certificates of instruction in Infectious Diseases and Mental Diseases, and attendance on Labours and proficiency in practice of Vaccination are required. In music two examinations are followed by a composition. At Cambridge there are a few points of nominal difference. The first examination is called the 'Little Go,' and the honours examinations are called the mathematical, classical, moral science, &c., triposes respectively. Every D. must be signed by the Master of the College to which the candidate belongs, and before the D. is conferred by the Vice-Chancellor a grace or *supplicat* must have been obtained from the Senate. The boards of theological, legal, and medical studies control the examinations for degrees in these subjects respectively. The distinctive feature of the University of London is that it examines and confers graduation on persons who have received instruction in such institutions at home and in the colonies as have satisfied a Secretary of State with regard to their *curriculum*. This university also has and exercises a power of examining for degrees persons who have not been at any institution. At Durham degrees are conferred by the Warden and Convocation. In Scotland the *curricula* for degrees were affected at the time of the Reformation by the principles on the subject laid down in the *First Book of Discipline*, and as regards Glasgow in the *Nova Erectio*, or charter granted by James VI. Their constitution was beneficially changed by the Universities Scotland Act, 1858. At Dublin University the undergraduates are classified into junior and senior Freshmen and junior and senior Sophisters; and after taking the first D. the graduate becomes successively a junior, middle, and senior Bachelor. By payment of money, an ordinary student or pensioner may become a Fellow-commoner and associate with Fellows. The *sizars* are bursars who by examination have earned a right to enjoy their commons free.

Degree of Kindred. By the law of England, a man may not marry his mother or step-mother, his sister, his son's or daughter's daughter, his father's daughter by his step-mother, his aunt, his uncle's wife, his son's wife, his brother's wife, his wife's daughter or sister, his wife's son's daughter, his wife's daughter's daughter. Marriages within the prohibited degrees are not merely voidable, but they are absolutely void if solemnised after passing of the statute 5 and 6 Will. IV. c. 35, and the children of the connection are illegitimate. (See MARRIAGE.) The prohibition applies to relationship by Affinity (q.v.); see also AGNATE, CONSANGUINITY. A judge within a certain degree of relationship to a party to a lawsuit is disqualified from acting. See, in Scotch law, DECLINATURE. For effect of D. of K. in bankruptcy, see CONJUNCT AND CONFIDENT; in marriage, see DIVORCE.

Degrees of Lambeth. Under a statute of Henry VIII. (25 Hen. VIII. c. 21) the Archbishop of Canterbury is authorised to confer all degrees which can be given by the Universities of Oxford and Cambridge; but a degree of Lambeth does not bestow the privilege of a university degree. In former times the Pope had the power so transferred to the archbishop.

De'i Gra'tia is a pious formula which has been much in favour among the dignitaries of church and state, as indicating that they hold their office or position by 'the grace of God;' from which it will of course follow that man has no right to deprive them of it. This tenure of office is still by courtesy held to be that of our own sovereigns; but 'the divine right of kings to govern wrong,' which received a rude shock at the execution of Charles I., was in England conclusively abolished at the Revolution of 1688. See DIVINE RIGHT.

De'ism (from Lat. *Deus*, 'God') ought to mean the same thing as Theism (Gr. *theos*, 'god'), viz., a belief in God, whatever the character of the God believed in may be, and on whatever kind of evidence the belief may be based. Both words, however, have acquired special significations. Theism now means the philosophical and religious affirmation of God on grounds of natural reason: in general (as in the case of Theodore Parker and Martineau, who may be called absolute theists), on the ground of *à priori* evidence, contained in the religious and intellectual intuitions of human nature, but sometimes, as in the case of so-called Christian theists, on the ground of the design and beneficence exhibited in nature, confirmed and enlarged by the revelation of Christ. D., on the other hand, although sometimes loosely used to express dislike or alarm, or to excite these feelings against one's opponent, has a definite historical meaning. It means the principles of the English freethinkers of the 17th and 18th centuries, who argued for natural, as against revealed, religion, and to whom Locke, Addison, Bentley, Berkeley, Campbell, Chandler, Clarke, Conybeare, Derham, Ditton, Foster, Gerard, Hoadley, Jenyns, Jortin, Lardner, Leland, Parker, Ray, West, and above all, Bishop Butler, replied. Toland, the disciple and translator of Giordano Bruno, the author of *Christianity not Mysterious* (1696), of *Amyntor*, *Nazarenus*, and the *Origin of the Jewish Nation*, &c., was perhaps the most learned and acute of the theological deists. He was expelled from the English Church. Anthony Collins, more a philanthropist than a theologian; Thomas Woolston, who was tried for blasphemy, and died in prison for resolving the Christian miracles into allegories; Matthew Tindal, the author of *Christianity as Old as the Creation*; Chubb and Morgan, the authors of various tracts which once enjoyed a great popularity—are also among the deists. Lords Bolingbroke and Shaftesbury, and in the earlier part of the 17th c. Lord Herbert of Cherbury, contributed less directly to the same school of thought. The two positions of D. are these—(1) an intellectual scepticism as regards the Christian miracles, and generally as to the value of miraculous evidence; (2) a vehement desire for *intelligible* religious truth, such as involves nothing contrary to human reason and morality. Butler's famous reply, which has always since been regarded as the mainstay of English orthodoxy, consists in admitting the objections made against revelation (which, like his follower Mansel, he holds to be essentially mysterious), and in pointing out that similar objections may be urged against natural theology, which has no miraculous evidence to support it. A generous estimate of the Deists, from the Christian point of view, will be found in Herder's *Adrastea*.

Dekk'er, Thomas, an Elizabethan dramatist, born about 1570, died probably about 1637. He was satirised by Ben Jonson in the *Poetaster*, and retorted happily in his *Satiromastix*. His plays—of which the best is *Old Fortunatus*—contains passages of exquisite pathos and of almost infantile simplicity and beauty. He wrote in conjunction with Webster, Ford, and Middleton, and was active as a pamphleteer. Hazlitt said he could not show his admiration for D. sufficiently, and Lamb pronounced his character of *Orleans* to be almost as poetical as *Romeo*. See Hazlitt's *Elizabethan Literature*, and Ward's *English Dramatic Literature*.

Del, a species of tree allied to the Bread-Fruit (q.v.), a native of Ceylon, and the wood of which is employed in shipbuilding, &c.

De la Beche, Sir Henry Thomas. See BECHE.

Delabec'lea, a genus of north-eastern Australian trees belonging to the natural order *Sterculaceæ*. *D. rupestris* is the bottle-tree, so called on account of the middle of the trunk being bulged out like a bottle. It yields a mucilaginous gum like gum-tragacanth, which is nutritious, and used by the aborigines in times of scarcity. The wood is remarkably loose in texture.

Delacroix', Ferdinand Victor Eugène, the son of the Secretary to the Council of Ancients, was born at Charenton-Saint-Maurice, near Paris, 26th April, 1799. After becoming known as an art critic, he began his career as a painter by producing, in 1822, 'Dante and Virgil in Hell,' the subject of which is the description in the third canto of Dante's *Inferno* of the poet's crossing Acheron in Charon's boat. This was followed by the 'Massacre of Scio,' which commemorates Turkish cruelty in the Greek insurrection of 1822; 'Sardanapalus Dying in the Midst of the Slaughter of his Wives'; 'Liberty guiding the People on the Barricades of 1830'; and, among others, two pictures on subjects taken from Scott's novel of *Quentin Durward*. A Government mission to Marocco supplied D. with the materials for his greatest colour-picture, 'The Women of Algiers' (1838). Later came 'Medea Fleeing from Jason after the Murder of Creusa'; 'Cleopatra Preparing for Death'; 'A Shipwreck,' in which the crew are drawing lots for death. These are merely the leading subjects among a number and variety probably unsurpassed by any other single artist. D.'s great allegorical pictures of 'Justice,' 'War,' 'Agriculture,' and 'Industry' are well known. Besides many decorations of public buildings, he produced lithographic illustrations of 'Hamlet,' 'Macbeth,' and Göthe's 'Faust.' He died 13th August, 1863. It is for his vehement expression and brilliant contrast of tints that D. is admired; his drawing is loose. He is considered the head of the French Romantic school of the 19th c., and he has himself described his position as opposed to that of the classical Louis David (*Revue des Deux Mondes*, July, 1854). See T. Gautier's *Histoire du Romanticisme*, and C. Baudelaire's *L'Art Romantique*.

Delago'a Bay, an almost landlocked inlet on the S.E. coast of Africa, between C. Colatto and Komati river, much frequented on account of its safe and ample anchorage, and is under Portuguese government, forming, as it does, the S. and W. extremities of the Portuguese province of Lourenço Marques. It receives the Pongola and Assagai (combined, Maputa), Komati, and Crocodile or Limpopo (into which Olifants flows), and other rivers, and its shores are low, swampy, and malarious in summer. The discovery of gold in the Transvaal greatly increased its trade. A railroad has been constructed from D. B., running inland 57 miles towards Pretoria, the remaining 290 being in the hands of the Netherlands Company, and of this distance 116 miles are now open. Caoutchouc, ivory, oil-seeds, and nuts are the chief commodities exported from D. B. at present. The acquisition of the port by the British has been strongly advocated by the progressive party in Natal, but the proposal has not been entertained by the Home Government.

Delam'bre, Jean Baptiste Joseph, a French astronomer and mathematician, was born at Amiens 19th September, 1749. His first work in astronomy was the construction of tables for Uranus, then recently discovered by Sir W. Herschel. His *Tables du Soleil, de Jupiter, de Saturne, d'Uranus, et des Satellites de Jupiter* (1792), secured his election as a member of the Académie des Sciences; and soon after, with Méchain, he undertook the measurement of the arc of the meridian from Dunkirk to Barcelona, the results of which appeared in his *Base du Système Métrique Décimal* (1806-10). In 1807 he succeeded his friend Lalande in the Collége de France, and in 1814 published his *Traité d'Astronomie*. He subsequently wrote several histories of his favourite science during the ancient, mediæval, and modern periods, a task for which his fine scholarship eminently qualified him. D. died at Paris 19th August, 1822.

Delane' or **Delaine, John Thaddeus,** son of W. F. A. D., for many years financial manager of the *Times*, was born in London in 1817. After graduating at Oxford, D. entered the editorial department of that journal, succeeding the late T. Barnes as editor in 1841. It was largely due to his energy, tact, and knowledge of men and of society, that the *Times* became the most powerful newspaper in the world. He retired in 1877; died 22nd November, 1879. D. was called to the bar in 1847, but never practised.

Delaroche', Paul, a brilliant French painter, born at Paris in 1797, was the son of a valuator of art products at the Mont-de-Piété. A pupil of Baron Gros, he struck out for himself a middle path between the romantic and classical schools. Hence he has been called the modern Eclectic, and the Casimir Delavigne of painting. His style is marked by elevation and simplicity of conception, picturesque colouring without exaggeration, and scrupulous care in details. Among his earliest pictures (1824) may be mentioned 'St. Vincent de Paul preaching on Behalf of Deserted Children before the Court of Louis XIII.,' and 'The Examination of Jeanne d'Arc.' Later came 'Cromwell Looking at the Corpse of Charles I.,' 'The Execution of Lady Jane Grey,' and the 'Death of the Duke of Guise.' D. spent four years in his decorative painting of the saloon of the Palais des Beaux Arts; it contains more than eighty figures of great artists of all ages, in appropriate costume. Nearly all his subjects are historical: one of his latest (1851) being that of 'Marie Antoinette before the Revolutionary Tribunal,' when she made her famous appeal to the mothers of France. D., who was for many years Professor at the Fine Arts School, died 4th November, 1856. See De Loménie's *Gallerie des Contemporains Illustres*, vii.

Delavigne', Jean François Casimir, a famous French lyrist and dramatist, born at Havre, 4th April, 1793, was the son of a merchant in humble circumstances. Through the kindness of the Comte de Nantes, who gave him a sinecure in a public office, D. was able to cultivate his poetical taste. His pieces, *Waterloo* and the *Devastation du Musée*, better known as the *Messéniennes*, protests against the concessions granted to the Allies by the government of Louis XVIII., made him, after Béranger, the most popular poet in France. Four dramas, *Les Vêpres Siciliennes*, *Les Comédiens*, *Le Paria*—suggested by Demaistre's *Lepreux d'Aoste*—and *L'École des Viellards* (played by Talma and Mademoiselle Mars), procured his admission to the Academy in 1825. The insurrectionary movements in Greece and Italy afforded him subjects for a second set of *Messéniennes;* the Revolution of 1830 inspired his splendid march-song, 'En avant! marchons contre leurs canons, à travers le fer, le feu des bataillons. Courons à la victoire!' The Polish insurrection produced *La Varsovienne* and the *Dies Iræ* of Kosciusko. His severe labour in producing his dramas of *Louis XI.* (1832), *Don Juan d'Autriche* (1835), and *La Fille du Cid* (1839), ruined his health. He died 10th December, 1843. Like Béranger, D. was a thoroughly conscientious man of letters, and more than once refused the tempting offers of Charles X. His chief friend was the comic dramatist, Scribe. There are numerous editions of D.'s works; that of 1845 contains a biography by his elder brother, Germain, himself a prolific writer of *vaudeville* and *opéra-comique*.

Del'aware, one of the smallest of the original thirteen states of the Union, forms part of the peninsula between the Chesapeake and the D., and has an area of 1960 sq. miles, and a pop. of 168,493, of whom 28,386 are described as persons of African descent; 37, as Chinese; and 4, as civilised Indians. The D. river and bay bound it on the E. Much of the soil is poor and sandy. Bog-iron ore and shell marl are found, and porcelain clay abounds. The total annual value of the mineral products of D. is estimated at $500,000. D. has a large school-fund and one college—13 teachers and professors, and 90 students. It sends one member to the House of Representatives, and two to the Senate. Before the war D. was a slave state. Dover (pop. 3061) is the capital, Newcastle (pop. 4010) the seaport, and Wilmington (pop. 61,431) the largest town. D. derives its name from Lord De la Warr, who entered the bay in 1610. In 1627 it was colonised by Swedes and Finns, whose descendants still survive. The Dutch seized it in 1655, but gave place to the English in 1664. It formed part of Penn's colony of Pennsylvania. There are over 590 manufacturing establishments in Wilmington, and in these over $20,500,000 are invested, and over $24,500,000 worth of products are manufactured annually. The principal manufactures are cars and steam railroad stock, foundry and machine-shop products, iron and steel, morocco leather, and shipbuilding generally.

GREAT SEAL OF THE STATE OF DELAWARE
LIBERTY AND INDEPENDENCE

Seal of Delaware.

Delaware River (Ind. *Makeriskiton*) rises on the W. of the Catskills in New York, and flows in a very sinuous course southward for 300 miles till it enters D. Bay. It separates New York and Pennsylvania, and further on bounds New Jersey on the E., and Pennsylvania and Delaware on the W. The upper part, between New York and Pennsylvania, presents varied and striking scenery; and southward, as the river pierces the mountains at the Water Gap, the views are unique and grand. The largest ships can ascend to Philadelphia, and steamboats to Trenton, the head of tide water.—*Delaware Bay*, into which the river enters, is 65 miles by 30, and forms a highway for vessels of every size. There is a large breakwater near the entrance, at Cape Henlopen, to protect shipping.

Deleb'. Palm, a palm found in great abundance near Lake Tchad, and other portions of the interior and W. of Africa, believed to be a species of *Borassus*, allied to the Palmyra Palm (q.v.). The fruit is prized by the natives, who also extensively use as an article of food the tender roots produced by the young plant.

Delec'tus Perso'næ (Lat. 'choice of person'). When certain legal relationships are entered into, it is understood by law that one of the parties has some special qualification in the opinion of the other; and, therefore, that he who has the special qualification is not entitled to put another in his place. D. P., in Scotch law, denotes this legal doctrine. Thus, under a contract of Society (q.v.), or Partnership (q.v.), the admission of a new partner by succession or alienation is barred by D. P., unless the contract stipulates that partners are to be succeeded by their heirs, or empowers partners to assign their shares. In Scotland, a tenant under an agricultural lease, unless its term be longer than that of ordinary human life, is barred by D. P. from subletting. In leases, however short, of urban subjects there is no D.P., consequently these may be sublet, unless there is a stipulation to the contrary. See LEASE.

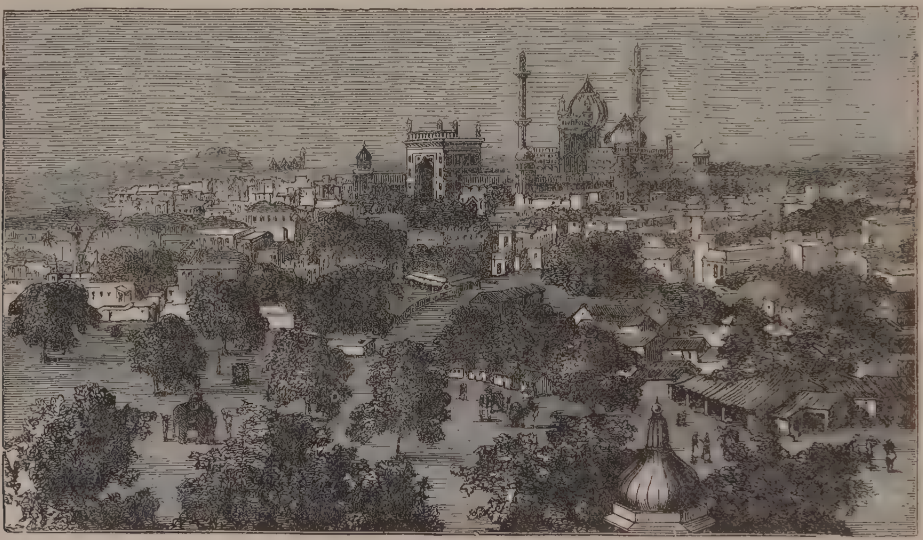
Delega'ted Jurisdic'tion, as contradistinguished from *proper* jurisdiction, is that which is communicated by one judge to another. Jurisdiction cannot be delegated without express power given in the grant. See DEPUTY.

Del'egates, Court of. In England, the supreme court of appeal in ecclesiastical and maritime causes was formerly constituted by a statute of Henry VIII., forbidding appeal in ecclesiastical causes to the court of Rome. The C. of D. was abolished by statute in the reign of William IV., and its functions transferred to the Judicial Committee of the Privy Council. See PRIVY COUNCIL, JUDICIAL COMMITTEE OF.

Delf (Old Eng. 'a delving'), is used in heraldry to describe a block of turf or coal. A *D. tenné* is said to be the proper abatement for one who has revoked a challenge, or departed from his word. See ABATEMENT, TENNÉ.

Delft ('a canal', from Dutch, *delven*, 'to dig'), a very ancient town of S. Holland, on the Schie, 10 miles N.W. of Rotterdam by rail, intersected in every direction by canals crossed by 69 bridges, generally of stone. It was formerly famous for its potteries, whence D.-ware is still a name for certain kinds of earthenware. Tobacco-pipes are largely manufactured. The most interesting edifices in D. are its churches. The Old Church, of the 11th c., contains the monuments of Admirals Tromp and Hein, and of Leeuwenhoek the naturalist; the New, of Prince William I. of Orange (who was assassinated at D. in 1584), and of Grotius. D. is the seat of the state arsenal, and has a new and important polytechnic school. Pop. 30,079.

Its harbour is *Delfshaven*, a town on the right bank of the Maas, 2 miles W. of Rotterdam, defended from inundations by strong dykes and flood-gates. D. has distilleries, breweries, sawmills, shipbuilding yards, and iron-foundries, and considerable shipping. Pop. 12,049.



Delhi.

Del'hi (Moham. *Sháhjahánábád*), formerly the largest and finest city of India, and the residence of the Great Moguls, now the capital of a division and district of the same name, province of the Punjab, British India, is situated near the W. bank of the Jumna, 934 miles N.W. of Calcutta, and 390 miles from Allahabad on the East Indian Railway. It is 5½ miles in circumference, and is surrounded by a grey granite wall 30 feet high, strengthened in 1803, and again in 1838, and which is pierced by ten gates opening on the river, and on the land side. The streets are narrow and crooked, with the exception of two, which are respectively 90 and 120 feet broad, and each about a mile long. These run from the palace, the one to the Agra gate, the other to the Lahore gate, and are both supplied with water in stone channels of red granite raised above their level; but are disfigured, like the other streets, by the occurrence of small blocks of houses planted irregularly in their centre. D. is divided into a Hindu, Mohammedan, and European quarter. The Mogul's palace, now called 'the fort,' a miniature town in itself, on the water side, surrounded by a wall of more than a mile in circumference, is one of the most beautiful monuments of Indo-Moslem architecture. This building contains the white marble Mosque of Aurungzebe, splendidly ornamented with sculpture, has an open audience-hall, also of white marble, rich in mosaic and relievos, and is embowered among beautiful gardens, in which are many fine baths and fountains. The chief building within the city is the Mosque of Shah Jehan (1631-37), famed throughout the East as the most beautiful in India. It stands on a rocky elevation of some 30 feet, and is built of marble and red sandstone. The Hindu temples are comparatively mean and diminutive. Near D. is the pyramid Kutab Minar, 280 feet high. In the European quarter there are the official palace, a Protestant church, the college, the arsenal, and barracks. The College of D., once a celebrated oriental school, founded in 1792, and affiliated to the University of Calcutta, has been abolished, Government having withdrawn its grant, which raised its revenue to £4058 yearly, in order to concentrate its assistance upon the central institution at Lahore. The chief manufactures of D. are cotton cloths, exquisite embroidery, rare gold and silver wares, and delicately-carved ivory. It receives British manufactured goods, large quantities of fruits, indigo, chemicals, salt, horn, hides, and Cashmere and Cabul shawls for embroidering. In recent years several printing-presses have been established at D., which are producing many valuable old works, especially in Persian and Arabic. The modern D. was founded by Shah Jehan in 1631. Beyond its walls are the desolate ruins of the ancient city of the Patan kings. Pop. (with cantonment) 192,579, of whom 108,058 are Hindus; 79,238 Mohammedans; 3256 Jains; 1700 Christians; 31 Parsees; 289 Sikhs; and 6 are Jews. D. is said to have been founded by a certain rajah, Dilu by name, from whom it received its name. In the *Mahabharata* it is called Indraprastha, the residence of the mythical Pandus, or Children of the Sun. D. was long occupied by native Indian kings. In 1011 it was stormed and sacked by Mahmud of Ghuzni, and in 1193 the Ghuridish Sultan Mohammed, founder of the first Afghan dynasty, made it the capital of an empire extending to Bengal. Timur took D. in 1398, but on his death followed a long period of bloodshed and anarchy. In 1450 the Lodi dynasty, of Patan or Afghan origin, conquered the empire, but were displaced in 1526 by Babar, a descendant of Timur, and the first Great Mogul. D. rose to its greatest prosperity in the times of Akbar and Aurungzebe. It was taken and plundered by Nadir Shah (1738), who is said to have taken away booty valued at £9,000,000; after which it never recovered its splendour. The British under Lord Lake captured the city, and relieved the Emperor from the tyranny of the Rohillas and Mahrattas, 14th March, 1803. During the Mutiny it was seized by the Sepoys, 10th May, 1857, and after a siege of seven days, was retaken on the 21st of September.—The *district* of D., which lies between the Ganges and the deserts of Multan, is only in parts well irrigated and fertile, and has an area of 1290 sq. miles and a pop. of 638,689, among whom are 479,057 Hindus; 382 Sikhs; 7613 Jains; 149,741 Mohammedans; 1858 Christians; 31 Parsees; and 6 Jews. Much of the soil, except near the Jumna and Jumna Canal, is hard and unfertile. Cotton, sugar-cane, rice, Indian corn, tobacco, barley, indigo, and oil-seeds are the principal products. The land revenue is over £620,000 from the whole of the D. division. Commerce and manufacture are centralised in the city of D.

Delict′ and **Delin′quency.** The law of Scotland, following that of Rome, divides delinquencies, as grounds of civil claim for reparation, into *delicts* and *quasi delicts*, the former being offences committed with criminal purpose, the latter being offences arising from gross negligence. Offences belonging to the latter class do not, like the former, always afford ground for criminal prosecution, as well as for action for Damages (q.v.), but they very often do. See CRIME, CULPA, DOLE.

Deli′lah (Heb. 'the languishing'), a personage mentioned in Judges xvi., and famous in connection with Samson (q.v.).

Delille′, Jacques, a French poet and professor, was born at Aigues-Perse, in Auvergne, 22nd June, 1738. He was educated at the Collége de Lisieux, Paris, and finally became Professor of Belles Lettres in the university of that city, was presented by the Comte d'Artois with the revenues of the abbey of Saint-Severin (30,000 livres a year), went to Constantinople in 1784 in the suite of the Comte de Choiseul-Gouffier, became Professor of Belles Lettres in the university of Paris on his return, lost his fortune and nearly his life at the Revolution, and quitted France for Switzerland after the Reign of Terror, but returned in 1801, and resumed the duties of his chair. He died 1st May, 1813. D.'s finest work is his charming translation of Virgil's *Georgics* (1769). Besides this he produced many elegant, harmonious, and felicitous poems of a didactic and descriptive character, of which the finest are *Les Jardins* (1774), *L'Homme des Champs* (1800), and *La Conversation* (1812). A complete edition of D.'s works was published in 1824 (later ed. 1844).

Delir′ium (Lat. from *delirare*, 'to wander in mind,' *de* and *lirare*, 'to go out of the straight line in ploughing'; 'to err, wander, go wrong'), a state of mind in which the ideas are wild, irregular, and unconnected, or do not correspond with the truth or with visible external objects. D. may be caused by whatever tends to disturb the healthy functions of the brain, and is a frequent symptom of a great variety of diseases and injuries. It varies in intensity from mild incoherence to the most exalted forms of frenzy. Injuries of the cranium, morbid growth within its cavity, diseases of the brain-tissue and its vessels, and serous effusion may result in D. It is also caused by the action of poisonous ingredients in the circulation, and is a common symptom of fevers and several acute diseases. Violent mental excitement, either of a depressing or elevating nature, may give rise to an attack of acute mania. D. is also frequently caused, more especially in the case of females, by reflex action from the terminal distribution of the nerves. D. is not a disease *per se*; so that the treatment to be adopted is not uniform, but must depend upon the nature of the disease with which it is associated, and of which it is a symptom.

Delirium Tremens is a form of delirium accompanied with tremors or trembling, principally of the hands and arms. This condition may be a symptom of organic disease of the brain or nervous system, of apoplexy and sun-stroke. It is occasionally caused by excessive and prolonged mental excitement from overwork of the brain in connection with literary pursuits, business, speculations, gambling, and such like; or it may be the result of certain acute diseases which act on the nerves or nerve-centres, as fevers, or of accidents and surgical operations followed by shock. In such cases it is sometimes called *delirium nervosum*. The term D. T. is generally applied to such cases as are caused by the excessive abuse of alcoholic stimulants, and the disease may be produced by a single but prolonged debauch, or by a long-continued course of dissipation. In the former case it depends on blood-poisoning from alcohol; and in the latter there is, in addition, saturation of the brain substance, and admixture of the serum of its ventricles with alcohol. Alcohol is absorbed directly by the blood-vessels, without change or decomposition, and passes rapidly into the circulation, acting as a direct poison upon the nervous tissues through which the infected blood circulates. It is cumulative in its action, and has been detected, by analyses, in the blood, bile, the fluid of serous membranes, the brain substance, the liver, &c. The long-continued presence of alcohol in the brain results in organic disease of that organ; and D. T. depends on the effect produced on the nervous centre, the pathological changes being, in some instances, softening; in others, induration of the cerebral or cerebellar substance with increase of the sub-arachnoid serum. There is also steatomatone degeneration of the small arteries of the brain, causing atrophy of its convolutions and also œdema. The nerve substance of the brain becomes poisonously affected, resulting in a permanent loss of cerebral power. The disease is sometimes called *delirium è potu*, or *delirium ebriositatis*.

The symptoms of D. T. are both mental and physical, and the following, which are the more prominent, are invariably present. There is great agitation and loss of control of the mental functions, and of certain muscles of the body. In addition to delirium, more or less vivid, there is a morbid anticipation of impending danger, with hallucination and spectral illusions, rendering the patient dangerous to himself, as he may endeavour to leap from a window to escape from imaginary foes in pursuit of him. In the early stages the patient is usually coherent when the attention is fixed, but incoherent when left to his own thoughts. In the later stages there is incessant muttering delirium. The prominent physical symptoms are, loss of control over certain of the voluntary muscles; the tongue, when protruded, is tremulous; there are convulsive movements of the extremities; the hands and arms tremble, and shake, so that it is impossible to hold a pen or convey a cup of liquid to the mouth; there is also, frequently, *subsultus tendinum*, and complete deprivation of voluntary motion. There is, generally, sleeplessness; but when sleep is procured it is accompanied with frightful dreams, and, when the patient is awake, the ocular spectra have the most horrible and repulsive forms.

The treatment proper for such cases consists in the stoppage of the stimulant which has been the cause of the malady, the judicious administration of opiates to calm the nervous system and procure sleep, nourishing articles of diet, and the gradual elimination of the poison. One attack leaves the brain permanently weakened, and predisposes to a second; and repeated attacks result in a state of fatuity or death. The only safety, therefore, consists in total abstinence from alcoholic stimulants.

Delitzsch', an old town of Prussian Saxony, on the right bank of the Löbber, 15 miles N. of Leipzig, with which it is connected by railway. It has manufactures of woollen cloth, hosiery, and tobacco, and several important annual fairs. Pop. 58,090.

Delivery of a Deed. While a deed or writing remains in the custody of the grantor or of his agent, never having been delivered, it is not binding. To make it so, it must have been delivered either to the grantee, or to a third party, although then it may be only upon some condition being performed; when put into the hands of a third party, the legal presumption seems to be that it has been delivered to him unconditionally for behoof of the grantee, but this presumption may be overcome.

Dell'a Cruscan School, a name adopted by certain English residents at Florence, who began about 1785 to publish affected, frigid, and silly verses in two English daily newspapers. Their effusions produced a host of imitators, equally fluent and equally intolerable, and the journals were flooded by verses in the style of Pope's *Song by a Person of Quality*. This literary nuisance was at length abolished. Horace Smith ridiculed it in the *Rejected Addresses;* and Gifford, in his *Baviad* (1794) and *Mæviad* (1796), extinguished the pestilent versifiers as completely as the follies of the Hôtel de Rambouillet were extinguished by Molière.

Dell'ys, a seaport in the arrondissement of Tizzi-Ouzou, Algeria, 49 miles E. of Algiers, identified by Bartle with the *Rusucurrium* of Pliny. The climate is healthy, and the vine and olive flourish. D. has trade in grain, oil, and salt, and is the chief mart of the Kabyles. Pop. 13,104.

Delolme', Jean Louis, was born in 1740 at Geneva. He became an advocate, but had to flee to England on account of the political opinions expressed in his *Examen de Trois Parts des Droits*. D. published his *Constitution de l'Angleterre, ou État du Gouvernement Anglais comparé avec la forme Républicaine et avec les autres Monarchies de l'Europe*, at Amsterdam, in 1771, and his English translation in 1772. After suffering great poverty he returned about 1775 to Switzerland, where he died, 16th July, 1806. Besides the *Constitution de l'Angleterre*, a sensible though superficial book, once popular, but no longer considered an authority, D. wrote a *History of the Flagellants* (1782), *An Introduction to Defoe's History of the Union*, and *Observations on the Window-Tax*.

Delorme', Marian, a noted character in French history, was born about 1612 near Châlons-sur-Marne. Going to Paris, and making no attempt to live virtuously, she won numerous lovers by her beauty, while her fondness for intrigue led her to take an active interest in the politics of the time. She espoused the side of the *Frondeurs*, and incurred the hostility of Mazarin, who was even on the point of throwing her into prison, when she died, at the age of thirty-nine. Long after this event, a curious report got afloat, and was widely believed, that she had escaped to London, returned to Paris, and after marrying three husbands, lived to the age of 129. D. is the subject of one of Victor Hugo's most powerful dramas.

De'los, called also Ortygia, Cynthus, &c., the central isle, and the smallest, of the Cyclades in the Ægean Sea. According to the common Greek myth, D. appeared on the deep at the stroke of the trident of Poseidon (hence its name), and was fixed by Zeus to afford a resting-place for Latona, as she fled from the wrath of Herè on the eve of the birth of Apollo and Diana. The island was originally inhabited by Ionians; was the seat of an Amphictyonic Council, and the centre of the worship of Apollo, whose festival was celebrated here with unusual splendour. Its sacred character was respected by the Persians, and in 477 B.C. it was chosen as the seat of the treasury of the confederacy against Persia. It was purified by the Athenians B.C. 426, when all tombs and human remains were removed from it, and it was declared pollution for a dog to enter, or for a human being to be born or to die on the island. Four years after, deeming the purification incomplete, the Athenians banished all the inhabitants also. The bronze and bronze vessels of D. were famous. After the destruction of Corinth by Mummius, B.C. 146, D. became a great commercial centre, and it continued to flourish till the Mithridatic war, when it was pillaged and crippled beyond recovery. Numerous fragments of marble structures lie scattered over the island; the remains of the temple and colossal statue of Apollo may still be traced, but the architectural glories of D. were carried off centuries ago to adorn Venice and Constantinople.

Del'phi, a town of Phocis, situated in the vale of the Pleistus, and enclosed behind by a rocky barrier, through a cleft in which issues the Castalian spring, was famous as the seat of the oracle of Apollo. The original name of this oracle was Pytho, and the sanctuary was at first superintended by the town of Crissa. On its decline, D., whose population had come from the Dorian town Lycoreia, became an independent state, and through the oracle rose rapidly in influence and wealth. Its affairs were administered by the noble families of the town; and whenever the oracle was to be consulted, the Pythia took her seat upon a tripod, placed above an opening in the ground, in the centre of the temple of Apollo, through which arose an intoxicating smoke. This smoke so affected the Pythia's brain that she became delirious, and in that state gave utterance to sounds that were believed to express the reply of the god to those who had come to consult the oracle. The answers still extant are generally in hexameter verse and in the Ionic dialect. The Pythia was a native of D., in early times a maiden, but subsequently always above fifty years, and generally taken from

Site of Delphi.

some family of poor country people. Innumerable benefactors loaded the shrines with gifts, and even in the 8th c. B.C. the fame of the oracle was widespread. The first celebration of the Pythian Games took place in 586 B.C. In 548 B.C. the temple was destroyed by fire, and was rebuilt at a cost of £115,000 sterling. In succeeding centuries it was frequently plundered—as, for example, by the Phocians at the time of the Sacred War, by Sulla, and by Nero. The oracle was closed in the general extirpation of pagan rites by Theodosius. The site of the ancient town is now occupied by Castri, a wretched village.

Delphinap'tera, a genus of *Cetaceæ* or Whales, belonging to the Dolphin family (*Delphinidæ*), and represented by such forms as the 'right whale porpoise' of the S. Seas, by the *D. Commersonnii*, by *D. Borealis* of the N. Pacific, and by other species. The species of this genus have no dorsal fin, and have the jaws prolonged to form a rostrum or beak, flattened from side to side. The first-mentioned species averages five feet in length. Numerous teeth exist.

Delphin Classics, an edition of the Greek and Roman classics, chiefly edited by Huet, tutor to the Dauphin, son of Louis XIV., for the use of his pupil—'in usum Serenissimi Delphini.' Thirty-nine eminent scholars aided in the preparation of the work, which is now, however, of little value. Valpy's *Variorum Latin Classics* (in 141 vols. Lond. 1819-30) contain the Delphin notes and *Interpretatio*.

Del'ta, in geology, the name given to the roughly triangular space—resembling the Greek letter Δ (delta)—formed near the mouth or estuary of a river by the dividing of its main channel. The apex of the triangle points up the river, and marks the point at which the division takes place. A D. land is a great receptacle of the detritus or debris brought down by the river, and hence it frequently occupies hundreds of square miles covered with alluvial soil, and with vegetable and other matters. The D. is frequently extended seawards by increasing deposits of the river. Deltas occur most typically in lakes and tideless seas, such as the Mediterranean. D. formations are of the highest interest to the geologist, as explaining, in some aspects at least, the process of coal formation and other allied points.

Del'uge, The, as commonly understood, is the flood which drowned the whole human race but Noah and his family. The biblical narrative, literally interpreted, requires us to believe that this was a flood which covered the whole earth, and so it was always understood till the increasing light of science and criticism revealed the objections to such a belief.

The chief of these are the smallness of the ark, the present distribution of animals on the globe, the varieties of human language, the ash-cones of extinct volcanoes, which, older than the supposed time of the flood, could not have been touched by it, the quantity of water required, the necessary destruction of most marine animals, as well as all in the ark, owing to the change of climate, and of freshwater fish and plants by the water, &c.

For a time it was thought that all these difficulties were avoided by supposing merely a partial D. But this question has been entirely superseded by the Assyrian discoveries, which appear to show that the Hebrew record is only a national form of a widespread Semitic legend. The Babylonian version, indeed, points in the direction of a solar myth. It is on a tablet, which is one of twelve, containing myths corresponding to the months of the year and the signs of the zodiac, and all relating to the solar hero, Gisdubhar. The story of the flood is on the eleventh, corresponding to the month called in Accadian 'the rainy,' our January, over which Aquarius presided. See Smith's *Assyrian Explorations and Discoveries* (1875), and *Chaldæan Account of Genesis* (1876). See also article CUNEIFORM.

Delun'dung, a genus of Carnivorous mammalia inhabiting Java and Malacca, and belonging to the *Viveridæ* or Civet-cat family. It is allied to the genus *Viverra* itself, but differs from the civets in having a very slender body, long legs, and elongated 'whiskers.' It does not possess any scent-pouches. Its colour is greyish, with four broad saddle-shaped bands of brown crossing the back. The sides are variegated with brown, the legs are spotted, and the tail encircled with alternate brown and grey rings. The muzzle is pointed. The D. is by no means common, and its habits have not been thoroughly ascertained.

Delvi'no, a fortified town in the vilayet of Janina, Albania, European Turkey, the seat of a Greek bishop, with olive plantations in the vicinity, and a trade in oil and other local produce.

Demand' and Supply'. It is a question among political economists whether, as a rule, the demand for anything creates the supply, or whether the supply precedes the demand. We shall endeavour to answer the general question by considering the two following questions as illustrative:—1. Does the earth produce wheat because men want bread, or do men eat bread because the earth produces wheat? 2. Do men wish to travel fast because locomotives have been invented, or were locomotives invented because men wished to travel fast?

In the production of wheat there are two concurrent agencies—human hunger, and the natural power of the earth for producing wheat. If we must determine which is antecedent, we must certainly hold the earth to have had power either of producing wheat or other fruit capable of sustaining human life before human life came. Finding wheat good and nutritious, the natural supply is augmented by art and industry. In answer to the second question, it is plain that the demand—that is, for speedy passage from one place to another—is antecedent to the supply; locomotives not being the produce of the earth, but of human ingenuity. Human necessities and wants are the demand, supply is the result of this force acting on human ingenuity and on the physical capability of our planet; and if the capability to sustain life had not preceded it, then life could not have been. These forces act and react on one another.

Adam Smith has shown that it is the man who saves money, not the man who spends it, who adds to the wealth of his country. Plainly the more wealth a man produces, or is the means of producing, and the less he consumes, the richer does he become; and what is true of the individual is true of men collectively; but while demand is the force which, acting on capability, produces supply, consumption is, in most articles, a necessary concomitant of demand. Thus, were men to cease from *drinking* wine, but to continue buying it, there would be a continuous accumulation of the wine—that is, so much accumulation of wealth; but then, if they ceased to drink the wine, they would certainly cease to buy it, and production would stop and wealth diminish.

Dem'avend, Mount, an extinct volcano, on the borders of Irak-Ajemi and Mazanderan, Persia, 18,600 feet above the level of the sea. It is the loftiest peak of the Elburz chain, is conical in form, and the top is entirely composed of a soft rock from which sulphur is dug. At its base there are several hot springs. D. in Persian tradition occupies a place corresponding to that of Ætna in the myths of Greece.

Dem'bea, a mountainous district, in central Abyssinia, the lower lands of which border the Lake of Tana, extending along its shores from Dagossa to Begemeder. Several small rivers descend from the D. heights, and passing through the plains enter the lake, whence the Bahr el Azrek or Blue Nile flows to the S.E. On the northern slopes of the D. plateau are some of the streams which form the river Menna, a tributary of the Dika or Takazze.

Dembin'ski, Henry, a Polish general born near Cracow, 16th January, 1791, joined the Polish army in 1809, shared in the French invasion of Russia, and distinguished himself at the battle of Leipzig in 1813. After the fall of Napoleon he returned to Poland, was appointed commander of a brigade in the Polish revolution of 1830, and shone conspicuous at the battles of Leiv and Kuflew. After his repulse of the Russians on the Narar, and his able retreat through Lithuania, in 1831, he was made general of the Polish forces. When Warsaw surrendered, D. took refuge in France, visited Egypt in 1833 in the expectation of a war with Russia, in

1849 transferred his services to the Hungarians against Austria and Russia, and was made general of the Hungarian army by Kossuth. After the defeat of Kapolna and resignation of Kossuth, D. fled to Turkey, and returned to Paris in 1851, where he died, 13th June, 1864. See D.'s *Mémoires sur la Campagne de Lithuanie* (Strasb. 1832) and *D. in Ungern*, by A. H. Danzen (Lond. 1875).

Demera'ra, a river of British Guiana, with a northerly course of 200 miles, falls into the Atlantic at Georgetown, where it is nearly two miles broad. Its embouchure, though obstructed by a bar, furnishes a spacious harbour, and the river is navigable for ships of considerable burden for nearly 100 miles. For D. settlement, see GUIANA, BRITISH.

Demesne' (Old Fr. *demaine*, Lat. *dominium*, 'lordship'). Lands next to the lord's mansion, and which he kept for the support of his household, were in old times called the D. In our day it denotes the right of an owner of land in Fee Simple (q.v.). See also DOOMSDAY BOOK.

Deme'ter. See CERES.

Demet'rius, the name of three kings of Syria.—1. **D. Soter,** grandson of Antiochus the Great, spent his early years at Rome as a hostage, whence he fled, partly through the help of Polybius, when twenty-three years old, and established himself on the throne of Syria. He conciliated the senate and secured his recognition as king, but acted so despotically towards his neighbours, that the Jews under Judas Maccabæus took up arms and defeated his general. D. fell in battle (B.C. 150) against an impostor named Balas, whose claims were supported by the Romans, the Jews, and Attalus, King of Pergamus.—2. **D. Dicator,** son of the preceding, after remaining in exile for some years, recovered the kingdom from Balas, by the assistance of Ptolemy Philometer, but the infant son of Balas being set up as a pretender against him, D. lost Antioch and a great part of Syria, and withdrew to Babylon. His army was soon after destroyed by the Parthians, and himself taken prisoner (B.C. 138). After a captivity of ten years he was re-established on the throne, but his soldiers and subjects having become disaffected, he was assassinated at Tyre, B.C. 125.—3. **D. Eucærus,** grandson of the preceding, held with his brother for a time the whole of Syria. War, however, broke out between the brothers, and Philip, having blockaded D. in his camp, compelled him to surrender at discretion. He remained in honourable captivity with Mithridates, King of Parthia, until his death. His coins bear date from 218 to 224 of the era of Seleucidæ, *i.e.*, from 94 to 88 B.C.

Demetrius, or **Dmitri,** son of Ivan IV. ('the Terrible'), Czar of Russia. On his father's death, in 1584, D. was exiled by Boris Godunoff to Ouglitch, and there died. The authorities proclaimed that he had killed himself in an epileptic fit, but the people believed he was assassinated by Boris, who usurped the throne in 1598, on the death of Fedor, Ivan's other son. The unpopularity of the usurper at length prompted a succession of romantic deceptions. Four persons came forward, two of whom declared themselves to be the son, and two the grandson of Ivan.

The *first* pseudo-D. appeared in 1603. He was a servant of Prince Adam Wizniowiecki, and was aided by his master, by the Palatine of Sandomir, and by Sigismund III., King of Poland. Boris had grown unpopular; and though he declared this D. to be an apostate monk, called Grishka Otrepiev, had to yield in 1604. D. ruled wisely, but his marriage with Marina, daughter of the Palatine, and his Polish leanings, cost him the throne. He was slain at Moscow in 1606, in a riot stirred by Prince Vassilii Shuiski, who became Czar.

The *second* impostor appeared in 1607, declaring himself to be D., and that he had escaped from the Moscow riot. He is said to have been really a Jew, but was accepted by Marina as her husband, and found supporters. He was put to death in 1610. A like fate befel the *third* pseudo-D., who pretended to be the son of the first. The *fourth*, who did the same, was executed at Moscow in 1613. These false Demetriuses have formed a favourite theme for poets and novelists; a dramatic fragment by Schiller deals with one of them. See Prosper Mérimée's *Épisode de l'Histoire de Russie.*

Demetrius, Phalereus, so called from his birthplace at the demos of Phalerus, was 'the Admirable Crichton of his time, the last of Attic orators, statesman, poet, and warrior.' D. was born B.C. 345, educated at the school of Theophrastus, and, on the death of Phocion (B.C. 317), placed by Cassander over the administration of Athens, which he conducted for ten years with so much success that the Athenians erected no fewer than 360 statues in his honour. Success, however, rendered him reckless; and on the approach of Demetrius Poliorcetes to Athens, B.C. 307, D. was compelled to flee. He lived for many years at the court of Ptolemy Lagi at Alexandria, and it is believed that by his influence the foundation was laid of the famous Alexandrian Library. The successor of Lagi sent D. into exile in Upper Egypt, where he died about 283 B.C. His works, which are enumerated by Diogenes Laertius to the number of fifty, have all perished.

Demetrius Poliorcetes. See ANTIGONUS.

Dem'i, or **Dem'y** (Fr. 'a half'), in heraldry, the upper, front, or dexter half, as a *D.-lion-rampant.* D. usually, but not always, indicates the dexter half *per pale* in inanimate objects.

Demi-Bas'tion, in fortification, a half-bastion, consisting of one face and one front, and usually terminating the faces of a crown-work or horn-work.

Demi'doff, a celebrated family of Russian capitalists, founded by **Nikita D.,** born a serf in Peter the Great's time. He amassed enormous wealth, first by the manufacture of arms, and then by Siberian iron-foundries, which he first established in 1699. He was raised to the rank of a noble in 1720, and left two sons, one of whom, **Akinfij D.,** worked still more extensively the metals of the Ural range, and established the ironworks of Nijni-Tagilsk, still the greatest in Siberia. In recognition of his labours and riches he was made Counsellor of State. See Spasskij, *Shisneopisanie Akinfija D.* (Petersb. 1833).—**Procopij, D.** (died 1786), son of the preceding, founded the School of Commerce at Moscow, which was removed to St. Petersburg in 1800.—**Paul Grigorjevich D.** (died 1821), nephew of Akinfij, was the founder of the D. Museum at Jaroslavl.—**Nikolaj Nikititch D.** (born 1774), nephew of the preceding, was both soldier and author. He raised a regiment against the French in 1812, and did good service. He died in 1828, and two years later his works were published at Paris under the title, *Opuscules d'Économie Politique et Privée.*—**Anatoli D.,** son of Paul, was distinguished as a literary man, a savan, and a philanthropist. Both Russia and other countries, especially Italy, in which he long resided, owe to him many useful educational and charitable institutions. A translation of his *Travels* was published at London in 1853. D. married Princess Mathilde, daughter of Jerome Bonaparte, in 1840, but their union was dissolved five years after. D. possessed one of the most splendid art collections in Europe. He died at Paris, 29th April, 1870.

Demi-Lune, in fortification, a work composed of two faces, forming a salient angle towards the outside of the fort, and intended to cover its curtain or wall, as well as the shoulders of the adjoining bastions. It is surrounded by a ditch, and has two demi-gorges near the counterscarp. See LUNETTE, RAVELIN.

Demir'-Hissar' ('iron castle'), a fortified town in Rumili, European Turkey, 46 miles N.E. of Salonica, with less than 3000 inhabitants. It takes its name from an old fort which crowns the hill at the foot of which it is built.

Demise', in English law, is the term applied to the conveyance of an estate in fee, or for life, or a term of years.

Demise of the Crown. By the law of England the sovereign never dies; for on the death of the reigning monarch the royal dignity vests, and the kingdom is *eo instante*, in legal language, *demised* to the heir to the crown.

Dem'isemi'quaver, in music, a note of which the duration is half that of a semiquaver, or one-eighth that of a crotchet. See NOTATION.

Dem′iurge (Gr. 'a workman,' lit. a workman of the *demos*, or people), according to the Gnostics (q.v.), was the creator of the world. All the Gnostics maintained a twofold creation; one evolved directly out of the Divine essence, and another produced by God's plastic power out of pre-existing matter—the framer of the latter lower creation not being the author of the higher world of animation, but the D., a being far inferior to the supreme God. Some believed the D. to be the representative of the supreme God on this lower stage of existence, and the highest of all emanations from his substance; others regarded him as absolutely hostile to God, and identified him with Jehovah, the God of the Jews. See Neander's *Kirchengeschichte*.

Demmin′, a town in the province of Pommern (Pomerania), Prussia, lies in the valley of the Peene, 75 miles N.W. of Stettin. It consists of D. proper, which is walled, and three suburbs; has manufactures of woollens, linens, hosiery, leather, and tobacco, distilleries and breweries, and a trade in corn and malt. D. is one of the oldest Slavic towns in Pommern, and as early as the time of Karl the Great is mentioned as an important seat of trade. In the fierce struggles between the Teutonic and Slavic race, that occupy a great part of the Middle Ages, D. suffered severely, and again in the Thirty Years' War. Pop. 11,462.

Democ′racy is a Greek word meaning the power or rule of the general body of the people, not of the mob or poorest classes. Thus at Athens there was a D. as distinguished from the tyranny of a noble family, and the oligarchy of a wealthy, priestly, or military class. But the Athenian D. did not contain the *metœci*, or the slaves. Nor among the free citizens who enjoyed the various political franchises and discharged the political duties was there complete equality of rights, any more than equality of conditions. The Solonian Constitution, as much as the Servian Constitution at Rome, recognised classes of citizens, whose rights, or some of them, were measured by their property. The degree in which the *demos* participates in the government of itself, directly or indirectly, is, however, not so fundamental a question as this—On what principle is the government conducted? It is of course humanly possible that even a despot could be found of sufficient intelligence and benevolence to ensure the happiness of the great mass of his subjects. But this is not sufficient for permanent security. The despot dying, either his son or an elected successor would reign, or there would be a revolution. In any event, there would be no indisputable record that government was to proceed according to the ascertained interests of the many; there would be no free constitution. Hence the argument of democrats is, that by the universal experience of history it has been found that constitutions in which the mass of the people has no power, direct or indirect, except the extremely indirect menace of revolution, have tended to the exaltation of the family or class having power, and to the debasement and denial of rights of the unenfranchised, unrepresented class. This is generally conceded, and hence the idea of representative government—viz., that the people are to govern themselves. In modern times the business of government has become so multifarious, and so much of it is entrusted to local machinery, by the permissive system, that the argument for D. as a means of elevating the moral tone and developing the mental energies of the people is very powerful. The great dangers of D. are a low grade of intelligence in the representative body, and in the popular opinion which controls it, and class legislation. This has always been a real difficulty in human affairs. No doubt one policy reconciles all the legitimate interests of a nation, but a social class may be as grievously in error about its own interests as about the interests of another class; it may even forget the interests of all other classes, and identify itself with the nation. These chances are increased when a class is not only numerically the strongest, but intellectually and morally the weakest. The commonest method of preventing these evils is the restriction of the suffrage to those whose material position is supposed to guarantee in some measure their moral and intellectual fitness for the franchise. Such a restriction rests on deeper grounds than the constitutional maxim, 'No representation, no taxation;' the unenfranchised must depend on the patriotism of those who represent the enfranchised. But D., as frequently practised, is unequal in favour of the predominant class which happens to be enfranchised. In all constituencies (which are not framed on a logical plan, but, as burghs, counties, &c., are the result of historical growth), very often only a numerical majority is represented, but the minority is never represented. Hence a vote of delegates returned on this principle may represent the wishes of an actual minority of the nation. The necessity of a representation of minorities is partly concealed by the fact that nowhere is the suffrage extended to all men and women in the area of voting. Another plan suggested for use in Great Britain is that of the three-cornered constituency, by which a minority, equalling or exceeding a third of the constituency, would be able, if it attempted no more, to return one out of three members, the voters having only two votes. Garth Marshall has advocated the cumulative vote, which has been successfully worked in school board elections. Such plans, however, leave untouched the case where a minority is made up of several constituencies. The most comprehensive suggestion on the subject is that of Thomas Hare. He takes as his unit of representation, not equal electoral districts (the plan which is being largely adopted in Europe and America), but the quota of electors reached by dividing the enfranchised population by the number of seats. Every candidate obtaining that quota would be returned, and every elector would be entitled to vote for all the candidates in an order of preference, his vote being counted for only one (Hare's *Treatise on the Election of Representatives*). This system of personal representation, as it is called, would entirely supersede the necessity of what have been called *fancy franchises*, viz., privileges of voting conferred on bodies who are supposed to have special intelligence or special interests to protect. The objections which have been made to it are chiefly practical: the suspicion to which the central office for analysing the votes would be exposed; and the risk of the American 'ticket' system, or mass-voting on a prepared list, being introduced. The fallacy consists in supposing that the entire voting would be revolutionised by a device which has for its object the special organisation of minorities. Hare's plan is in operation in Denmark (where it had been thought out independently by Andrae). It would probably be necessary to limit the number of secondary or contingent votes to be given. But so many strong beliefs and entire schools of thought are unrepresented by the present system, that probably some form of personal representation will ere long become general.

Democ′ritus, a celebrated philosopher, born at Abdera, in Thrace, about 460 B.C., disciple of Leucippus, travelled extensively in quest of knowledge, and after spending his inheritance, returned home in great poverty. He visited Babylon and Meroë, spent a considerable time in Egypt, and even, according to some, reached India and Ethiopia. He was a man of upright character, of great modesty and disinterestedness, and of such immense diligence and acquisitiveness, that he excelled in range of knowledge all the earlier Greek philosophers. For his worth and wisdom his fellow citizens greatly honoured him; while his sterling merit is said to have secured for him even the good opinion of the arch-scoffer Timon, whose tongue spared no man else. According to a tradition, he put out his eyes that he might pursue his studies unmolested; but it is much more likely that he lost his sight by severe application to study. From his irresistible inclination to look at the comical side of things, and to laugh at human follies, he acquired the name of 'the laughing philosopher.' He studied and wrote on physical science, mathematics, grammar, music, and philosophy; but only a few fragments of his voluminous writings remain. D.'s system of philosophy was an expansion of the atomic theory of Leucippus—that the universe, material and mental, consists of minute, indivisible, and impenetrable atoms. These atoms he assumes as the ultimate ground of nature; necessity as the cause of all existence. In other words, he ignores design, but admits the reign of law. Gods and men are alike the aggregates of atoms. This theory was adopted by Epicurus and ardently advocated by Lucretius. Inward peace, a conscience without reproach, freedom from fear and passion, he considers as the ultimate objects of human endeavour. D. died about 357 B.C. A good collection of the fragments of his writings was published by Mullach (Berl. 1843).

Demo′dex, a peculiar genus of mites, represented by the species *D. folliculorum*, which inhabits the sebaceous follicles of the human skin, especially near the nose. This parasite is of minute size and thoroughly harmless.

Demoiselle, the name of a species of Crane, sometimes known as the Numidian crane. This bird occurs in Africa, Asia, and E. Europe. Its graceful movements have procured for it its French sobriquet. Its height is about 3 or 3½ feet. The colour is a bluish-grey; the ear-tufts are white, and the head itself is a deep black colour. The breast has a tuft of deep iron-grey plumes, and the secondary feathers form a prominent upper tail, which droops over the primaries and tail-feathers. The nostrils are narrow. To this genus the Stanley crane of the E. Indies also belongs. The name D. is also given to the *Libellulidæ* or Dragon-Flies (q.v.).

Demoi′vre, Abraham, a mathematician, known best by the formula in analytical trigonometry which bears his name, was born at Vitri in Champagne, 26th May, 1667, but passed most of his life in England, where he had taken refuge after the revocation of the Edict of Nantes. The appearance of Newton's *Principia* stimulated his mathematical studies, and he soon acquired a high reputation in the science. An intimate friend of Newton, Leibnitz, and Bernouilli, he was nominated by the Royal Society to decide the famous controversy between the first two. D. died at London, 27th November, 1754. His chief works are his *Miscellanea Analytica* (1730), *Doctrine of Chances* (1716, 1738, 1756), *Annuities on Lives* (1724, 1740, 1750), and several memoirs in the *Philosophical Transactions.*

Demoli′tion, the art of destroying a structure, is part of the professional education of a military engineer. Under this head he is taught how to destroy works and buildings; what quantity of gunpowder or other explosive is required to blast masonry of a given thickness; how to determine the line of least resistance; and similar matters in military operations.

Demo′niacs, persons believed to be possessed by Demons (q.v.). It was the popular belief of the Jews (except the Sadducees) at the time of Christ, and of many other nations centuries before, that demons, especially the spirits of bad men, entered the bodies of men to torment them. It was believed that a man's soul could go in and out of his body during sleep, and also that demons could be drawn in with the breath, of which yawning and sneezing were proofs. Along with this there was the belief that diseases were due to supernatural causes; a belief which had two phases; first, that diseases, pestilences, &c., were due to the anger of God (2 Sam. xxiv. 15); and secondly, according to dualistic ideas (see DEVIL), that these were the work of the devil and his agents. So firm a hold had this belief on the human mind, that it was not till the 17th c. that it even began to be checked by writers on medical science. From the fusion of these two beliefs resulted a firm conviction that those diseases especially which were more mysterious in their symptoms, as insanity, epilepsy, St. Vitus's dance, dumbness, &c., were caused by demons who had their abode in the persons afflicted.

In the New Testament Christ is represented as 'casting out demons;' and as science now finds it difficult to recognise in the manifestations of the infirmities of D. any evidence of a superhuman cause, except in the sense in which all things are *originally* of divine origination, various interpretations of the cures have been offered, of which the most rational is that the language used concerning them represents the popular belief, probably that of the evangelists too, who looked at the phenomenon only from a *religious* point of view, and is therefore not to be interpreted as inculcating scientific knowledge. After all has been said that can be said on the scientific side, it remains credible that physical evil had its primary origin in *sin*, and sin—apart from personality—is a meaningless term.

De′mons (Gr. *daimones*, 'divine intelligences,' 'deities') are evil spirits; but that they are exclusively evil is peculiarly a Christian notion. By pagan writers the word was applied to every order of beings superior to man, or was confined to the inferior deities, or to a class of beings between gods and men, some of whom were benevolent and some malignant. The dualistic idea (see DEVIL) of the Indians, Persians, Egyptians, &c., was not known to the Israelites in the earlier stage of their religious development. Jehovah was the author of all evil as well as all good (Isa. xlv. 7). The plagues and disasters, and even the temptations of men, were all the work of God and his angels (Exod. vii. 3; 2 Sam. xxiv. 1). In the apocryphal books the influence of Persian and Alexandrine ideas is unmistakably apparent in the increasing abundance of good angels and their development into a hierarchy, and perhaps even more plainly in the belief in wicked spirits. The earliest form of the belief that these were *fallen* angels appears in the Book of Enoch. Satan by this time had a distinct kingdom and a residence in the subterranean hell, from which tens of thousands of fiends constantly streamed obedient to his behests. Their favourite haunts were deserts and wildernesses, but there they grew weary, and as they wandered about finding no rest, their great resort was to take up their abode in a human body. See DEMONIACS.

In the New Testament there is distinct reference to a hierarchy of evil spirits as well as of angels (Eph. vi. 12, &c.); and the figurative language of St. Paul (1 Cor. x. 20), in speaking of the heathen gods as devils, perhaps led to the theory of later writers that they were literally D. At any rate the whole heathen Pantheon was transformed into a Pandemonium. The belief in a parallelism between the powers of light and the powers of darkness also multiplied devils to match the multiplication of saints. These holy men were continually assailed by them, but were uniformly able to vanquish them by the sign of the cross, a drop of holy water, or an appeal to the Virgin. The period including the 13th and four succeeding centuries has been called 'the devil's own,' from the extent to which the belief in evil spirits then prevailed. Every destructive or terrifying phenomenon of nature, every pain or disease which afflicted man or beast, every accident, the most trifling as well as the most serious, all were the work of the devil, his imps, or his agents. (See WITCHCRAFT.) In a book published about the middle of the 16th c., giving the popular notions regarding the infernal hierarchy (Weir's *Pseudomonarchia Dæmonum*), seventy-two princes are named, and their subjects estimated at 7,405,926 devils. See Lecky's *History of Rationalism in Europe* (1865); Maury's *Histore de la Magie* (Par. 1860); Farrar's *Life of Christ* (1870).

Demonstra′tion (Lat. *demonstrare*, 'to point out'), in mathematics or logic, is the process by which a result is shown to be a necessary consequence of pre-established premises.

Demonstra′tion, an exhibition of military force to check or deceive an enemy, and by causing a division of his troops, to weaken him at a point where the real attack is intended.

De Mor′gan, Augustus, the son of Colonel De M. of the Madras army, was born on the island of Madura, near the coast of Java, 27th June, 1806. He entered Trinity College, Cambridge, in 1824, and took his B.A. degree as fourth wrangler in 1827. In 1828 he was elected Professor of Mathematics in London University, an office resigned in 1831, but resumed in 1836, and held till his death 18th March, 1871. His extensive knowledge, combined with his clear, logical, and, when necessary, sarcastic style of writing, rendered him a powerful controversialist. He wrote a treatise on almost every branch of pure mathematics, on arithmetic, algebra, trigonometry, probabilities, &c., and his *Differential and Integral Calculus*, published by the Society for the Diffusion of Useful Knowledge, is the most complete treatise on the subject ever produced in England. His numerous articles in the Penny Cyclopædia make up nearly one-sixth of the whole twenty-seven folio volumes. His *Budget of Paradoxes*, which originally appeared in the *Athenæum*, is full of quiet chuckling humour. His treatment of the most celebrated claimants to the discovery of perpetual motion and the squaring of the circle is particularly delightful.

Demos'thenes, the greatest orator of antiquity, and one of the noblest characters in history, was born in the Attic borough of Pæania, B.C. 385. When he came of age, he prosecuted his guardians for their mal-administration of the property bequeathed by his father, and, after much delay, obtained a verdict against them, with ten talents (£2400) damages. Stimulated by his loss of fortune, and encouraged by his success in the courts, D. devoted himself to a public career, and assiduously strove to overcome the physical disadvantages of his feeble constitution and stammering speech. In 358 B.C., Philip of Macedonia commenced the attack on the northern allies and possessions of Athens, which was his first step towards the overthrow of the liberties of Greece. The unflinching and patriotic, though unsuccessful, opposition of D. to the Macedonian aggression is embodied in his famous orations against Philip, the first of which was delivered, B.C. 352; and in the three Olynthiac orations he endeavoured to avert the fate of Olynthus, which fell before Philip, B.C. 348. The peace of Philocrates followed, from the benefits of which the unhappy Phocians were basely excluded, and Philip passed Thermopylæ. Notwithstanding the opposition of Athens, he became a member of the Amphictyonic League, and steadfastly pursued his plans for the subjugation of Greece. He was elected general-in-chief of the Amphictyonic army, B.C. 339, and, in the next year, Greek independence was completely destroyed in the disastrous battle of Chæroneia. Æschines, the rival of D., and the leader of the Macedonian party in Athens, endeavoured to prove the illegality of the proposal of Ctesiphon, that D. should receive a crown in recognition of his noble public career; and D. triumphantly replied in an oration that has been justly ranked as the masterpiece of ancient eloquence. The death of Philip, B.C. 336, and of Alexander, B.C. 323, afforded delusive grounds of hope to the Greek patriots; and on the latter event D. was recalled from the exile into which he fled when punished for his alleged protection of the rebel Harpagus. The Macedonian power, however, was still in the ascendant. Antipater marched to Athens, and D. fled to the temple of Neptune, in the island of Calaurea, where he took poison, and died, B.C. 322.

Demot'ic Alphabet. See HIEROGLYPHICS.

Demot'ika, a town in the vilayet of Adrianople, province of Rumili, European Turkey, 22 miles S. of Adrianople, with manufactures of silks, woollens, and pottery. It is defended by a citadel, and contains a palace, in which several Sultans resided before the Turks captured Constantinople. Karl XII. of Sweden found an asylum here for some time after his defeat at Pultowa. Pop. 14,080.

Dem'pster, Thomas, a learned professor and voluminous writer, was born at Muiresk, Aberdeenshire, about 1579, and educated at Aberdeen and Cambridge, whence he repaired to France. Here he assumed the title of Baron of Muiresk, and obtained a professorship in the College of Beauvais, which was afterwards exchanged for one at Nîmes. Repairing to Italy, he taught first at Pisa and afterwards at Bologna and at Butri, in the neighbourhood of which he died, 6th September, 1625. The best known of D.'s works is his *Historia Ecclesiastica Gentis Scotorum* (1627), which, though in some respects a valuable and learned work, is justly discredited on account of its deliberate falsehoods and misrepresentations. A reprint was made for the Bannatyne Club in 1829.

Demul'cents (Lat. *demulceo*, 'I soften') are medicines for internal use, taken for the purpose of lubricating the mucuous membranes when these are inflamed. D. are given for inflammation of the stomach, the air passages, &c. Examples—Mucilage, marsh mallow, and linseed tea.

Demurr'age (from the Fr. *demeurer*, Lat. *demorari*, 'to delay'), in mercantile law, is the allowance paid by the exporter or importer of goods to the owner of the vessel, when it is obliged to wait beyond her *levy* or *running* days (days allowed to load or unload a ship), either before or after the voyage, or while she is waiting for a convoy. During loading or unloading, the risk of delay lies with the freighter; after loading or unloading, it is with the shipowner. Rate per day of D. is usually stipulated for in the charter-party.

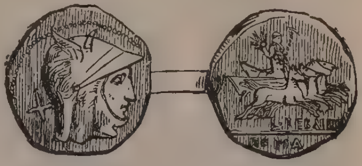
Demurr'er, an English law-term, denoting a legal difficulty which must be determined by the court before an action can go further. A D. therefore is an issue on a point of law. It concludes an allegation, but denies or questions the inference sought to be drawn from it. D. is usually taken advantage of in civil matters, although it may be resorted to in criminal proceedings.

Demy', a size of paper frequently referred to. For printing paper it measures 22½ inches by 17½; for drawing, writing, and account-book papers, 20 by 15½. D. blotting-paper is 22½ inches by 17¾.

Denain', a town in the department of Nord, France, on the left bank of the Scheldt (here navigable), and 6 miles W. of Valenciennes. It occupies the centre of a coalfield, and coal and iron are extensively raised. D. has several blast-furnaces. Pop. 18,258.

Den'ary Scale. See NOTATION.

Denar'ius (Lat. *deni*), the principal silver coin among the Romans, was first coined, B.C. 269. It originally contained ten, and afterwards sixteen *asses* (see AS), and was in value equivalent to about 8½d.



Roman Denarius (exact size).

Denbigh (Welsh *Din-bach*, 'little fortress'), the capital of Denbighshire, near the centre of the vale of the Clwyd, 30 miles W. of Chester. It is situated on the sides and at the base of a limestone hill, which is crowned with a ruined castle, built in 1284 by Henry de Lacy, on the site of one still more ancient. D. consists mainly of one street. There is a free grammar school (1727), an orphan school for 55 girls, founded in 1860 with funds left in 1540, and a church, St. Mary's (1875), built at a cost of £11,000. Leather, wool, shoes, and gloves are manufactured. D. unites with Ruthin, Holt, and Wrexham in returning one member to Parliament. Pop. district of parl. bors. 24,216; reg. sub-dist. 9023; mun. bor. 6412; and civ. par. 4507.

Den'bighshire, a maritime county of N. Wales, having the Irish Sea on the N., Flint, Chester, and Salop on the E., Caernarvon on the W., and Montgomery and Merioneth on the S. Chief towns are Denbigh, Wrexham, Llangollen, and Ruabon. Its general character is mountainous, but in the N. there are some level tracts, and the vales of Llangollen, of the Conway, and of the Clwyd are noted for their beauty and fertility. On the hills sheep, ponies, and goats are reared; barley, oats, and potatoes are grown on the uplands; and the valleys produce heavy wheat and pulse crops. Of the 424,435 acres, representing the total area of land and water in D., 51,779 acres are under Corn Crops (oats 28,272), 14,312 under Green Crops (potatoes 3383), 38,169 under clover, sainfoin, and grasses in rotation, and 167,399 under permanent pasture, &c. Bare fallow is estimated at 487 acres, and Small Fruit is cultivated on 525. Mountain and heath-land account for 61,955 acres, while 20 are laid out in Nursery Grounds, and 17,961 are occupied by Woods and Plantations. The chief mineral products are coal, iron, slates, lead, and copper. D. possesses numerous British remains of the Roman period or earlier, as tumuli, barrows, forts, &c. To later times belong Offa's Dike, and Watt's Dike which runs parallel to it on the E., works consisting of a ditch, with forts at intervals, and constructed to protect the English of Mercia from the irruptions of the Welsh. Area 662 sq. miles; pop. anc. county 117,872; adm. county 118,843; and reg. county 116,698. D. is divided into two parl. divs., each of which returns one member; eastern pop. 47,317; western pop. 46,339.

Den'derah (the *Tentyra* of Strabo, and the Coptic *Tentoré*, Thy-n'-Athor, *i.e.*, the abode of Athor, a contracted form of Aphrodite), a ruined town of Upper Egypt, on the left bank of the Nile, celebrated for its temple, the best-preserved structure of its kind in the land. It was dedicated to Athor, and its oldest portion dates from the period of the later Ptolemies. It contained sculptured portraits of Cleopatra and her son Cæsarion, and the names of the Cæsars from Tiberius to Antoninus Pius (A.D. 14—161). It is 220 feet long by 50 broad, and has a portico (erected by Tiberius) supported on twenty-four columns, ranged in four rows, with quadrangular capitals. On the ceiling of the portico is the sculpture called by the French savans the zodiac of Tentyra, which seems to represent mythological and emblematic figures.

Ruins at Denderah.

A smaller sculpture of mythological figures on the ceiling of one of the lateral chambers was, in 1821, by the permission of Mehemet Ali, cut out by Lelorrain, and brought to the Paris Museum. Other buildings were a temple of Isis and a Typhonium, all enclosed with a brick wall, in some parts 35 feet high and 15 feet thick, forming a square with a side of 1000 feet.

Den'dermonde ('the mouth of the Dender'; Flem. *Termonde*), a town in the province of E. Flanders, Belgium, at the confluence of the Dender and the Scheldt, 18 miles E. of Ghent by rail. It has a citadel built in 1584. The church of Notre Dame contains two pictures by Vandyk. Principal manufactures, woollens, lace, pottery, &c. By opening sluices of the rivers, D. compelled Louis XIV. to raise the siege in 1667, but it was taken by Marlborough in 1706, and again by the French in 1745. Pop. 9298.

Dendrer'peton (Gr. 'the tree-lizard'), a genus of fossil and extinct Amphibians, belonging to the order *Labyrinthodontia*, and found within the trunks of *Sigillariæ* (q.v.), or certain fossil trees in Nova Scotia. The genus is founded on several small bones discovered in a *Sigillaria* trunk, two feet in diameter, and wholly converted into coal. D., according to Owen, shows affinities with *Archegosaurus* (q.v.), from the plicated structure of the teeth, the sculpturing of the cranial plates, and the relations, size, &c., of the bones of the limbs.

Den'drite (Gr. *dendrites*, having the property of a *dendron* or tree), the name applied to the hydrous oxide of manganese, occurring in limestones, trachytes, and other rock-substances, and which from its peculiar branching or plant-like crystallisation is sometimes mistaken for fossilised plants and mosses.

Dendrograp'sus, an important fossil genus of *Hydrozoa* (q.v.) or Zoophytes, exclusively found in the Upper Cambrian and Lower Silurian rocks. The species of this genus have been referred by palæontologists to the modern order of the *Sertularidæ* (q.v.), or 'sea-firs,' as well as to the extinct order of the *Graptolitidæ*, or Graptolites (q.v.). *D. Hallianus* is a familiar species, and exists in the form of a plant-like organism, springing from a stout footstalk, which was probably attached to some fixed object, like our modern zoophytes. The branches bear on one side a series of cups or *cellules*, resembling the 'thecæ' of living sea-firs, each of which cups must have contained a little *polypite*, or single member of the zoophytic colony. In D. the cups, like those of graptolites, partially overlap each other.

Den'drolite (Gr. 'tree-stone'), a general term applied to the fossilised trunks of trees, characteristic more especially of the Carboniferous age. The trees belong to various groups of the vegetable world, but chiefly to the acrogenous and endogenous divisions of the plant kingdom. Since the more intimate study of fossil botany or *Palæophytology* has been undertaken, fossil plants of all kinds have been directly referred to their respective groups; and the use of such collective and general terms as D. is now greatly done away with.

Dendrophyll'ia, a genus of compound *Sclerodermic* (q.v.) corals belonging to the *Zoantharia Sclerodermata*, and ranked among the 'deep-sea' corals and reef-building forms. The species of D. derive their name from their branching tree-like shape. *D. nigrescens* is a familiar species. It is regularly branched, possesses deep cells, and the tentacles of the polypes are cleft or divided in a longitudinal manner. It is found in the tropical seas.

Den'drophis (Gr. 'tree-snake'), and **Dendroph'idæ** a genus and family of Colubrine (q.v.) snakes, so named from their habit of frequenting trees. In this family, which occurs in Africa and S. America, the body is long and slender, five-sided, and the upper jaw is larger than the lower. The *scuta* or head-shields are long and regular, and the scales are narrow. *Bucephalus* and *Ahætulla* are familiar genera.

Deneb', a brilliant star of the first magnitude, in constellation Cygnus, forming with Vega and Polaris an evident right-angled triangle. Near it is the small double star 61 of Cygnus, interesting as having a large proper motion, and being one of the nearest stars to our system—according to Bessel 650,000 times more distant than the sun is from the earth.

Den'gue [*Kisuaheli*, E. African, from *ki-dingi*, the prefix *ki* being the diminutive or personal form. The term *dinga* is now obsolete in E. Africa, except as the designation of this disease; and as such it is used with the word *pepo*, an evil spirit. 'D.' or 'Denge' is a Portuguese form of the E. African term *kidinga-pepo*, signifying a disease marked by the sudden accession of cramp-like pains, which are supposed by the natives to be caused by an evil spirit]. *D. scarlatina rheumatica* has been defined as 'a peculiar febrile disease conjoined with sudden severe pains in the small joints, which swell, succeeded by general heat of skin, intense pain in the head and eyeballs, and the appearance of a cutaneous eruption on the third and fourth day.' D. has occasionally appeared as an epidemic disease in the E. and W. Indies, the Southern U.S., the ports on the Gulf of Mexico, and even as far N. as New York. In America it is called the *Break-bone Fever*, and was epidemic there in 1824-28, 1847, 1850, and 1860. The disease has probably been derived from E. Africa in connection with the slave trade. D. has never appeared as an epidemic in Europe. The latest epidemic of D. broke out at Zanzibar in 1870, and spread thence over Arabia, India, and China along the lines of human intercourse. D. is usually accompanied with obstinate constipation. Quinine has no influence over the disease, except during the febrile stage, but the exhibition of iodide of potassium is attended with the most favourable results. The disease has been described by Drs. Twining, Mouat, and Goodeve, and since then by Dr. Christie, of Zanzibar (*Trans. of the Med. and Phys. Soc.*, Bomb. 1871).

Den'ham, Sir John, an English poet, was the son of the Chief Baron of the Exchequer in Ireland, and was born at Dublin in 1615. After an education at Cambridge, he studied law in Lincoln's Inn. In 1641 his tragedy of *The Sophy* appeared, and was hailed with plaudits which are now as forgotten as the play itself. '*Cooper's Hill*, a pleasant descriptive poem still worth reading, was produced in 1643. Previously to the Restoration, D. had to leave England, but his later life was prosperous, and spent in the King's service. He died 10th March, 1668. Pope's praise has made D. a permanent name in English literature; and those to whom the smooth vigour of *Cooper's Hill* is quite unknown still remember the line—

> 'Where Denham's strength and Waller's sweetness join.'

Deni'al, in law, imports no more than *not confessing*. It does not amount to a positive assertion of the falsehood of that which is denied. The term for D. is usually *traverse*. See CONFESSION, CONFESSION AND AVOIDANCE, CONFESSION, JUDGMENT BY.

Deni'na, Carlo Giovanni Maria, a well-known Italian historian, was born at Revello, in Piedmont, 28th February, 1731. He studied at Turin, and in 1754 was appointed Professor of Humanity at Pignerolo, but lost his seat by writing a comedy which offended the clergy. Subsequently D. was appointed Professor of Rhetoric in Turin University. This office he lost by giving provocation to the monks in his *Discorso sull' Impiego delle Persone* (Flor. 1777), and being banished from Italy, he went, in 1782, on the invitation of Friedrich the Great, to Berlin. There D. lived and wrote till 1804, when Napoleon appointed him his librarian. D. died at Paris, 5th December, 1813. He was the author of numerous works, mainly historical. D. also wrote a heroic poem, *La Russiade* (Berl. 1799-1800), in honour of Peter the Great.

Denis, St., a town in the department of Seine, France, on the rivulets Croud and Rouillon, 6 miles N. of Paris, and within the outer line of the fortifications. The Abbey Church, built by Dagobert I. on the site of the chapel that covered the remains of St. D., became the mausoleum of the kings of France. The National Convention decreed its destruction in 1793, when its tombs were rifled, and the royal dust thrown ignominiously into ditches. Napoleon I. commenced its restoration, which was completed by successive governments, with so much care that it is now one of the most splendid ecclesiastical structures in France. The crypt contains statues of the French kings from Hlodowig to Louis XVI. St. D. has dyeworks, printfields, bleacheries, flour-mills, and chemical works, and an active inland trade. Pop. town 50,992; arrond. 403,956.

Denis, St., or **Denys, St.,** the patron saint of France, the founder of the Gallican Church, and the first Bishop of Paris, was a Christian missionary who came from Rome to Lutetia (Paris) in 251, where, after making many converts, he was martyred by command of the Roman governor, Pescennius. His body was taken from the Seine by a heathen lady, Catulla, who became a Christian, and buried the saint in her garden, on the spot where the Abbey of St. D. (q.v.) now stands. D. has been confounded with Dionysius the Areopagite (q.v). The *Acts of St. D.* are a forgery of the 7th or 8th c. *Mountjoye St. D.*, was long the war-cry of France. See De Launoy's *De Duobus Dionysiis*.

Deni'zen (Old Fr. *deinzein*, one who is *deins;* Mod. Fr. *dans;* Lat. *de intus*, 'from within,' *i.e.*, 'the city') was an alien born who had obtained letters of denization, which entitled to purchase and transmit lands, though not to inherit them. The right to grant letters of denization was a prerogative of the crown. See ALIEN.

Deniz'li, a town of Asiatic Turkey, vilayet of Aidin, 100 miles S.E. of Smyrna, has many large bazaars, and some manufactures of leather (morocco), silks, articles of dress, &c.

Den'mark (Dan. *Danmark*), the smallest of the three Scandinavian kingdoms, in the N. of Europe, embraces the peninsula of Jutland, and the islands Zealand, Möen, Fünen, Laaland, Falster, Bornholm, Faröe, &c. It is bounded N. by the Skagerak, an inlet of the N. Sea, E. by the Cattegat, the Sound, and the Baltic, S. by Slesvig, and W. by the North Sea. Its lat. extends from 54° 32′ (Gjedserodde, the S. point of Falster) to 57° 45′ N. (Cape Skagen in Jutland), and its long. from 8° 5′ (Blaavands Huk, 'the horn,' on the W. of Jutland) to 12° 45′ E. (the island of Saltholm in the Sound). The divisions, areas, and populations are as follow:—

Counties.		Area in sq. miles.	Population.		Chief Town.
In Jutland—					
	Hjörring	9,743	110,361	942,120	Frederikshavn.
	Aalborg		104,490		Aalborg.
	Randers		110,444		Randers.
	Thisted		69,407		Thisted.
	Ringkjöbing		98,623		Ringkjöbing.
	Viborg		100,777		Viborg.
	Aarhus		157,191		Aarhuus.
	Veile		111,904		Veile.
	Ribe		78,623		Ribe.
In the Islands—					
Zealand	Frederiksborg	5,024	84,684	917,401	Helsingor.
	Copenhagen		152,706		Copenhagen.
	Holbek		94,235		Holbek.
	Sorö		88,990		Skagelso.
	Præstö (includes Möen)		100,649		Præstö.
	Bornholm		38,761		Rönne.
Fünen	Odense		136,117		Odense.
	Svendborg		120,707		Svendborg.
	Maribo (Laaland and Falster)		100,552		Maribo.
City of Copenhagen		7·7		312,859	
Faröe Islands		514		12,782	
Total		15,288·7		2,185,162	

The great island groups lie to the S.E. of Jutland, and in the entrance to the Baltic. By far the largest island is Zealand, separated from the Swedish coast by the sound (*Ore Sund*, 'Ear Sound,' from its shape), which narrows to 24 miles at Helsingor. In the Sound are the islands Amager and Saltholm, and to the S. of Zealand lie Möen, Falster, Laaland, and several of smaller size. The Great Belt passes between Zealand and another group, consisting of Fünen (*Fyen*), Langeland, Arrö, Taasinge, &c. To the N. of the Fünen group are the islands Hesselö, Seierö, Samsö, Hjelm, Thunö, and Endelave, and to the N., in the Cattegat, Anholt, Läsö, and Hirsholm. These islands have generally rugged, rocky coasts, and are pointed in a southerly direction. Some 95 miles E. of Zealand is the solitary island of Bornholm. D. has an entire coast-line of 3855 miles. Copenhagen (q.v.) is the capital, and chief among the other towns are Aarhuus, Randers, Odense, and Helsingor. Foreign possessions are Iceland, Greenland; St. Croix, St. Thomas, and St. John, in the W. Indies. Estimated pop. of colonies, 116,599.

General Aspect.—The surface of mainland and islands alike is singularly flat, and is elevated but little above the level of the sea. The greatest heights in Jutland are Himmelsberg (530 feet) near Silkeborg, and Eiers-Bavnehöi (522 feet) in a central sandy range forming the watershed between the N. Sea and the Baltic, and terminating in the extreme N. in Cape Skagen, or Skagen's Odde. In the W. of the peninsula there are stretches of sandy heath (*dunes*) and swampy morass, alternating with more or less fertile parts. The E. is a rich corn-land of fine valleys, with here and there forests of beech, elm, birch, alder, and pine. Zealand is also well wooded, and in the S. is very productive. D. is richly watered by small streams, of which the most important are the Guden-Aa (87 miles), entering the Baltic Sea near Randers, and the Ribe-Aa, Varde-Aa, and Stor-Aa, flowing into the North Sea. There are numerous lakes, as the Arre, Fure, Esrom in Zealand, and the Fjil, Tastum, Lang, Juul, Mos See, &c., in Jutland, none of which are of any great depth or size. The coast is greatly indented, and is generally sandy and shelving; the inlets, or fjords, occasionally form good harbours. In the N. of Jutland, Hjorring and Thisted have been insulated by the Lymfjord breaking through the isthmus Harboöre-Tange into the North Sea (in 1825). The principal inlets besides the Lymfjord are the Isefjord in the N. of Zealand, the Odensefjord or Stegestrand in Fünen: and on the E. of Jutland the Mariagerfjord (20 miles long), the Randersfjord (15 miles), the Horsensfjord (10 miles), and the magnificent Veilefjord, which can admit ships of war. The Lymfjord, which is the most extensive of these arms of the sea, varies in depth from 27 to 53 feet, and sends off several branches, as the Aggersund, Skivefjord, Hjarbukfjord, Feggesund, Vilsund, &c. It contains the islands Mors, Fuur, Livö, Oland, &c., and its waters, which are saltish, are subject to a regular tide. The W. coast of Jutland is one of the most dangerous in the world to shipping, owing to its shifting sandbanks and frequent mists (*Havgufen*). In the N. it forms the expansive Bays of Tannis and Jammer, and further S. is broken by the Lymfjord, Nissumfjord, Stadilfjord, and Ringkjöbingfjord. The most northerly of the N. Frisian islands, Fanö, Manö, &c., which belong to D., lie off the coast of Ribe.

Climate, Geology, Botany, &c.—The climate of D. is somewhat severer than that of Britain, but milder than that of N. Germany. It is free from violent extremes. From March to September winds from the W. and N.W. prevail; during the other five months S.W. and W. are the most common winds. The cold piercing N.W. wind, which, in the beginning of the year, sweeps over the N. of Jutland and along the W. coast, is called the Skai. For about one-fifth of the year (69 days) the sky is quite clear; in winter the W. districts are frequently shrouded in thick mists. In the course of the year Copenhagen has 157 days of rain, and a fall of 23 inches; Ringkjöbing on the W. coast of Jutland has 200 days and a fall of 29½ inches. The former of these places is fairly representative of the rest of D., and has a mean temperature of 31°·1 F. in winter, 43°·7 in spring, 63°·5 in summer, and 49°·1 in autumn. With the exception of Bornholm, which is partly covered with volcanic rocks, like the adjoining coast of Sweden, D. consists almost entirely of Tertiary formations. Chalk comes to the surface in Möen, in the S. of Zealand, and in many parts of Jutland. D. is singularly devoid of minerals. Bornholm yields annually some 40,000 tons of an inferior coal, but peat is the fuel in general use. Blue marble, sandstone, and potters' clay are found in various parts. On the W. coast of Jutland there is a slight yield of amber. The subsoil usually consists of layers of dark-blue clay (*blaalaer*), or beds of peat-moss. On several of the islands the clay is of a reddish colour, being mixed with fine sand. It is generally rich in vegetable remains, but contains no trace of large land animals. The upper soil contains much sand, and is often of a fine gravelly nature. In the islands, and in parts of Jutland, there are tracts of rich marshy loam, composed chiefly of bituminous marl. D. is on the whole a fertile country. Some three-fifths of the inhabitants are engaged in agriculture. The most productive parts are Möen, Laaland, Falster, Zealand, and Fünen; the W. of Jutland has been greatly improved by assiduous cultivation during the last twenty years. The annual produce is averaged at 26,400,000 bushels of oats, 18,500,000 of rye, 4,500,000 of wheat, 20,700,000 of potatoes, and 17,500,000 of barley. There is also some production of hemp, lint, and tobacco. In the S. of Zealand, Möen, and Fünen gardening is a favourite occupation, and the chief fruits produced are apples, pears, cherries, &c. The indigenous vegetation is almost identical with that of N. Germany. Of the 9,352,761 acres (exclusive of lakes and rivers), which are the area of the country, 559,256 are occupied by woods and forests, while 3,029,404 are under corn crops (oats, 1,050,456, and wheat only 119,691); 128,849, under potatoes; 5599, under flax, hemp, hops, caraway seeds, and tobacco; 456,585, under clover and grasses in rotation; and 2,625,865, under meadow and permanent pasture. Gardens occupy 69,737 acres, and 637,696 are under bare fallow. In 1894 the wheat crop was valued at £520,425; rye, barley, and oats at over 7¾ millions; beetroot at £168,670; clover and hay at 2¼ millions; and potatoes at £1,693,082.

Zoology.—The wild animals of D. have almost entirely disappeared since the decline of the large forests. The wild boar, however, still exists, and among the animals that abound are the deer, the polecat, the fox, the hare, &c. All the ordinary domestic animals of Europe are reared successfully. Jutland has a celebrated breed of horses, admirably adapted for light cavalry. Great attention is paid also to the rearing of horned cattle, and there is a fair export of live stock and horses. In 1893 and 1894, owing to the closing of the English market in 1892, no cattle were exported to Great Britain, but 65,439 sheep and lambs, and 1802 horses were landed at British ports. Of birds, the chief are the eider-duck, wild-goose, partridge, thrush, and snipe. The Lymfjord abounds in swans. From 60,000 to 70,000 men are engaged in the fisheries, and among the fish caught are the turbot, torsk, salmon, herring (*stromming*), mackerel, cod, flat-fish, and eels. Along the E. of Jutland occur large oyster-beds.

Industries and Commerce.—As might be expected from the comparative absence of coal and iron, the manufactures are few and of no great importance. As a rule, the peasantry are self-supplied with the ordinary articles of clothing and furniture. Copenhagen is the chief seat of the manufactures, which are mainly silks, cottons, leather, porcelain, tobacco, and chemicals. Randers is the centre of the glove industry, and Tondern is noted for its lace. There are also large breweries, distilleries, paper-factories, sugar-refineries, &c. D. has an admirable position for commerce, lying in the great trading highway of N. Europe. Its trade is chiefly with Germany, Great Britain, Sweden, Russia, Brazil, France, the United States, and the W. Indies. The principal exports are cattle, prepared meats, grain, flour, hides, leather, and gloves; imports, coffee, raw metals, coal, worsted, and cotton goods, oilcake, dye-stuffs, sugar (beet), raw tobacco, and timber. The imports, in 1893, were estimated at £17,794,161; and the exports in the same year were valued at £13,061,996. The merchant navy consists of about 3500 vessels, a very large proportion being vessels under 300 tons.

Railways and Finance.—In the absence of good roads the railway system in D. is of greatly increased importance. It now extends throughout Jutland to Aalborg and Frederikshavn in the N., and is connected with the Slesvig-Holstein Railway, while Fünen, Zealand, and Falster are also traversed by lines of various lengths. In 1894 there were open 1292 miles of railway and 3674 miles of telegraph lines transmitting over a million messages. There are also many important canals. The budget revenue for 1895-96 was £3,485,773; the expenditure, £3,431,524. In 1893-94 there was a deficit of £226,511. The cental system of coinage was adopted on the 18th of January, 1875. Of this system the unit is the *öre*, of which 100 make a *krone* (crown), 18 of which are equal to the English pound sterling. The English *ton* has also taken the place of the old *taēst* as the unit of tonnage.

Government, Army, Navy, &c.—According to the Liberal constitution of 5th June, 1849, modified in 1855 and 1863, but restored in an amended form on 28th July, 1866, D. is governed by a hereditary monarchy, and by a National Assembly or *Rigsdag*. Executive power is vested in the king, who must belong to the Evangelical Lutheran Church, the religion of the state, and his responsible ministers. The Rigsdag is composed of two Houses—the *Landsthing* (Senate), a body of sixty-six representatives of the wealthier classes, of whom twelve are chosen for life by the king, the others being elected for eight years; and the *Volksthing* (House of Commons), consisting of one hundred and two members (one to every 16,000 of the inhabitants), elected for three years by universal suffrage. During the annual session of the Rigsdag, a financial budget is submitted by the ministry. Each member of the Rigsdag receives 6s. 8d. a day, together with his travelling expenses to and from Copenhagen. The Senate appoints from its members assistant judges to the Supreme Court (*Höiesteret*), which sits in Copenhagen, and which admits appeals from all the lower courts. Civil cases are tried primarily before courts of conciliation, composed of persons of local position and influence. For army, &c., and navy, see articles ARMIES, MODERN, and NAVIES, MODERN.

Ethnography, Religion, and Education.—The Danes belong to the Scandinavian branch of the Teutonic family. They are a strong, muscular people, with regular features, light hair, and blue eyes. In disposition they are patient and plodding, and are rather distinguished for sincerity and sense than for wit or sprightliness. The established religion is Evangelical Lutheran, but complete toleration prevails. The Reformed religion, to which the king must adhere, was introduced in 1536. There are seven bishops, who are nominated by the king. In 1890 there were of other creeds 4080 Jews, 3647 Roman Catholics, 941 Mormons, 4556 Anabaptists, &c. Education is compulsory for children between the years of seven and fourteen, and the system is in many other ways admirable. Every adult in the kingdom is said to be able to read and write. The number of state or parish schools is 2940, while there are also 53 lyceums, many academies, and training colleges for teachers in the public schools. Besides the university (founded 1478), with its 40 professors and 1300 students, the capital has a military high-school since 1830, an academy of agriculture and veterinary science, with 22 professors, and an art academy (7 professors), founded in 1754. A college of pharmacy was founded in 1892, with 7 teachers.

History.—It is probable that some part of Jutland was the original home of those Cimbri (q.v.) who, along with the Teutones, ravaged Gaul and threatened Italy in the time of Marius (B.C. 113-101). At any rate, the peninsula was known to Roman writers under the name of the *Chersonesus Cimbricus.* Of this prehistoric period there are many interesting remains, as tumuli, cromlechs, &c., which have been carefully examined by the antiquarians of N. Europe. From the S. of Jutland, as well as from the N. of Germany, came those Saxons, Angli, Frisians, and Jutes, who, in the 5th and 6th centuries, invaded and possessed the island of Britain. Their numerous emigrations, extending over more than a hundred years, greatly depopulated the peninsula, into which now poured the Danes, who had hitherto been restricted to Zealand and part of the Swedish coast. These new comers subdued the whole mainland as far S. as the Eyder on the Saxon border, and formed among themselves a group of 'gaus,' or states, ruled by petty kings (*smaâ kongar*), one of whom, Gottrik or Gottfried, even ventured to make war on Karl the Great (804-810). In 826 Ansgar (q.v.) entered S. Jutland with the news of Christianity. Gorm, the Old, rose against the new faith, and succeeded in conquering the territories where it had taken root before his death in 936. His son, Harald Blaatand ('Blue-tooth'), did homage to the German Emperor Otto I., was converted to Christianity (965), and made Norway a fief of the Danish crown. The old Odin worship maintained a footing in D. for 200 years longer, and its later heroes were fabled in the Kæmpeviser (see DANISH LANGUAGE AND LITERATURE) and the Eddas (q.v.). England was completely conquered by Knud (Old Eng. Cnut), a grandson of Gorm, who died 1035. Civil war, which had meantime been disturbing D., was stamped out by Valdemar I. the Great (1157-82), and his son Knud VI. (1182-1201) subdued Holstein and Pommern. Valdemar II. added to the kingdom Lauenberg, Mecklenburg, and Esthonia. Erik, Valdemar's eldest son, was killed in battle (1250) by his brother Abel, who made himself Duke of Slesvig or S. Jutland, and later King of D. (1326-30). Valdemar IV. Atterdag (1340), granted Slesvig in fief to the Duke of Holstein (1386). (See SLESVIG-HOLSTEIN.) His daughter Margaret (q.v.), a great queen, wife of King Hakon of Norway, conquered Sweden (q.v.) in 1389, and left the three Scandinavian kingdoms to be ruled by her favourite grand-nephew, Erik of Pommern. The three countries, bound together by the Calmar Union, 20th July, 1397, were soon lost by Erik. The Swedes achieved independence in 1448, and the Danes in the same year raised Christian of Oldenburg, a descendant of the old royal line, to the throne. Christian I. (q.v.), who founded the long line of Oldenburg, was also chosen by Norway, 1450, and by Slesvig-Holstein, 1460. From Christian II. (q.v.), 'the Wicked' (1503-23), the crown was transferred to his uncle, Frederik I., who again united D. with Norway and Slesvig-Holstein (1523-33). Christian III. (q.v.), son of Frederik (crowned 1536), united Slesvig-Holstein in perpetuity to D., codified the laws in the 'Recess of Kolding,' and introduced the Reformation (1536), but had little control over the lawless nobility. Frederik II. (1559-88) fought against Sweden for seven years, and Christian IV. (1588-1648) also made a vigorous effort to hold the kingdom together, which was partly frustrated by the arrogance of the nobles. Under Frederik III. (1648-70) the Swedish possessions were seized by Karl X. (1657), and the fiefdom of Slesvig was lost. On 8th September, 1660, Frederik was granted supreme power by the three estates. Christian V. (1670-99) instituted serfdom, and greatly oppressed the middle classes. In the reign of Frederik IV. the disputed claim to Slesvig was recognised (1720), and in the same year Sweden ceded to D. the right of receiving the Sound dues. A long period of tranquillity follows, chiefly marked by the restriction of the aristocratic privileges, the abolition of servitude (1787), and the general improvement of art, trade, and agriculture. In the beginning of the 19th c. Frederik VI., regent from 1784, king 1808-39, by his attitude towards Napoleon, involved D. in a ruinous war with Sweden, England, Prussia, and Russia — the chief events of which were the battle of Copenhagen under Nelson (1801), the storming of the capital itself (1807), when the entire fleet was surrendered to the English, and the subsequent cession (1814) of Norway to Sweden under Bernadotte. Christian VIII. (1839-48) made an effort to convert all the Danish possessions into one united state, and his scheme was taken up by his son, Frederik VII. (1848-63). In 1848 the Duchies of Slesvig and Holstein, with the connivance of Prussia, broke into open revolt on the subject of the succession, aggravated by the mutual dislike of the German and Danish inhabitants. But after a severe struggle the rebellion was eventually quelled by a victory at Jndsted, 25th July, 1850. The direct Oldenburg line, founded in 1448, expired on the death of Frederik VII., 15th November, 1863. Prince Christian of Slesvig-Holstein-Sonderburg-Glücksborg received the crown through his wife, a niece of Christian VIII., in conformity with 'the treaty of London' of May 8th, 1852. Again the question of the accession in the duchies was revived in all its force. The Prince of Augustenborg, styling himself Frederik VIII. of Slesvig-Holstein, renewed a spurious claim that had been disposed of in 1848. He was directly aided by Germany, and it soon became apparent enough that the Confederation was working for the sole possession of the duchies. On the 1st of February, 1864, an Austro-Prussian force crossed the Eider, and subsequently laid waste the country as far N. as the Lymfjord. The Danes, who had unhappily been led to expect the assistance of England, were soon overwhelmed in the unequal contest, and by the treaty of Vienna (30th October, 1864) had to surrender Lauenborg, Holstein, and Slesvig to the discretionary disposal of Prussia and Austria. The future of the duchies were made a question which led to the struggle for supremacy in the Confederation between the two great powers. Since the war of 1866 Slesvig-Holstein has ranked as a German province. The Slesvigers made a futile attempt to rouse public feeling on the subject in 1875. For history, see Allen's *Haandbog i Fädrelandets Historie*, and Dahlmann, *Geschichte von D.* to 1523 (Hamb. and Gotha, 1840-43).

Denn′ewitz, a village in the province of Brandenburg, Prussia, 42 miles S.S.W. of Berlin, where, on 6th September, 1813, General Tauentzien with 45,000 Prussians (mostly *landwehr*), after desperate fighting, forced 70,000 French, Saxons, and Poles, commanded by Marshal Ney, to commence a retreat. At this decisive moment Bernadotte, Crown-Prince of Sweden, joined the Prussians with upwards of seventy battalions of Russians and Swedes. The defeat of the French was instantly turned into a rout. They lost from 15,000 to 20,000 men, and 43 pieces of cannon; the allies from 5000 to 6000 men.

Denn′is, John, the son of a saddler, born in London in 1657, was educated at Cambridge, and after travelling on the Continent, settled at London as a professional critic. He produced numerous plays, poems, and tracts, joined the Whig party, and assailed his political and literary opponents with rancorous abuse. In return, Swift satirised him with merciless wit, and Pope 'executed' him in the *Dunciad*. He is now chiefly known through the terrible retaliation which his 'frenzied' strictures provoked. In his blind and poverty-stricken age a play was acted for his benefit, to which Pope, forgetful of former strifes, contributed a prologue. D. seems to have been of a sour and suspicious nature, but to have possessed some critical insight. He died 6th January, 1734. See D'Israeli's *Calamities of Authors*.

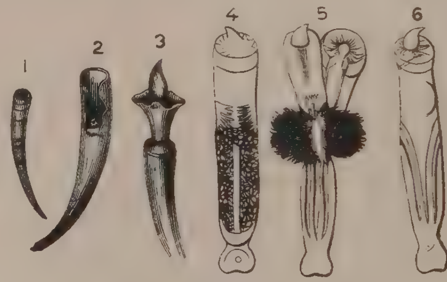
Denon, Dominique Vivant, Baron, was born at Châlons-sur-Saône, 4th January, 1747. For a time he was, ostensibly, a student of the law, but really of the fine arts, a page of the chamber and a gentleman-in-ordinary to Louis XV. His great artistic powers, however, came out after the Revolution, when he accompanied Bonaparte to Egypt, and in 1802 published his *Voyage dans la Basse et la Haute Egypte*, the engravings in which were greatly admired. Bonaparte was much attached to him, and made him Inspector-General of Museums, and D. accompanied him on various of his expeditions, the result being the addition of the art treasures of more than one conquered city to the Louvre. The celebrated Vendôme Column was constructed under his direction. D., who was an editor of considerable merits, was dismissed from his offices in 1815 after the fall of his master. He died 27th April, 1825, much respected for his excellent personal qualities as well as for his high taste in art. His most important work, left unfinished at his death, was completed by Amaury Duval, and published in 1829 under the title *Monuments des Arts du Dessin chez les Peuples tant Anciens que Modernes* (Par. with 315 plates).

Dénoue′ment (Fr. from *dénouer*, 'to untie'; Lat. *de* and *nodare*), strictly the unravelling or discovery of a plot, but generally applied to the catastrophe of a play or romance. A D. should rise naturally out of the plot, and should be recondite enough to exercise agreeably the reader or hearer's ingenuity.

Dens, Peter, a once famous Roman Catholic scholar and theologian, was born at Boom, a small town near Antwerp, in 1690. His life is almost unknown, the epitaph on his tomb at Malines being our only source of information regarding his career. We learn from it that D. was for twelve years theological reader or professor at Malines, where he likewise became canon, penitentiary, priest of St. Romuauld's, and for forty years president of the college. He died 15th February, 1775. His great work is his *Theologia Moralis et Dogmatica*, a minute and curiously casuistic vindication of Roman Catholic tenets in ethics and theology. It has no scientific merit, but is well known on the Continent, and is the favourite theological text-book in Roman Catholic colleges. An edition of this work was published at Dublin in 1832.

Den′sity (Lat. *densitas*, from *densus*, 'thick') of a body is the quantity of matter comprised in unit volume; or is given by the equation $V\rho = M$, where V is the volume, M the mass, and ρ the density of the body in question. It is *practically* the same as Specific Gravity (q.v.).

Denta′lium, or **Tooth Shell,** sometimes called the 'Elephant's Tusk' from its shape, belongs to the *Gasteropodous* class of molluscs, and to the family *Dentalidæ*, in which the shell is tubular, symmetrical, and of curved shape, open at both ends, and with an entire (*holostomatous*) circular aperture or mouth. The foot is pointed, and has symmetrical *Epipodia* or side lobes. Huxley placed D. in the class *Pteropoda*, from its possessing a rudimentary head, a neural flexure of intestine, the presence of the epipodial lobes of the foot, and from its development. *D. arcuatum* is the familiar species. Fossil species of D. occur in the Devonian, Carboniferous, Mesozoic, and Tertiary formations.



Dentalium.

1, Shell of Dentalium; 2, Shell magnified and fractured (animal contracted); 3, Animal advancing from the shell; 4, Animal magnified (abdominal aspect); 5, Animal magnified and cut open (internal formation); 6, Animal magnified (dorsal aspect).

Denta′ria, a genus of herbaceous perennial plants belonging to the natural order *Cruciferæ*, and more commonly known by the popular name of Toothwort, of which their scientific one is the Latin translation. There are many species, natives of temperate America and Europe. The roots of *D. diphylla* (Pepperwort) have a pungent taste, and are used by the settlers in the region of America where it is found as a substitute for mustard. *D. bulbifera* is a native of the southern portion of England.

Denta′tus Man′ius, according to some **Marcus Curius,** the most famous of the Curii, was said to have derived his surname of D. from having been born with teeth. He was of Sabine descent. After holding the office of tribune of the people, he was elected consul in 290 B.C., and compelled the Samnites to sue for peace after they had waged war against Rome for forty-nine years. Immediately after, he subdued the Sabines, and thus celebrated two triumphs in his first consulship. In his second consulship (B.C. 275), D. defeated Pyrrhus, King of Epirus, near

Beneventum, as he was returning from Sicily, and obliged him to quit Italy. His triumph was distinguished by four elephants, the first ever seen at Rome. The booty taken from Pyrrhus was wholly given up to the republic. Elected consul for a third time (B.C. 274), he brought the final war with the southern Italians to a successful issue. In 272 B.C., during his censorship, D. built an aqueduct which brought the water of the Arno into Rome. He also dug a canal, by which the waters of Lake Velinus were precipitated into the river Nar from a height of 140 feet. This is the famous Cascata del Marmore, which inspired the splendid stanzas of Byron (*Childe Harold*, Can. iv. st. 69-72). He then retired to his Sabine farm, to devote the rest of his life to agriculture. D. is the type of the old Roman simplicity and valour, and many anecdotes finely flavoured with a spirited patriotism and unselfish honour are recorded of him.

Den'tex, a genus of Teleostean fishes included in the family *Sparidæ* (Sea-Bream, &c.). This genus, of which the common D. is a familiar species, is found in the Mediterranean Sea, and occasionally on the S. British coasts. It has a compressed body, somewhat resembles the perch in shape, has a single continuous dorsal fin, scaly cheeks, and numerous minute teeth, with several larger teeth of pointed conformation. The common D. was the D. of classical writers. Its average length is from 3 to 4 feet, and its weight from 18 to 30 lbs. It is eaten both fresh and pickled in the Levant.

Den'tifrices (Lat. *dens*, 'a tooth,' and *frico*, 'I rub') are preparations for cleansing the teeth. The daily cleaning of the teeth is of the greatest importance, which should be early inculcated on children. If teeth were regularly cleaned and examined for incipient decay, not only toothache, but many more remote evils would be averted, for much imperfect digestion arises from imperfect mastication. Many preparations are puffed as wonderful D., but one tooth-powder is as good as another, provided there be nothing contained therein injurious to the teeth or the gums—any hard substance which may destroy the enamel of the tooth, or any matter which may loosen the gums or cause them to retract. If the taste be not objectionable, soap rubbed on the tooth-brush is a perfect dentifrice. The best tooth-powder is finely ground chalk mixed with a very little soda, to which some aromatic ingredient, such as orris powder, is added, together with an astringent for action on the gums. Above all things, the teeth should be cleansed before bed-time, so that no particle of injurious matter may rest upon a tooth during the hours of sleep, when the tongue and lips are still and cannot be employed in removing the decaying obstruction. There is also another reason for this course, when tooth-powder is used. Whatever medical property may exist in the D., it will have more opportunity of doing good to the teeth or the gums throughout the night, when no food or drink is taken, which, of course, carries away any of the powder remaining within the mouth after use. The common habit of washing away the powder is an absurd one—wash and brush the mouth and teeth thoroughly with water first, then use the powder in moderate quantity, and allow it to remain on the teeth and perform the duties for which it is employed; not the least important being one of counteracting the action of the acids arising from the stomach. The movement of the tooth-brush should be always from the gum and not against it, as the latter should never be encouraged to recede.

Den'tine, a tubular structure forming the chief part of the Teeth (q.v.).

Dentiros'tres (Lat. 'tooth-beaked'), one of the four sub-orders of the order *Insessores*, or Perching birds, chiefly distinguished by the upper mandible being notched in its lower margin near the tip. Most of the D. are insect-eaters. The chief families are the Shrikes, Fly-catchers, Thrushes, Tits, and Warblers.

Den'tistry, as comprising dental surgery and dental mechanics, is the art of one who treats diseases of the teeth, and who fashions artificial sets. Both branches of D. have been greatly advanced of late years, the surgery branch having been formulated into a regular course of academic instruction, and the mechanical section having been entirely reformed by the application of scientific inventions.

Dental Surgery.—The chief operations in dental surgery are (1) scaling; (2) regulating; (3) stopping; and (4) extracting.

Scaling is the removal of *tartar* from the base of the teeth by means of small pointed steel instruments, and is a most necessary operation, as the accumulation of this substance absorbs and irritates the gums, and gradually loosens and decays the teeth. As a preservative, it ought to be undergone periodically, especially when the teeth are not regularly cleaned. *Regulating* is the restoring of overcrowded or displaced teeth to their proper position, by the gradual pressure of 'regulating plates.' Teeth that have been regulated required to be maintained in their new position for some six months.—*Stopping*, or *Stuffing*, is a process performed by filling in the hollow of a decayed tooth, so as to stay the progress of decay and save the nerve from exposure. It is often necessary, however, to destroy the nerve before stopping, and this is best done by applying a pellet of cotton wool steeped in arsenious acid, chloride of zinc, or carbolic acid, for a period of at least twelve hours. The decayed hollow must then be carefully scooped out with the 'excavators' till the hard wall of dentine is laid bare. For a temporary stopping the substance commonly used is gutta-percha; the chief permanent stoppings are gold, white enamel fillings, and amalgams. After the hollow is well dried, the stopping is pressed firmly in, and the plug is smoothly finished off at the proper height of the tooth. In gold stopping, which is by far the most difficult process, the strips of gold-leaf or pellets of 'sponge-gold' are packed so that their ends, and not their flat surfaces, shall present at the top of the cavity. The gold would be apt to peel off if laid in, like the other plugs, in layers. The top is finished off by burnishing.—*Extracting* ought to be the last remedy of the dentist, as it is also the operation he is oftenest called upon to perform. It requires the use of, at least, some five pairs of forceps, and of an elevator or tooth-punch; the forceps are adapted to the variety in size, form, and situation of the different teeth. The tooth to be extracted must be carefully seized by a sound part, and its detachment from the socket should be by a lateral or semi-rotary motion in the direction in which it will offer the least resistance. This necessarily presupposes, on the part of the operator, a knowledge of the anatomical peculiarities of the teeth.

To arrest the progress of decay in the teeth is the first object of the dentist, and hence the importance of scaling and stopping. But when a tooth is too much decayed to admit of stopping, and is occasioning pain, it is to be removed altogether. It may be well to state that a skilled dentist can best decide whether a tooth should be treated by stopping. In the extraction of teeth, anæsthetics, local and general, are now widely used; chloroform and ether giving place rapidly to nitrous oxide gas. This last, although it requires to be used cautiously, like other anæsthetics, may be safely employed, except on children under seven years of age, or when the patient is very old, or of plethoric habit, or when he suffers from hæmoptysis or pulmonary disease.

Dental Mechanics.—This department of D. mainly deals with the replacement of lost teeth by artificial ones. It also embraces the treatment of deformities of the mouth, as in cleft palate. (See PALATE.) The manufacture of the teeth employed by the dentist has risen into an independent industry of great importance, in which there is a strong competition between the great producers, basing on various inventions, and holding as secret their different processes. The composition of which the teeth are generally made consists of certain proportions of kaolin (white clay), silex, and felspar; none of these minerals are fusible at a low temperature, nor, when fused, are they acted upon by acids. After an elaborate system of moulding, enamelling, and baking, the teeth receive their colours and shades from a delicate manipulation of metallic oxides. The main operations of the dentist are—(1) taking an impression of the mouth in beeswax, plaster of Paris, or in certain compositions; (2) casting a model from the impression in plaster or in zinc, occasionally with a counterdie in lead; (3) forming, by means of the dies, a vulcanite base, a celluloid base, or plates in gold, dental alloy, or in alloys of gold, copper, silver, platinum, &c.; and (4) adjusting and fixing the teeth upon the base or plate.

The dentures may be either partial or complete, *i.e.*, may either embrace a few or an entire set of teeth. Single teeth are usually fixed in a peculiar manner. A pivot attached to the artificial tooth is passed into the natural pulp cavity, which has been previously prepared; when a wooden pivot is used, it is maintained in position by the swelling of the wood, when of metal, the pivot is properly fastened with mastic, &c. The vulcanite base is in more general use than the gold plate, and its construction necessarily is now carried to great perfection. The celluloid base above mentioned consists of collodion, a preparation of camphor and gun-cotton, and was first produced in 1871. It is easily prepared, and is light and comfortable to wear, while its pink is natural in appearance. See Tomes' *System of Dental Surgery*, Oakley Coles' *Dental Mechanics*, and Sewill's *Anatomy and Dental Surgery.*

Denti'tion, the name applied to the process of tooth-development and succession, and also to the arrangement and description of the various teeth found in the mouth, particularly of *Mammalia* (q.v.). Most mammals have two sets of teeth, and are hence termed *diphyodont;* those in which one set only is developed are termed *monophyodont.* The first set is named the *milk, temporary*, or *deciduous* set. The teeth in mammals are never united by bony union or *ankylosis* with the jaw-bones as in lower forms; and they are confined to the jaw-bones, being developed from *alveoli* or *pockets.* The different kinds and structure of teeth are described in the article TEETH (q.v.), and their functions under the head of DIGESTION (q.v.). Naturalists express the arrangement of the teeth in any animal by a *dental formula.* The dental formula of man runs as follows:—

$$\text{I. } \frac{2-2}{2-2} \quad \text{C. } \frac{1-1}{1-1} \quad \text{P.-M. } \frac{2-2}{2-2} \quad \text{M. } \frac{3-3}{3-3} = 32$$

And that of the sheep, for example, is thus stated:—

$$\text{I. } \frac{0-0}{3-3} \quad \text{C. } \frac{0-0}{1-1} \quad \text{P.-M. } \frac{3-3}{3-3} \quad \text{M. } \frac{3-3}{3-3} = 32$$

The meaning of these convenient formulæ is readily understood. The letters stand for the various kinds of teeth (incisors, canines, præmolars, and molars). The figures *above* each line indicate the teeth in the *upper* jaw; those *below* the line indicating the teeth in the *lower* jaw; whilst the further division of the figures, above and below each line, indicate the number of teeth in each side of each jaw respectively. We read the D. formula of man, then, as expressing that he has 2 incisors in each side of each jaw; 1 canine in each side of each jaw; 2 præmolars in each side of the upper, and the same number in each side of the lower jaw; and 3 molars in each side of each jaw—making a total of 32. Similarly in the sheep, there are no incisors and no canines in the upper jaw, but 6 incisors (3 in each side) and 2 canines (1 in each side) of the lower jaw; and then there are 6 præmolars and 6 molars in both upper and lower jaws. In man the teeth are developed in little sacs (*dental sacs*) formed in the gums, the little *papilla* or process enclosed in each sac becoming encrusted, as it were, by the hard structures of the tooth, and the papilla itself forming the pulp of the future tooth. The temporary or milk-teeth are gradually pushed out by the permanent teeth, or they may decay or be absorbed. The milk-teeth of man number 10 in each jaw, and thus comprise 4 incisors, 2 canines, and 4 molars. These 10 teeth are replaced by the permanent teeth, and in addition 6 other teeth appear in the permanent set of each jaw, the latter being the true molars, which are thus not represented in the milk set. The permanent teeth are being developed during the formation of the milk teeth, each permanent tooth being, in fact, developed in a little sac partitioned off from the dental sac in which its milk predecessor is formed. In the seventh month after birth, the central (lower) milk incisors generally appear, the molars about the thirteenth month, and the milk set may be completed from the eighteenth month to the second or even third year of life. The permanent teeth appear about the seventh year of life; the first true molar generally being developed before the other teeth, and being soon followed by the permanent central incisors. The permanent canines appear about the twelfth year of life; and the last molars, or 'wisdom teeth,' may vary in their development from the sixteenth or seventeenth, to the twenty-first or twenty-third year of life.

D'Entrecasteaux', the name given in memory of a French navigator to an archipelago, cape, and channel in Australasia.—1. The *archipelago* lies in the S. Pacific, E.S.E. of New Guinea, in S. lat. 10°, E. long. 151°.—2. The *cape* is on the S.W. coast of W. Australia, in S. lat. 34° 52', E. long. 116° 1'.—The *channel*, about 40 miles in length, and from 3 to 9 miles in breadth, divides Bruné Island from the S.E. coast of Tasmania, its centre being in S. lat. 43° 25', and E. long. 147° 6'. It contains several excellent harbours.

Denuda'tion (Lat. 'the making *nude* or bare'), in geology, the term applied to the wearing away of rock masses, and to the consequent laying bare of underlying rocks. The chief agents which effect D., are rivers, glaciers, and ice action generally, rain, atmospheric action, &c. D. is thus another name for the reconstruction of rocks, since from the matters taken from the land new sedimentary formations are produced. The consideration of D. leads the geologist to study how the features of our earth have been sculptured out. The process of D. may be divided into *subaërial D.*, as effected by rivers, ice, &c., and *marine D.*, as effected by the sea and its tides. Subaërial denudations cut down the land surfaces into valleys, whilst marine D. tends to form plains.

Deob'struents (from Lat. *de*, 'away,' and *obstruere*, 'to obstruct') are medicines which remove any abnormal enlargement or tumour. Certain medicines, when taken internally, or when rubbed on the skin, cause absorption of enlarged glands and other tumours. Among the most powerful of these are iodine, bromine, and mercury, with their several preparations.

Deoband', a town of British India, district of Saharanpur, N.W. Provinces, 20 miles S.E. of Saharanpur, between the Hindun and Kali Nadi, branches respectively of the Jumna and the Ganges, and on the railway from Saharanpur to Muzaffarnagar. Pop. 19,250, of whom 8049 are Hindus, 10,871 Mohammedans, 324 Jains, 3 Christians, and 3 are Sikhs. The Mohammedans are in the ascendant, and possess over 40 mosques, but D. is really a Hindu town, dating back some 3000 years, and was called the 'Sacred Grove,' where a religious festival took place at certain times. Grain, oil, and sugar, together with fine cloth, are the chief exports from D. and the surrounding country.

De'odand. Formerly, by the law of England, any personal chattel (see CHATTEL) which by accident caused the death of a human being was forfeited to the crown or lord of the manor, that it might be sold, and the proceeds distributed among the poor. No forfeiture, however, took place when the victim was an infant under the years of discretion, and the horse, cart, &c., which had caused the death, was not in motion at the time. D., as the name imports (*Deo dandum*), was originally an atonement to God for the untimely death of one of his creatures. Deodands are abolished by 9 and 10 Vict. c. 62.

De'odar. See CEDAR.

Deodar', or **Diodar,** a protected independent state, in the N.W. of Guzerat, India, with an area of 440 sq. miles, and a pop. of 24,061, mostly Kolis and Rajputs. The revenue is estimated at £2500. The country is simply an open plain, where no system of irrigation exists, owing to the absence of streams and springs. Butter is the only export. There is no army. Each village forms the capital of an independent community. D. having become a haunt of robbers, the East India Company assumed the protection of it in 1819.

Deo'dorisers are chemical substances which have the power of destroying odours. D. may or may not be Antiseptics (q.v.) or Disinfectants (q.v.).

D'Eon, The Chevalier, a famous diplomatic agent, was born of an ancient family at Tonnerre, Burgundy, 2nd October, 1728. He was employed on a mission to St. Petersburg in 1755, was aide-de-camp to Marshal Broglie in the campaign of 1762, in 1763 accompanied the Duc de Nivernois to England as secretary, whose place he filled when the Duc left this country, till he was superseded by the Comte de Guerchy. In 1771 his sex began to be doubted, since he had, from caprice, or from purposes of intrigue, dressed as a female. He returned to France in 1777, when he assumed the female dress at the request of the queen, and in 1785 revisited England, where he died, 21st May, 1810, when medical inspection put the question of his sex beyond doubt. D. wrote various historical and political works, which were published in 13 vols. in 1775.

Deoxida'tion, or **Reduc'tion,** signifies the removal of oxygen from a substance. Most metals are separated from their ores by D., for, in the majority of cases, the ore is an oxide of the metal, or is converted by roasting into the oxide. (See METALLURGY.) The deoxidising agent employed in the extraction of metals generally contains carbon—an element having, at a high temperature, a strong affinity for oxygen. When the oxide is heated with carbon, the latter abstracts its oxygen, and combines with it, forming carbonic oxide, or carbonic acid. Carbonic oxide is itself a powerful reducing agent, being prone to take up oxygen and pass into carbonic acid. Thus carbonic oxide is often purposely produced (by burning carbon in a limited supply of air) for the purpose of reduction, instead of acting on the substance to be reduced with carbon alone. This is the case in Iron Smelting (q.v.).

Depart'ment (Fr. *département*), a name widely applied in England to a section of the administration, as the Home D., the Education D., &c., but used to designate a territorial division of France since 1789. After the abolition of the aristocracy, Mirabeau suggested that, as the existence of large provinces tended to prevent centralisation and to foster local power, a subdivision should be made, and this was followed by the redistribution of the thirty-four provinces into eighty-three departments by decree of the Assembly, dated 16th February, 1790. These departments, named usually after geographical features, were subsequently increased to 140, but were again reduced to eighty-three at the peace of 1814. Their number has varied greatly with the vicissitudes of the nation, and now amounts to eighty-seven. They elected their own governors till Napoleon I. took away the privilege, and established the right of the head of the state to place over each a *préfet* and a *conseil de préfecture*. The D. is divided into arrondissements, each of which is under a *sous-préfet*, while the arrondissements are subdivided into cantons, and these again into communes, corresponding somewhat to our parishes. Several of the states of Central and S. America have adopted a division into *departimientos*, which correspond, however, only in name to those of France.

Depen'ding Action. In Scotch law, an action is held to be in dependence from the moment of the Citation (q.v.) until the final decision of the House of Lords, should an appeal be made to that tribunal. During dependence, the pursuer is entitled to use Inhibition (q.v.), or Arrestment (q.v.), as security for fulfilment of the decree by the defender, should judgment be against him.

Dephal, a tree, a native of India, the fruit of which, though eaten, is inferior to that of its congeners, the Bread-Fruit (q.v.) and Jack (q.v.). The wood is used for building, the root for dyeing, and the thick, tenacious juice for birdlime.

Depil'atories, or **Epil'atories** (Lat. *de*, and *e* or *ex*, 'from,' and *pilus*, 'a hair'), are substances used to remove hair from the face or body. The safest D. are made with quicklime and other ingredients, as sulphate of sodium and starch, made into a paste and applied to the part. Sulphide of barium has been used for D. instead of quicklime. Orpiment, the yellow sulphide of arsenic, is sometimes mixed with lime to form D. D. containing arsenic are dangerous. Orpiment one ounce, quicklime one pound, starch ten ounces, and sufficient water to make a paste, is supposed to constitute the famous D., the *Rusma* of the Turks.

Deploy' (Fr. *déployer*, 'to unfold'), in military nomenclature, means to form or extend troops from column into line.

Depos'it (Lat. 'a laying down'), in geology, a name given to sedimentary or aqueous rocks made by the Denudation (q.v.) and 'laying down' of other formations. Deposits are *marine* when formed in the sea, *lacustrine* in lakes, *fluviatile* in rivers, &c.

Deposit, in English law, either a monetary payment to bind the sale of real estate, &c., or a bailment of goods to be kept by the bailee, without reward, and delivered according to the object and purpose of the trust. The principles of the Roman law regarding D. have been adopted by modern nations; and in Scotland the name of the contract is preserved. He who deposits is called the *depositor;* he who receives, the *depositary*. The contract is completed by delivery of the subject. The right of property and risk remains with the depositor, on whom, if the subject is injured or destroyed accidentally, the loss falls. The depositary, until the subject is demanded back, is liable only for gross negligence; but if he unduly delay to re-deliver the subject after requisition, he will be liable for an accident. There are special kinds of D. See CONSIGNMENT; NAUTÆ, CAUPONES, STABULARII; TRUST, STOPPAGE IN TRANSITU.

Deposi'tion, in English and Scotch law, signifies the testimony of a witness taken in writing. Information given on oath, and the evidence of witnesses before magistrates and coroners, are put into writing in the words used by the witnesses, or as nearly so as possible. The person who makes oath judicially is called a *deponent*. Evidence in the Court of Chancery was formerly taken in written answers to written questions. By the Law of Evidence (q.v.) a D. cannot be received where the witness can be himself produced, unless he has become insane since giving his testimony; but may be used when he cannot be found, or is without the jurisdiction of the court. In criminal proceedings, by 11 and 12 Vict. c. 42, the deposition, or evidence taken down in writing of a witness at the preliminary hearing may be read in court when the witness is dead or unable to be present, should the prisoner have had full opportunity of cross-examining the witness at the time of the deposition. Under 30 and 31 Vict. c. 35, a deposition may be taken of the evidence of a witness who is dangerously ill, by a justice of the peace, and the deposition may be read at the trial should the witness be dead or in a state which renders him incapable of travelling or giving evidence at any time, provided prisoner has had the opportunity of cross-examination. See DYING DECLARATION.

Deposition is an ecclesiastical sentence on a clergyman for crimes, scandalous immorality, or promulgating doctrine contrary to the standards of his church, or for farming or trading in contradiction to the law after being twice previously convicted, &c. It amounts to degradation from his office—that is, a total and perpetual suspension of the power and authority committed to him in his ordination, reducing him to the condition of a layman, and removing all emoluments he may enjoy as a clergyman. In churches which hold the indelible nature of Orders, the clergy may be *deprived* but cannot be *degraded*. See Bingham's *Ant. of the Christian Church*, and Blunt's *Dictionary of Doctrinal and Historical Theology*.

Depot (Fr. *dépôt*, from Lat. *de*, 'down,' and *positum*, 'placed'), in military language, a place where army stores are kept and recruits trained. The term is now usually applied to that portion of a brigade which remains at home while the rest are upon foreign service. The regimental D. system has existed in the British army since about 1825, but it was not completely developed until 1872, when Great Britain and Ireland were distributed into military districts and sub-districts, each of the latter apportioned to a brigade with a D., and having a lieutenant-colonel appointed to it. The sum of £3,500,000 was voted by the House of Commons in 1872 to provide for the development of the D. system. Formerly a man enlisted into a regiment or a battalion of the line, he now enlists into a brigade, and is drafted off as required. Canterbury is the cavalry D. for the whole country, and under the Localisation of Forces Act, there is an infantry D. for each sub-district. The brigade depots and districts were afterwards called regimental districts, and in this way they are now known. The regimental districts have also been renumbered; the number of the district being that of the first battalion as it was before the changes. Thus the regimental district No. 34 is the district of the regiments which were formerly numbered 34 and 55; the former being now the 1st, and the latter the 2nd, battalion of the new 'Border Regiment.' The depot is at Carlisle, and it is to Carlisle that all the recruits for the Border Regiment have to be sent. See DISTRICTS, MILITARY.

Depres'sion, Angle of, in trigonometry, is the angle which the line drawn from the spectator to an object *below* him makes with the horizontal plane. Hence the D. or dip of the horizon is this D. from the true horizontal plane, due to elevation of the observer above the surface of the earth. This is the *true dip*, with which the observed dip never agrees, on account of the refractive power of the atmosphere. The true dip in minutes gives the distance to the observed horizon measured in nautical miles, an exceedingly convenient rule for the mariner, to whom the dip is of the greatest importance.

Depriva'tion is an ecclesiastical censure whereby a clergyman is deprived of all the revenues and privileges of his benefice, and all control over it. It may be temporary or perpetual. Perpetual D. necessarily forms a part of Deposition (q.v.), along with degradation, and temporary D. is one of the forms of Suspension (q.v.).

De Profun'dis ('out of the depths'), the first words in the Latin Vulgate of the 130th Psalm, forming part of the burial service in the Roman Catholic Church. It is appropriately sung at the moment when the body of the dead is committed to the 'depths' of the earth, and the hearts of pious mourners can only be cheered by the closing assurance of a 'plenteous redemption.'

Dep'tford ('the deep ford'), a town partly in Kent and partly in Surrey, on the right bank of the Thames, at the mouth of the Ravensbourne, 4 miles E. of London. Most of the inhabitants are employed in the works and shipbuilding yards. The Master and Brethren of the Trinity House of D. Strond have a hall and two sets of almshouses here. In 1885 D. was constituted a parliamentary borough, returning one member to Parliament. It consists of the par. of St. Paul, Deptford (Kent), and Hatcham (Surrey), and has a pop. of 101,286.

Deptford Dockyard was established for shipbuilding purposes by Henry VIII. in 1513, and was subsequently used also as a victualling depot for the British navy. In 1865 shipbuilding was discontinued, the slips being unfit for the large war-ships, and D. D. was for a short time the principal victualling yard for the British navy at home and foreign stations. It also supplied clothes, bedding, and other naval stores. On 31st March, 1869, it was purchased by the City of London Corporation for £94,640 to be used by them as a market for foreign cattle. It was opened for this purpose on 28th December, 1871.

Dep'uty (Fr. *deputé*, from Low Lat. *deputo* = Class. Lat. *delego*, 'I send or place in the stead of another'), one who exercises an office under another. The principal is liable for the acts of his D., but the grantor is not liable for the acts of his assignee. No judge has the power to appoint a D. unless authorised to do so by the grant to himself. A D. appointed by a D. is usually called a substitute, but this can be done only under special authority, since a D., as a rule, cannot appoint a D. See ASSIGNS, SHERIFF, &c.

De Quin'cey, a great English prose writer, was the son of a Manchester merchant, and was born at Greenhay, near Manchester, 15th August, 1785. He received his early education at Bath and at Manchester, and was a student at Oxford from 1803 to 1808. Thenceforth until 1829 he resided chiefly at a cottage in Grasmere in the Lake country, becoming intimate with Wordsworth, Coleridge, and Southey, and contributing largely to journals, especially to the *London Magazine* and *Blackwood*. During this period he became a confirmed opium-eater, having at first indulged in the drug to allay physical pain. In 1816 he was taking 8000 drops a day, but, after several years of suffering and mental lethargy, he, to a great extent, renounced the habit. Little is known of his life until 1843, when he settled at Lasswade, near Edinburgh. He died at Edinburgh, 8th December, 1859. D. was an exquisite writer and scholar, and a fascinating conversationalist, but his fragmentary works are evidently the outcome of a fitful and relaxed though powerful genius. They are distinguished by imaginative grandeur, subtle originality, and a luxuriance of erudite diction, and are unsurpassed for the stately pomp and artful melody of the sentences, but are occasionally marred by a wayward fondness for paradox. D. claimed to have introduced 'a new *mode* of impassioned prose,' in which the writer's individual experiences are rendered interesting by the splendour of the literary setting, as in his *Confessions of an English Opium-Eater*, his *Autobiography*, and in the dreamy, fiery, rhapsodies of the *Suspiria de Profundis*, the finest of all his works. His other writings comprise critical essays on Homer, Milton, Shelley, Wordsworth, Greek tragedy, the Greek orators, &c.; biographies of Shakespeare, Pope, Göthe, and Schiller; superb historic or visionary descriptive pieces, such as *The Cæsars*, *Joan of Arc*, *The Revolt of the Tartars*, *The English Mail-Coach*; and miscellaneous articles on the most varied subjects —*The Theban Sphinx*, *Political Economy*, *Judas Iscariot*. His peculiar humour is shown in his *Murder Considered as one of the Fine Arts*. D. was among the first writers who leavened English literature with German thought. See his *Life and Writings*, by H. A. Page.

Derajat' (from *dera*, 'a camp'), a division, under a Commissioner, of the Punjab between the Suliman Mountains and the Indus, 250 miles in length, with a maximum breadth of 60 miles. It is watered in the N. by the Gannil. The chief towns are Kulachi, Edwardesabad, Leia, Rajanpur, and Lakki. D. embraces the districts of Dera Ismail Khan (area 9440 sq. miles; pop. 486,201), Dera Ghazi Khan (area 5606; pop. 404,031), and Bannu (area 3847; pop. 372,276). Much of the division is occupied by barren tracts and forest reserves. Iron, copper, and lead are found. Coal of good quality exists but is not worked. Wild game is abundant. Indigo, opium, cotton, wheat, barley, and hides are the chief products.

Der'bend, or **Derbent** ('the shut-up gates'), capital of the government of Daghestan, Trans-Caucasia, Asiatic Russia, on the W. shore of the Caspian. It lies at the mouth of a defile, is in the form of a parallelogram, three miles long by half a mile broad, and is surrounded by a massive wall with two large gates. D. is the ancient *Albaniæ Pylæ*, and is said to have been originally fortified by Darius I. as the key of the Persian Empire on that side. Much saffron is grown in the neighbourhood, and there are manufactures of copper and iron vessels and woollen stuffs. Pop. 24,380.

Derby, the county town of Derbyshire, on the right bank of the Derwent, at the fringe of a mining district, and 132 miles N.N.W. of London by railway. It stands in a beautiful and fertile valley, and is built mostly of brick, the chief buildings being the town-hall, market-hall, corn exchange, free library (1876), infirmary, theatre, county lunatic asylum, and School of Art (1877). The chief churches are All Saints (rest. 1876), and St. Alkmund. In 1867 T. Bass presented the municipality with a recreation ground. Its grammar-school was founded in 1162. There are large markets here on Tuesdays and Fridays. The chief manufactures are silk, cotton, iron chemicals, paper and porcelain. The famous *D.*

China, distinguished for its beautiful flower-painting, has been manufactured here since the middle of the 18th c. (See *Old D. China Factory*, by J. Haslem.) The cutting and polishing of Derbyshire marble or flint spar is also a large industry. The name D. is derived either from *Deoraby*, the name which the Danes gave the English *Northweorthige*, or from *Derventio*, the Roman station, or, most probably, is a contraction from Derwentby, the village on the Derwent. D. returns two members to Parliament. The parl. bor. of D. comprises the old bor. of D., the townships of Litchurch and Little Chester, and parts of Normanton, Littleover, and Markeaton. Pop. county bor., co-extensive with parl. bor., 94,146; reg. dist. and reg. sub-dist. (each) 95,077. See Bemrose, *Derbyshire Guide*.

Derbend.

Der'by, the titular name of a great English family, which took its rise in the lordship of Stanleigh (Stony Lea), in the county of Derby, afterwards exchanged for another property in Staffordshire. The most distinguished of the earlier members of the family are **Thomas Stanley**, whose father was made Lord Stanley in 1456, and who, at the battle of Bosworth, by espousing the side of the Earl of Richmond against Richard III., ensured the success of the former, and crowned him as Henry VII. He was in 1485 rewarded with the dignity of Earl of D. and the position of Lord High Steward of England.—**James Stanley**, seventh Earl of D. who took the Royalist side during the civil war, having been taken prisoner at the battle of Worcester in 1651, was beheaded at Bolton in the same year. His widow, Charlotte, daughter of the Duc de Tremouille, is famous for her gallant defence against the Parliamentary forces of Latham House and the Isle of Man, which through marriage had come into the possession of the Stanley family. She had in the end to yield, but lived to see the restoration of Charles II. To the present century belong two illustrious members of the family. **Edward Geoffrey Smith-Stanley, 14th Earl of D.**, was born at Knowsley Park, Lancashire, 29th March, 1799. He was educated at Eton and Christchurch, Oxford, where, in 1819, he gained the Latin verse prize. D., then known as Mr. Stanley, threw himself keenly into politics on the Whig side, was returned for Stockbridge in 1820, and subsequently for Preston, Windsor, and N. Lancashire. In 1830 he became Chief Secretary for Ireland under the administration of Earl Grey, took an important part in the passing of the Reform Bill of 1832, and carried two important measures, the one relating to Irish Church temporalities, and the other giving national education to Ireland. At the same time he reached the first rank among parliamentary speakers by his fiery eloquence, which, aided by a singularly fine presence, gained for him the title of the 'Rupert of Debate,' and by his quickness of retort, which has been compared to an instinct. He was looked upon as the ablest opponent of O'Connell in his movement for the repeal of the Union. In 1833 he became Colonial Secretary, and carried the measure for emancipating the slaves in the West Indies. In 1834 D. seceded from the Cabinet on the Irish Church question, and subsequently was identified with the Conservative party. He became Colonial Secretary in the Peel administration of 1841; in 1845, when Sir Robert Peel brought in his bill for the repeal of the corn laws, he withdrew from it, and became the chief of the Protectionist party. D., after his succession to the earldom in 1851, thrice became premier—from February to December, 1852; from February, 1858, to June, 1859, when he was overthrown on the question of parliamentary reform; and from June, 1866, to February, 1868, when, with the help of Disraeli, he carried a Reform Act, which, however, was so completely modified by the Liberal opposition, that, according to the unimpeachable testimony of the Duke of Buccleuch, nothing was left of the original bill but the word 'whereas.' In February, 1868, failing health compelled him to resign office, and he was succeeded as Premier by Disraeli. He died 23rd October, 1869, his last public act being to protest in the House of Peers against Gladstone's bill for the abolition of the Irish Church. D. was a man of high scholarship, as is shown by his translation of Homer's *Iliad* into unrhymed iambics (Lond. 1864), which has received just praise for its elegance and exact rendering of the original. But it is not poetry: it is only admirable verse, expressed in faultless English. In 1852 D. was elected to succeed the Duke of Wellington as Chancellor of the University of Oxford. In 1825 he married the second daughter of the first Lord Skelmersdale, by whom he had a considerable family.—**Edward Henry Smith-Stanley, 15th Earl of D., K.G., D.C.L., LL.D., F.R.S.**, eldest son of the above, was born at Knowsley Park, 21st July, 1826, and educated at Rugby and Trinity College, where he took a first class in classics, in addition to other honours, in 1848. In December of the same year, and while absent in America, Lord Stanley, as he was then styled, was elected M.P. for King's Lynn, and in 1850, after a tour in the West Indies, made his mark in the House of Commons by a speech upon our sugar colonies. In the course of a tour in the East, D. was appointed, March, 1852, Under-Secretary for Foreign Affairs under his father's first administration. D., who at this time was thought by many to be more of a Liberal than of a Conservative, was in 1855, on the death of Sir William Molesworth, offered the seals of the Foreign Office by Lord Palmerston, but declined to quit his party. In 1858, under his father's second administration, D. became, first Colonial, and then Indian, Secretary. It was while he held the latter office that the Indian mutiny was suppressed, and the management of our Indian Empire transferred from the East India Company to the Home Government. In his father's third administration of 1866, and in the succeeding administration of Disraeli, D. held the seals of the Foreign Office, and obtained (at the time) much popularity by his settlement of the Luxembourg difficulty. He greatly assisted Disraeli in carrying through his Household Suffrage Bill. D., who succeeded to the peerage in 1869, again became Foreign Secretary in February, 1874, on the accession to power of Disraeli. This office he held till 1879. In 1881 he seceded from the Conservative party, and was Secretary of State for the Colonies in Gladstone's second ministry; but on the introduction of the Home Rule for Ireland Bill in 1885, Lord D. joined the section of the Liberal party now called the Liberal Unionists. He was a member of the Cambridge University

Commission, 1856-60; chairman of the Commission on the Sanitary State of the Indian Army in 1859-61. He was installed Rector of the U. of Glasgow, 1st April, 1869, and on 18th December, 1875, Rector of that of Edinburgh. D. was strangely unlike his perfervid and chivalrous sire. He was the reverse of eloquent, was distinguished simply by strength and sobriety of judgment, by the practical philosophy of his singularly lucid speeches, and by freedom from sentimentality. He died 21st April, 1893, and was succeeded by his brother, Frederick Arthur Smith-Stanley, who, as a Conservative, represented, in the House of Commons, Preston (1865-68), N. Lancashire (1868-85), and Blackpool div. of Lancs. (1885-6); and was a Lord of the Admiralty (1858), Financial Secretary, War Office (1874-77), Financial Secretary, Treasury (1878), Secretary for War (1878-80), Secretary for Colonies (1885-86), President of the Board of Trade (1886-88), and Governor-General of Canada (1888-93). The present peer is the 16th Earl of D., and sat in the House of Lords as Baron Stanley of Preston before the death of his brother, the late Earl of D. He is also a Baronet, G.C.B., and P.C.

Derby-Day, the second day of the Summer Meeting at Epsom, when the Derby stakes of 50 sovereigns each, instituted by the Earl of Derby in 1780, are run for. It falls on the Wednesday after Trinity Sunday, and is the great London holiday. Formerly, even Parliament was adjourned over D.-D., but such is not the case now. For hours the road from London to Epsom presents a throng of vehicles of every kind, and the humours of the road resemble the Roman Saturnalia. Trains arrive at the station at short intervals, and, before the event of the day comes off, the Downs are covered with pleasure-seekers of all ranks. Frith's well-known picture of the D. has commemorated some of the peculiar features of the spectacle on the course.

The primary entrance-money, paid by the nominator of a horse, is £5; this is increased to £25 if no declaration of withdrawal be made on or before the first Tuesday in the January of the year previous to that in which the race is to be run; and if another year is allowed to pass, then the liability is raised by £25 more, so that every runner in the Derby costs his nominator or assignee £50. The stakes run for are now £6000, of which the owner of the winner receives £5000; that of the second horse, £300; that of the third horse, £200; and the nominator of the winner, £500. A horse is withdrawn on the death of his nominator. The distance is about 1½ mile.

Derbyshire, one of the N. midland counties of England, having York on the N., Nottingham on the E., Warwick and Leicester on the S., and Stafford and Chester on the W. Its greatest length is 56 miles; its greatest breadth, 34. The S. and S.E. parts of D. are comparatively level, and generally fertile and well-cultivated, but the N. and N.W. portions are rugged and hilly, and remarkable for the romantic beauty of the scenery. Precipices and caverns abound, and the streams sometimes disappear among the cavities of the limestone formations. The hills seldom exceed 1800 feet; the Peak, the highest elevation, is only 2000. The chief river is the Trent, with its tributaries the Derwent and Dove. The scenery of the latter is pre-eminently beautiful. Smaller streams are the Wye and the Rother. There are warm mineral springs at Buxton and Matlock, and numerous calcareous springs in various parts of the county, which incrust substances immersed in them. D. is rich in minerals; coal, iron, lead, zinc, manganese, copper, mineral oil, marble, fluor spar, alabaster, pipeclay, and chert being found. It is intersected by six canals and various railways. The climate is cool and moist, especially in the higher parts; wheat, barley, and oats are the principal crops, but much of the land is in pasture. Of the 657,550 acres, which are the area of D., 51,607 are under corn crops (oats, 29,165); 20,279, under green crops (potatoes, 2391); 22,882, under clover, sainfoin, and grasses in rotation; and 410,615, in permanent pasture. Small fruit is grown on 520 acres, and 2169 acres are occupied by bare fallow and uncropped arable land. Of the mountain and heath-land, 28,766 acres are used for grazing; and 25,428 are given over to woods and plantations. (See also articles CATTLE, HORSE, PIG, and SHEEP.) There is much dairy farming. The manufactures are cotton, silk, worsted goods, porcelain, spar and alabaster ornaments. Chief towns:—Derby, Ashbourne, Buxton, Chesterfield, and Belper. There are many British and Roman antiquities. Pop. anc. county 528,033; adm. county 426,768; and reg. county 432,414. There are seven parliamentary divisions of D., each of which returns one member — Chesterfield, 61,294; High Peak, 60,740; Ilkeston, 69,192; Mid, 59,769; N.-Eastern, 61,995; Southern, 63,910; Western, 56,987. See Bemrose, *D. Guide*.

Derbyshire Spar. See FLUOR SPAR.

Derec'ské, a town of Hungary, 12 miles S. of Debreczin. Near it are four lakes from which soda is obtained, and in one of which small pearls are found. Lake Fingoto, in the neighbourhood, is celebrated for its baths. Pop. 8272.

Dere'ham, East (Old Eng. *Deorham*), a town in the centre of the county of Norfolk, 16 miles W.N.W. of Norwich, with a spacious market-place. The poet Cowper was buried in the old church. D. has manufactures of agricultural machines, and an active trade in corn and cattle. Pop. reg. sub-dist. 8476; and civ. par. 5524.

Der'elict (Lat. *derelictum*, 'anything abandoned'), an English law-term signifying anything forsaken, or left, or wilfully cast away. D. lands suddenly left by the sea belong to the crown; but if the sea recede gradually, the gain goes to the owner of the adjacent lands. (See ALLUVION.) A ship does not become D. until she has been abandoned by her master and crew without intention of returning. When D., first comers are entitled to take possession of her and claim Salvage (q.v.) from the owner or person having right to the wreck. Under the Merchant Shipping Act of 1854 (17 and 18 Vict. c. 104), the Board of Trade is, with consent of the Treasury, authorised to appoint in any district a receiver of wreck, who has due power to fulfil the duties of his position. Articles washed ashore must be delivered to the receiver, who has power forcibly to suppress disorder or plundering. Description of wreck is to be without delay affixed to the nearest customhouse; and if the value of the wreck exceed £20, a description must also be sent to *Lloyds* (q.v.). If no one proves himself the owner within a year from the receiver taking possession, then the wreck, on payment of salvage and expenses, is to be given to the person having the right to it, which may be the lord of the manor, the mayor, the admiral, or the crown.

Derelic'tion, a term of Scotch law nearly equivalent to the English term *Derelict* (q.v.). Stray cattle, if ownership is not proved within a year, are escheated to the crown; but if the thing found be inanimate, the owner may reclaim within forty years. (See, regarding land left by the sea, article ALLUVION.) The word is also used in the law of Scotland regarding *teinds* (tithes) relative to valuations.

Derg, Lough (Gael. 'the red lake'), in the S. of Donegal county, 3 miles long by 2½ broad, has many small islands, one of which, Station Island, is famous as a place of pilgrimage. Between 10,000 and 15,000 pilgrims visit it annually from 1st June to 15th August. It is only 3 r. 26 p. in extent. There were two small chapels on it, with a house for the officiating priests, and some cabins, but the abodes are tenantless now, for the island is uninhabited. The river Derg flows from Lough D. for 17 miles to the Foyle.—Another and a much larger *L. D.* is only an expansion of the Shannon. It lies between Tipperary on the S.E. and Galway and Clare on the N.W., and is 24 miles long and from 2 to 6 broad.

Deriva'tion, in medicine, a term used by the older physicians, signifying the drawing of *humours* from one part of the body to another, and thereby effecting a cure. It is not much used by modern writers. A good example of what is meant consists in placing a blister behind the ear to benefit an affection of the eye.

Der'ma (Gr.), the name given to the true skin. The skin consists of two layers, an upper or epidermis, and a lower or D., or *cutis vera*. See SKIN.

Dermatol'ogy (Gr. *derma*, 'the skin,' and *logos*, 'a discourse') is that branch of medicine which treats of diseases of the Skin (q.v.).

Dermat'ophytes, low forms of Fungi (q.v.), which grow parasitically on the skins of man and other animals, producing Ringworm (q.v.), Favus (q.v.), and similar forms of skin-diseases. The best application for destroying them is sulphurous acid.

Dermes'tes, a genus of Coleoptera or Beetles, belonging to the family *Dermestidæ,* and to the section *Pentamera.* The antennæ are shorter than the thorax, and are club-shaped. The best-known species is the bacon-beetle, the larvæ of which are found in bacon, cheese, &c. This beetle is about one-fourth of an inch long, the colour being black. *D. murinus, D. vulpinus,* and *D. paniceus* are also well-known species.

Dermop'terous Fishes (Gr. 'skin-finned'), a term, not now generally used, for fishes (*e.g.*, lampreys) in which the rays of the medium fins are very soft.

Derr'ick, a kind of Crane (q.v.), much used in stone-yards, and generally when a great height of lift and varying radius are required. It is fitted with a moveable jib, jointed at its lower end to a mast supported by stays, and weights can be laid down at any point within the height and swing of the machine. The angle of the jib is varied by turning a barrel, or drum, connected with the jib-head by a chain which passes over a pulley at the apex of the crane. The machine may either be worked by hand or steam power. Of moveable derricks, or those capable of transporting a load from one place to another, the floating are the most important. They are of immense power, and are extremely effective in raising vessels, placing machinery, &c.

Der'vish (Pers. *Dervêsch,* 'a poor man or beggar,' from *derew,* 'to beg'), the name of a class of Mohammedan devotees, very numerous in Turkey and Persia, who considerably resemble the monks of Europe. In Hindustan they are called *Fakirs* (q.v.). They live partly in monasteries, partly as vagrants, and are divided into various orders, each of which imposes its peculiar novitiate and religious exercises, which are strictly observed, and are very severe. They engage in frequent fastings, mortifications, and circular dances. Their dances, which are accompanied by violent cries and contortions, are often prolonged until the performers faint. In their frenzies they burn and gash themselves with red-hot swords. They are accredited with great sanctity, and with power to heal diseases and interpret dreams.

Turkish Dervishes.

Der'went, a principal river of Tasmania, near the centre of which it rises in Lake St. Clair. After a winding S.E. course, it falls into D'Entrecasteaux Channel by an estuary varying from $1\frac{1}{2}$ to 4 miles in breadth. Hobart Town (q.v.) is situated on its right bank, 13 miles from its mouth, and for 9 miles higher up the D. is navigable for ships of any size.

Der'wentwater (Celt. 'the bright or clear water), also **Kes'wick Lake,** the most beautiful of all the English lakes, lies in the S. of Cumberland, and is formed by an expansion of the Derwent, $3\frac{1}{2}$ miles long by $1\frac{1}{2}$ broad, with steep banks, and dotted with wooded islands, of which Vicar's Island, Lord's Island, and St. Herbert's are the largest. At the foot of the lake, in the gateway of Borrowdale, are Scawfell, Great End, Glaramara, and Castle Crag. Sometimes there floats on the surface a mass of soft earthy matter known as the 'Floating Isle.' D. abounds in trout, pike, and perch. Keswick stands on its N. shore, and the Cataract of Lodore (celebrated by Southey), with a fall of 100 feet, is near its S.E. corner. D. has a depth of 72 feet, and lies 222 feet above the sea.

Derwentwater, James, Earl of, a gallant but unfortunate Jacobite leader, was born in 1688. His father died in 1705, and D., who had been educated in France, returned to the family seat of Dilston, in Northumberland, where, becoming known as a Jacobite, warrants were issued for his apprehension in 1714. He threw himself into the rising of 1715, was taken prisoner at Preston, removed to London, and beheaded, 24th February, 1716. D., for whom much sympathy was felt by the public, was the last Earl of the name.

Derza'vin, Gabriel Romanovicz, a Russian lyric poet, was born at Kazan, 14th July, 1743. He studied at the gymnasium there, joined a regiment of Guards in 1762 and for his skill in drawing and mathematics was placed in a military school by Count Schuvalov. His talents soon became known, and under the Empress Catharine, and the Emperors Paul and Alexander I. he filled some of the highest offices of the state. In 1804 he withdrew from public life, and till his death, 21st July, 1816, devoted himself entirely to poetry. His best-known ode, addressed *To God* (translated into English by Bowring and others), owes something to Young's *Night Thoughts;* but his other works are free from imitation. His sentiments are pure and his ideas lofty; but his language is too richly metaphorical, and sometimes passes into Oriental extravagance. His collected works (St. Petersb. 1810-15) were republished by the Russian Academy of Sciences in 1864-65. His posthumous memoirs were published at Moscow in 1860.

Desaguade'ro (Sp. 'the channel') is the name of several waters in S. America, of which the most important are:—1. A river of Bolivia, which rises in Lake Titicaca at a height of 12,850 feet, and after a course of 180 miles enters Lake Aullagas, 12,280 feet above the sea. This is probably the highest river in the world.—2. A river of the Argentine Confederation, which is fed by a multitude of streams from the E. side of the Andes, and flowing through lakes and salt marshes, is lost in Urre Languen or the Bitter Lake, among the deserts of the interior, about 500 miles from the source.—3. A lake in the S. of Chili, 35 miles long and 5 broad, with an outlet to the Pacific.

Désaix' de Veygoux', Louis Charles Antoine, a celebrated general of the days of the first French Republic, was born of a noble family in Auvergne, 17th August, 1768, and entered the army as a second lieutenant at the age of fifteen. Always a skilful and intrepid leader, by 1796 he became commander of a division of the Army of the Rhine, and defended Fort Kehl for nearly two months against the Austrians, until forced to surrender. In 1798 he accompanied Bonaparte to Egypt, accomplishing the conquest of Upper Egypt in about eight months, and from his power of conciliation, as well as his just administration, obtaining from the natives the title of *The Just Sultan.* Returning from Egypt, D. fell, 14th June, 1800, at the battle of Marengo, by a musket-ball, while leading a great and ultimately triumphant attack on the Austrian line. See Beker's *Étude Historique sur Désaix.*

Des'cant, or **Discant** (Sp. *discante*, from Lat. *dis*, 'apart', and *cano*, 'I sing'; a variation in singing, or part-singing), in music, a second part sung along with, and as an accompaniment to, the plain song or church melody. It was the first form in which the Church seems to have allowed the Gregorian melodies to be harmonised, and was probably introduced from the northern countries, where singing in parts seems to have been natural to the people from very early times. D. was permitted by the Church in the 11th c., and was at first improvised, but gradually it came to be written down and developed into *Counterpoint* (q.v.).

Descarte's, René, one of the most renowned philosophers of France, was born at La Haye, in Touraine, 31st March, 1596, and was the son of a French officer who had fought against the Huguenots. Educated by the Jesuits of La Flèche, he served as a volunteer at the siege of La Rochelle, and afterwards in Holland under Prince Maurice, where he also wrote a treatise on music and some mathematical papers. He next served in Bohemia and Hungary. After wandering for several years through Europe, he settled at Paris in 1626, the year of Bacon's death, and for some time discussed the principles of his new philosophy against the scholastics and peripatetics whom he met at Richelieu's salon and elsewhere. In 1629 he went to Holland, where, under Egmont, greater freedom of thought prevailed, and where he remained for twenty-five years, until Voet, the rector of Leyden, accused him of atheism, when he returned to Paris, and was shortly afterwards invited to the court of Stockholm by Queen Christina, who called him her 'illustrious master.' There he was carried off by pneumonia, 11th February, 1650. He died professing the Catholic religion. In 1793 the National Convention ordered his remains to be transferred to the Pantheon. There is a complete edition of D.'s works by Cousin (Par. 1824-26), and a convenient selection of the philosophical writings by Jules Simon (Par. 1865). The latter consists of the famous *Discours de la Méthode pour bien conduire sa Raison et rechercher la Verité dans les Sciences* (1637); the *Meditationes de Primâ Philosophiâ* (1641), with D.'s replies to the objections of Gassendi, Hobbes, Arnauld, Caterus, De Mersenne, and others; and *Traité des Passions de l'Âme.* In his *Principia Philosophiæ* (1644) he takes up the subject of general physics, and states his theory of *vortices*, by which he explained the formation of the stars in the centre, and the gradual generation of planets and comets. This theory (which is entirely discredited) has nothing in common with the modern theory of vortex rings in molecular physics. D. applied his 'Method' in three scientific works on Dioptrics, Optics, Meteorology, and Geometry. In the last, he first applied algebra to the geometry of curves, explained the formation of his 'ovals,' and laid down a general rule for the determination of tangents to curves. The Cartesian equation will be found in all works on algebra. In a posthumous work, D. states the theory of animal spirits, or of the nervous system, as a hydraulic mechanism, which Huxley and Clifford have revived as at least an accurate general conception of the automatism of the human body and brain. The same train of thought runs through the treatise of the Passions, in which most grotesque physical explanations are given of the several emotions. As a metaphysician, D. admitted as fundamentally true the idea of self as a thinking substance. All equally distinct ideas would also be true, unless God impressed on them a false appearance. It thus becomes important to prove the existence and the character of God. There must be as much reality in the cause as in the effect; and existence cannot be separated from the idea of the essence of God, for non-existence would be imperfection. In this way mind and matter, being distinct ideas, are proved to be distinct in reality as substances, otherwise God would be wanting in power. This is the famous argument *à priori*, which has been much more logically stated by Spinoza and the Rev. Moses Lowman, but which in substance is as old as the Eleatic school of Greek philosophy. This distinction of mind and matter into substances led to the theory of occasional causes, according to which all phenomena (especially those where matter apparently acts on mind, and *vice versâ*) were produced by divine volition, determined by the assemblage of physical or psychical conditions. The courageous scepticism of D. was of good example as a mental attitude, but he added nothing to positive psychology and he introduced into modern philosophy the fallacy that there is an absolute test of truth besides verification by experience. The Scotch Common-sense School have confounded his position with that of Locke and Berkeley, with whom he had nothing in common except the truism that what the mind immediately knows is a mental modification. See Baillet's *Vie de D.* (Par. 1691), and Bordas-Dumoulin's *Le Cartésianisme* (Par. 1843).

Descham'ps, Eustache, a French poet, was born at Vertus, in Champagne, about 1340. He studied at Orleans University, travelled into Italy, Germany, and Hungary, and, according to his own statement, was for some time captive among the Saracens. He was a great court favourite, but always poor, and his property in Champagne was pillaged by the English, whom he heartily abuses in his ballads. He died about 1409. 'He is,' says Besant, 'the most *real* French poet of his century.' His works, comprising 90,000 verses, display grim humour and fierce satiric energy, and give a valuable picture of his times. He resembles Jean de Meun, from whom he occasionally borrows. Morley suggests that Chaucer may have taken the idea of the *Flower and the Leaf* from one of D.'s ballads. See *Poésies Morales de D.*, edited by Crapelet (Par. 1832), Besant's *French Humourists* (Bentley, 1873), and *Early French Poets*, and Gidel's *Histoire de la Littérature Française* (Par. 1875).

Descen'dants are all those descended from a common ancestor. See Collateral Succession, Conquest, Descent, Heir, Succession.

Descent'. By the law of England, real property can only be acquired by D. or by purchase. (See Purchase of Estates.) D. or hereditary succession is the title by which real property devolves by law on the heir from his ancestors. D. at common law is lineal or collateral. Lineal D. is from the father to son, and from son to grandson, and so on. (See Collateral Succession.) The person next in the line of succession is the Heir-Apparent (q.v.), or the Heir-Presumptive (q.v.).

Des'eret. See Utah.

Des'ert (Lat. *desertus*, 'solitary,' 'waste'), the general name of a flat, unproductive region, or uninhabited wilderness. According to Ami Boué, a D. properly so called always indicates the site of a large gulf or inland sea of comparatively recent geological time. Although the word is specially applied to the Sahara (q.v.), a D. is not necessarily a sandy waste, but may bloom with vegetation like the prairies, llaños, pampas, and selvas of America. Other varieties are the salt plains, as of Cashgar (q.v.), and stony or rocky deserts, like those of Arabia, Labrador, Patagonia, &c. One of the characteristics common to all 'deserts where no men abide,' is the scarcity of food and water. It is impossible to say, notwithstanding what has been done in Algeria, whether the discovery of the Artesian Well (q.v.) will ever materially augment the number of oases. As effecting the conditions of climate, the D. plays an important part, acting, so to speak, as a great heat-reservoir. It was calculated that, had the Sahara been flooded, as projected in 1875, there would have followed a fall of several degrees of the temperature of S. Europe. Mineral riches are not unfrequently found in waste regions, as in the case of the 'D. of Atacama,' in the N. of Chili, where valuable deposits of silver and copper have been discovered. See G. von Humboldt's *Ansichten der Natur.*

Deser'tion, in martial law, is the offence of a soldier or a sailor quitting the army or the navy without being discharged or having leave of absence. By the articles of war, framed under powers granted by the Army Act of 1881, military D. is punishable with death, or such other punishment as a court-martial may award. Inducing any one to desert from the army was formerly punishable with death. The punishment is now, by statute, penal servitude. In the navy, by the Naval Discipline Acts of 1861 and 1869, 'every person who shall desert, or entice others to do so, shall suffer death, or such other punishment as a court-martial shall think fit.' In the merchant service a seaman who deserts the ship forfeits his wages, and renders himself liable to imprisonment. But it is not held to be D. if the seaman forthwith enter into Her Majesty's service. Neither is it D. if the master compel the seaman to quit the ship by harsh treatment.

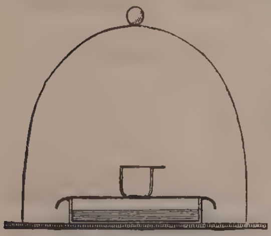
Desertion of Spouse. In England, under statute 20 and 21 Vict. c. 85, a sentence of Judicial Separation (q.v.) may be obtained by husband or wife, on the ground of desertion without legal cause, for two years and upwards, and an order may be made for the protection of the property of a wife deserted by her husband. Under statute 49 and 50 Vict. c. 52, a wife deserted by her husband may, by application to the justices of the peace, obtain an order that her husband pay her a weekly allowance (not to exceed £2). During the continuance of the protecting order, the wife is, relative to property and contracts, on the same footing as if she had obtained a decree of judicial separation.

In Scotland, wilful D. on the part of husband or wife of the other may be the ground of an action of adherence or of divorce under the statute of 1573, c. 55. If the wife desert her husband she forfeits her claim to Aliment (q.v.). It is questionable if she would, on his death, have a right to Terce (q.v.), the statute enacting that offenders shall 'tyne and lose their tocher, *et donationes propter nuptius*.' An offending husband must restore to the wife her *tocher*, and fulfil to her all provisions, legal or conventional. As in England, a wife deserted by her husband can now in Scotland obtain protection of her earnings or other acquisitions; but the process for obtaining it is more difficult in Scotland than in England.

Desertion of the Diet. See DIET, DESERTION OF.

Desertion of a Tenant. In Scotland, when a tenant neglects to cultivate his land, the landlord is entitled to eject him, and to resume possession. The action is valid by common law, but as the fact of D. may be questionable, the action ought to be laid on the Act of Sederunt of 1756.

Desicc'ants (from Lat. *desicco*, 'I dry up') are medicines used to dry up some watery secretion by being dusted over a part.



Desiccator.

Desicca'tion is the process of drying. The desiccator is an apparatus much used in chemistry and physics, and usually consists of a bell jar placed over a vessel containing sulphuric acid or chloride of calcium; this vessel is covered with wire-gauze, and on the gauze is placed the substance or apparatus to be dried. Owing to the strong attraction for water possessed by the two substances mentioned, complete D. is rapidly accomplished.

Design' (Lat. *designo*, 'I mark or trace out') denotes, in a general sense, any intention, scheme, or plan of action. That which bears traces of constructive forethought is said to be a work of D. Hence the adaptation of means to ends observable in nature, and the general harmony and order of the universe have been advanced as confirmatory evidence of an intelligent designer. This argument is admirable as an inference from the character of the effect to the nature of the cause; but it postulates a belief in the divine existence. See Paley's *Natural Theology*, the *Bridgewater Treatises*, the *Burnett Prize Essays*, and Ueberweg's *History*, i. 383.

Design, in art, signifies either a tentative sketch, or the composition of subject-matter, as opposed to the execution of a finished picture. In the latter sense, the ancient Greek sculptors and the great Italian painters excelled in the striking boldness and exquisite grace of their designs, as seen especially in the marbles of the Parthenon, in the statues of Michael Angelo, and in Raffaelle's famous cartoons.

Designs, Copyright in. This is mainly regulated by the Designs Act, by which the grant of copyright is given to any original design, whether applicable to the ornamenting of any article of manufacture, or of any substance, artificial or natural, or partly artificial and partly natural. The application of the design is not necessarily for protection to be within the United Kingdom; and the protection is given though the inventor and proprietor be foreigners. See COPYRIGHT, LAW OF.

De'sio, a small town in the province of Milano, N. Italy, 11 miles N. of Milan, and a station on the Milan and Como Railway, lies in the midst of gardens and vineyards, and is beautified by fine trees and fountains. The inhabitants are engaged for the most part in tillage and the breeding and pasturing of cattle.

Desirade', or **Deseä'da,** one of the Leeward Islands, W. Indies, belonging to France, 6 miles long and 2 broad. It lies 4 miles E. of Guadeloupe, of which it is a dependency. Pop. 1391. D. was the first island discovered by Columbus in his second voyage, 1493.

Des'man. See MUSK RAT.

Desmid'ieæ, or **Desmidia'ceæ,** a natural order or sub-order of green-spored (chlorospermous) Algæ, remarkable for their mode of reproduction and many curious forms. 'The more typical species of the group,' writes Berkley, 'as the name implies, consist of a chain of connected joints, increasing by the continued addition of two new half-joints in the centre, so that the two extreme members of the chain are the oldest, and the two in the centre the youngest. In the majority of instances, however, the disarticulation takes place on the formation of the first new half-joints, in such a manner that the two new individuals consist of half the old plant connected with half of the new, a mode of increase which obtains also in the *Diatomaceæ* (q.v.). Fructification takes place, though rarely, by the conjugation of two individuals by means of lateral tubes or simple contact, as in *Conjugatæ*, the spore affecting interesting forms, and being often strongly spinulose, the spines being occasionally complicated in structure. The new individual is produced from this by the formation of a vertical partition in the centre, and the subsequent formation of two new half-joints, so that the proper form of the species is not attained till the third generation, if so soon.' D. differ from *Diatomaceæ* in their green colour and the absence of silex; hence they shrivel up and lose their natural form in drying. Pools and running streams are their favourite habitats; they are sometimes found in brackish, but never in salt water. None are applicable to any economic purpose. See CONJUGATION and SWARMING.

Desmon'cus, a genus of tropical American palms, resembling the calami in general appearance. The Jacitara, a common species of the Amazon or Rio Negro, owing to the sharp curved spears in the leaf-stalks, obstructs the traveller by catching hold of his garments. The Indians manufacture various implements of it; among others, the strainers used in squeezing the mandioc juice are plaited out of strips of the stem.

Desmou'lins, Camille', one of the most typical and brilliant of the early French Revolutionists, was born at Guise in Picardy, in 1762, and studied for the bar, but never practised. He was seized with the revolutionary fever, and wrote some works advocating the establishment of a republic in France of the ancient or classical type. D.'s fiery utterances were mainly instrumental in leading the population to destroy the Bastille on the night of the 14th July, 1789. His first idol had been Mirabeau, but after the death of the latter he attached himself to Danton. Next to Danton and Marat he was the most influential member of the Cordeliers Club. He became a member of the National Convention, voted for the death of Louis XVI., and although in reality more in sympathy with the Girondins than with the Jacobins, pelted the former with ridicule, of which he was a master, in his

Histoire des Brissotins. After he saw what excesses the reign of the Terrorists was leading to, he attacked the members of the Committee of Public Safety. In consequence he was arrested, along with Danton, 30th March, 1794, and was executed with him, 5th April, saying, when asked his age, that 'he was of the same age as the *bon sans-culotte* Jesus, thirty-three years, an age fatal to Revolutionists.' A fortnight afterwards his wife, Lucile D., who had attempted to arouse popular feeling in his favour, was also executed. D. was a writer of powerful imagination and great humour, although deficient in moral resolution; in quieter times he might have been a great wit, if not a great poet. An edition of his works appeared in the *Bibliothèque Charpentier.* See *Camille D., Lucile D., Étude sur les Dantonists*, by Jules Claretie (Par. Plon, 1875), and an English translation of his Memoirs (Lond. 1876).

Des'na, a river of Russia, an affluent of the Dnieper. It rises 50 miles S.E. of Smolensk, traverses the governments of Smolensk, Orel, and Tchernigov, and after a course of more than 500 miles, falls into the Dnieper near Kiev. It is navigable to Briansk.

Des'potism (from Gr. *despotēs*, 'lord or master') is a form of government having its origin in superstition, under which the welfare of a community is subordinated to the interests of a class or individual. In the latter case, if the individual clothed with 'the divinity that doth hedge a king' is of a strong moral and intellectual nature, the form of rule is not without something to recommend it. Under the direction of one wise man the practical force of a people is greater than when they are free. This fact was acted on by the ancient Romans, by the creation of a Dictator (q.v.) in times of great public peril. England was, perhaps, never so powerful as when its whole energy was directed by the wisdom and iron will of Oliver Cromwell. Nevertheless a free form of government is to be preferred; the despotism of a weak or narrow-minded ruler being an unqualified evil.

Dess'alines, Jacques, one of those extraordinary characters whom the circumstances attending, or following, the French Revolution brought into prominence, was born about 1760, on the Gold Coast of Africa, and became a slave to a free black in Santo Domingo. After the liberation of the slaves there in February, 1794, he took an active part in the disturbances that occurred in the colony. He became lieutenant to Toussaint l'Ouverture, and, after his capture, leader of the insurgents, and finally drove the French out of the island, October, 1803. When the people declared themselves independent, D. was proclaimed Emperor of Haiti, under the title of Jean Jacques I. His tyranny and cruelty, however, provoked hatred, and on the 17th October, 1806, he fell a victim to a conspiracy by a negro named Christopher (q.v.), who succeeded him as Emperor Henri I. of Haiti.

Dessau', a town of Northern Germany, capital of the Duchy of Anhalt, on the left bank of the Mulde, about 3 miles above its confluence with the Elbe, and 80 miles S.W. of Berlin by rail. It is walled on three sides, and protected on the fourth by the river. Its principal building is the ducal palace (1748) with a picture gallery and an extensive library containing numerous MSS. of Luther. The manufactures are woollen and linen cloth, leather, hosiery, and tobacco. Mendelssohn was a native of D. Pop. 34,658.

Destina'tion. In Scotch law, the series of heirs called to the succession of heritable or moveable property by provision of law, or to moveable property under a will, is termed a D.; but the term is usually limited to a nomination of successors under a will. For rules of succession in heritable and moveable property by provision of law, see SUCCESSION. For rules as to destination of moveables by will, see LEGACY, TESTAMENT, LEGITIM, JUS RELICTÆ. By the law of Scotland heritage cannot be conveyed in form of a last will and testament. Regarding execution of a settlement, including heritage as well as moveable estate, see article WILL. An absolute proprietor of heritage is under no legal restraint as to the distribution of his property. He may put a daughter in place of a son, or a younger child in place of an elder one, or he may exclude all his children in favour of some one else.

Desu'etude (Lat. *desuetudo*, 'disuse'), a term of Scotch law indicating the legal doctrine that a statute may lose its force by the gradual establishment of usage contrary to its provisions, without these being repealed by the legislature. Mere non-usage, however, even for the greatest length of time, will not abrogate a statute; continued intention of the community to repeal by contrary practice must be shown. In England the rule of law is that a statute remains in force, however unsuited to the altered condition of society, until repealed expressly, or by implication, by another statute. In the latter case, the repeal, according to Blackstone, 'is to be understood only when the matter of the later statute is so clearly repugnant that it necessarily implies a negative. As, if a former Act says that a juror upon such a trial shall have an estate of £20 a year, and a new statute afterwards that he shall have 20 marks.' For a remarkable instance of the extremity to which this doctrine of English law has been carried in recent times, see article BATTEL, TRIAL BY. Since 1869 an edition of the English statutes has been published, containing only those statutes, or parts of statutes, which are in force. The rule of D. in Scotland applies only to statutes made previous to the Union, and even to them its application is uncertain.

Detach'ment (Fr. *détachement*, from *détacher*, 'to disengage'), in military language, a comparatively small number of troops detached from the main body for some special duty. In naval language, also, a D. of one or more ships under a separate command is spoken of.

Detain'er, in English law, the name of a writ which was lodged with the sheriff against any one in his custody, or, formerly, lay against prisoners in the Marshalsea or Fleet Prison, directed to the marshal or the warden, directing him to detain the prisoner until lawfully discharged.

Deter'minants, a symbolic method of modern mathematical analysis, by which, among other things, the solution of equations of several unknown quantities becomes a mere matter of inspection. A determinant may be defined as the algebraic sum of all the possible products obtained by permuting the suffixes of the expression $a_1b_2c_3d_4\ldots$, the sign being changed for every *single* permutation. Thus the determinant of the third order is

$$a_1b_2c_3 - a_1b_3c_2 + a_2b_3c_1 - a_2b_1c_3 + a_3b_1c_2 - a_3b_2c_1,$$

and is usually written thus :—

$$\begin{vmatrix} a_1, & b_1, & c_1 \\ a_2, & b_2, & c_2 \\ a_3, & b_3, & c_3 \end{vmatrix}$$

The properties of D. are very numerous; but for these the student is referred to works on the subject, such as Salmon's *Higher Algebra*, Dodson's *D.*, and Balzer's *Theorie und Anwendung der Determinanten.* A short treatise, with some of the commoner applications, is also given at the end of Todhunter's *Theory of Equations.*

Det'inue, in English law, the name of an action against one who refused to restore goods entrusted to him. (See DEPOSIT, and the articles there referred to.) When the plaintiff seeks a return of the actual chattel, a course is open to him provided by the Rules of the Supreme Court, ord. 48, by which he obtains a writ of delivery, and this is sent to the sheriff to distrain on the defendant till he returns the chattel.

Det'mold (originally *Theotmalli*, 'the people's *mall* or place of assembly'), the capital of the principality of Lippe, Germany, on the Werra, E. of the Teutoburger-Wald, and 47 miles S.W. of Hanover. It consists of an old and a new town, and is encircled by pleasant promenades. The principal buildings are the palace, the gymnasium, and the theatre. There are several charitable institutions, a military hospital, and a public library, established in 1781. D. is supposed to be the ancient *Teutoburgium.* On the Grotenburg, about two miles from D., is the Hermann Memorial, a colossal copper statue erected to the memory of Hermann or Arminius, who defeated Varus and his legions (B.C. 9). Pop. of D. 9735.

Detona'tion signifies a sudden explosion.

Detri'tus (Lat. 'worn down'), in geology, denotes a natural accumulation of debris or fragments of disintegrated rocks.

Detroit' (Fr. 'the strait'), the chief city of Michigan, stands on the right bank of the D. river, opposite Windsor, in Canada, 526 miles N.W. of Washington. The city extends along the river several miles, and the site rises gradually to a height of 40 or 50 feet. Its chief public buildings are the courthouse, customhouse, post-office, the Roman Catholic cathedral, the insurance bank, and the churches. D. is the great centre of commerce, banking, and produce in the state, railroads connecting it with all parts of the States and Canada, and the river giving it the unequalled waterway of the lakes. The industry comprises many steam sawing-mills, shipbuilding, foundries, with copper-smelting in the vicinity. D. has a medical college, St. Philip's College, and many public and private schools. Eight great lines of railway centre here, diverging into all parts of America. In 1858 the debt was $300,000, which has increased to $2,215,226, less sinking fund. Over 45 millions of dollars are invested in the manufactures of D., of which the chief annual outputs are cars and steam railroad stock ($10,000,000), foundry and machine shop products ($7,631,103), tobacco ($4,742,412), &c. D. was first visited by the French in 1610, settled by them in 1701, and taken by the British in 1760. Pop. (1870) 79,577; (1890) 205,876.—*Detroit River* flows S. from Lake St. Clair 25 miles to Lake Erie, with a breadth of three-quarters of a mile, and is deep and navigable.

Dett'ingen ('the people's home or town'), a village of Lower Franconia, Bavaria, on the right bank of the Main, about 8 miles N.W. of Aschaffenburg, notable only for the victory gained here on the 27th of June, 1743, by the allied army of English, Hanoverians, Austrians, and Hessians, amounting to 40,000 men, and commanded by George II. of England, over the French, 58,000 strong, under the Duc de Noailles. The latter lost 2659 men, and the allies at least as many. The battle of D. was the last occasion in which an English sovereign appeared on the field. See Carlyle's *History of Friedrich II. of Prussia*.

Deuca'lion (the 'bright' or 'brilliant'), in Greek mythology, a king of Phthia, and son of Prometheus and Clymene. When Zeus, to punish the wickedness of men, had sent a flood over Hellas, D. with his wife Pyrrha entered an ark, previously prepared on the advice of his father, and they alone were saved. On the ninth day the ark rested on Mount Parnassus. There D. sacrificed to Zeus, who sent Hermes to grant any prayer he might offer. Having prayed for the restoration of the human race, he and his wife were ordered to cover their heads, and cast their mother's bones behind them as they went their way. Judging that the earth was their mother, they cast stones behind them, when those thrown by D. became men, and those by Pyrrha women. D. is the father of Hellen, from whom sprang the Hellenes or Greeks, and of Protogeneia ('the first-born'). Cox, in his *Manual of Mythology*, finds in the names evidence of the mythic perversion of solar phenomena.

De'us ex Mach'ina, a phrase used by the ancients in allusion to a practice not unfrequent in the classical theatre of bringing about the solution of a difficulty in the plot by the intervention of a god, who descended on the stage in a kind of machine. Horace (*De Arte Poeticâ*) obliquely censures the abuse of this unskilful artifice—

> 'Nec Deus intersit, nisi dignus vindice nodus
> Inciderit.'

The phrase has been borrowed by the moderns, who have given it, however, a wider application.

Deuteron'omy (Gr. 'the second law') is the fifth book of the Bible. According to Jewish and Christian tradition, it was, like the rest of the Pentateuch (q.v.), the composition of Moses. It is almost entirely made up of discourses of Moses to the people regarding the way in which Jehovah had guided them through the desert, and setting forth anew his commands; the only historical part, with the exception of iv. 41-43, being the last four chapters. Modern critics endeavour to prove that the aim of the author was not historical, but hortatory with reference to the circumstances of his own time—about the time of Hezekiah and Josiah, if not as late as the Babylonian exile—to suit which he brought prominently forward those laws which were then needed, altered some of the earlier ones, and gave new ones altogether; which treatment is shown particularly in the laws relating to the priests and Levites, and the offering of sacrifices in one place. See Bleek's *Einleitung in die Heil. Schrift* (Berl. 1870).

Deut'zia, a genus of plants of the natural order *Philadelphaceæ*, many of which are cultivated in our greenhouses. They are natives of India, China, and Japan. The leaves of *D. scabra* of Japan are covered with siliceous star-shaped hairs—favourite objects under the microscope—and are used by wood-polishers in Japan. Similar hairs are seen on *D. staminea*.

Deux Ponts. See ZWEIBRÜCKEN.

Dev'apraya'ga, a town in Gurwhal, Hindústan, 12 miles W. of Srinnuggur, in the fork of the Aluknunda and the Bhagiratti, henceforth named the Ganges, the part of which deemed most sacred by the Hindus being at D. Hence it is the resort of numerous pilgrims, but its fixed population consists of 1000 Brahmans. In the upper part of the town is a temple 60 feet high, built of large blocks of squared stone piled up without mortar. Three basins have been excavated in the solid rock below the level of the stream. D. is 2266 feet above the level of the sea.

Devel'opment of Doc'trine is related to, but not to be confounded with, the Roman Catholic doctrine of Tradition (q.v.), according to which there is a supplementary revelation over and above that contained in the Bible, and which has been handed down outside of the Scriptures. A certain theory of D. of D. is indeed held by some Roman Catholics, namely, that although the doctrines of Christianity are all in the Scriptures, they are there only in their rudiments, and that the Church, under the tuition of the Spirit, comes to understand all that these rudiments imply, and to expand them in their fulness. The orthodox Protestant doctrine is, that 'all the facts, truths, doctrines, and principles which enter into Christian theology are in the Bible, as fully and clearly at the beginning as they are now.' Still progress has been made in theological knowledge as well as in physical science. As the science of astronomy, for example, is always advancing, while the structure of the heavens remains ever the same, so the Bible, which contains the great truths of revelation, is always becoming better understood, and the representations of the early fathers regarding, for example, the doctrine of the Trinity, as compared with the clear, precise, and consistent statements in the creeds of the Church, are like the astronomy of Pythagoras compared with that of La Place. Another theory, initiated by Schleiermacher, and founded on the philosophy of Schelling and Hegel, is that humanity is a generic life which, assumed into union with the divine life of the Son of God, and thus raised to a higher power, is communicated from him by a natural process of development to the Church, and that Christian theology is not the systematic exhibition of what the Bible teaches, but the interpretation of this life. Without regard to any theory, the D. of D. seems to be the change which the definitions of doctrines, teaching certain essential truths, continually undergo partly at least under certain external causes, such as differences of climate, national character, personal feelings and passions, court intrigues, priestly imposition, the fanaticism of monks, and the internal principles of human reason. See Donaldson's *Critical History of Christian Literature and Doctrine from the Death of the Apostles to the Nicene Council* (Edinb. 1864).

Dev'enter, commonly **Dem'ter** (Lat. *Daventria*), an ancient town in the province of Overyssel, Holland, on the Yssel, 55 miles E.S.E. of Amsterdam, fortified by a wall and ditch. The principal buildings are the townhouse, courthouse, and prison. D. has numerous hospitals and several high-class educational institutions. The chief industries are iron-foundries and the manufacture of Turkey carpets and hosiery. D. exports butter, grain, beer, and a celebrated gingerbread known as 'D. cake' (*D. Koek*). D. was destroyed by the Saxons in 778, and again by the Norsemen in 883, and was made an imperial fortress by Lothar of Saxony in 1123. During the Middle Ages it was a famous Hanse town, and in the 16th c. ranked after Antwerp and Amsterdam as an emporium of trade, and is still flourishing, though neither so famous nor so conspicuous as formerly. Pop. 23,353.

Devia'tion of a Ship. Under the contract of affreightment, if a vessel be compelled by weather, by an enemy, or by accident, to deviate from the appointed line of voyage, no claim arises to the freighter against the owners; and it is now held that the master may detain the cargo, though formerly the rule was that he was bound to forward it in another ship. An unnecessary D., being an alteration of risk, discharges the underwriter. The *onus probandi* lies on the person alleging D.

Device', in heraldry, an emblematic design, borne upon armour or on banners. The term is derived from the *vestialla divisa*, or parti-coloured uniforms by which Italian retainers were distinguished in the 13th c. Devices were used to mark different warriors early in the Middle Ages. Henry II. bore the D. of the broom-plant, or *planta-genista*, an emblem of his name, Plantagenet. The devices of the Houses of York and Lancaster—the red and white roses—became famous in the civil war. In the 16th c. painted or carved devices were very common in noblemen's dwellings.

Dev'il (Gr. *diabolos*, 'traducer'), in Christian theology, is a personal evil spirit, the cause of all evil, and the active enemy of God and man. One of the first tasks of man's imagination, in his primitive state, is to account for the phenomena of nature. On the one hand there appears to be a beneficent power, who scatters welcome gifts upon men; on the other, a harsh and cruel power, that covers the sky with blackness, sweeps away his home with torrent or tempest, starves, freezes, or scorches him, poisons him with exhalations, casts him to the beast of prey: 'One a god of light smiling in the sunbeam, the other a god of darkness scowling in the thunder-cloud; the one ruling by good and gentle spirits, the other by fierce and evil spirits.' Here we have the origin of the dualism, or worship of two gods, which prevailed among the ancient Indians, Persians, Egyptians, and many other nations; for instead of the good deities alone being worshipped, as might be supposed, the terrible gods were more adored than they, from fear of their vengeance.

The monotheism of the Hebrews lifted them far above the perplexities of the dualistic idea. Belief in a D. nowhere appears in the earlier books of the Bible. In Genesis the serpent which tempted Eve is not represented as a great being hostile to God, though in later times that interpretation was accepted as the only adequate explanation of the phenomenon. After the captivity the D. was discovered under the disguise of the serpent (Wis. ii. 23, 24), the symbol of the Persian Ahriman. Neither is there any dualism implied in the ceremonial connected with Azazel (Lev. xvi. 8, 10, 'scapegoat'), for he is not a personal being, and the goat is not offered to him; he is merely a personification of abstract uncleanness; although the prototype of Azazel is the Egyptian Set. The first definite appearance of the doctrine afterwards so fully developed is in the Book of Job. According to the introduction of this book, among the 'sons of God' who surround Jehovah's throne there is a Satan (Heb. 'adversary'), whose part it is to speak against man, and bring misfortunes on mankind, but who seems as much a servant of God as the other angels. A slight development of the idea appears in the prophecies of Zechariah, where Satan, although still merely the accuser, is rebuked for his attack on Joshua, the high-priest, and on Jerusalem; so that he is already beginning to be opposed to Jehovah. It is at this point that the influence of the Persian dualism which took effect during the captivity appears. The Jews, of course, did not adopt the dualism of that religion. The grand idea that Jehovah shaped and directed all things was so strong in them that they did not recoil from the consequence that not only plagues and disasters, but even moral evil, must be in some deep, mysterious way the work of God; and on the part of some of the nobler-minded prophets there was a direct protest against the dualistic notions when they began to take effect (see Isa. xlv. 7). To others, however, Jehovah's moral purity seemed to suffer from this conception, and the conception of Satan gradually developed from that of an 'adversary' into that of the *tempter* of mankind. The change in the conception of the moral world is well seen in the account of the temptation of David to number Israel, as given in 2 Sam. xxiv. 1, where it is said to have been Jehovah who moved him to do it, and by the Chronicler (3rd c. B.C.), who makes it the work of Satan (1 Chron. xxi. 1). It would be very difficult to tell how far the Jewish conception of Satan was influenced by the Persian belief in Ahriman; but the likeness between the Hebrew and Persian evil powers gradually became so great that it was easy to confuse them—the distinction between them, however, being manifest, namely that Ahriman is physical evil which has also become moral evil, while Satan is moral evil becoming physical evil. This explains the unbounded influence which he had acquired in the physical world before the time of Christ (see DEMONIACS). The growth of this influence is clearly seen in the Apocryphal books, which all contain either Alexandrine or Persian elements. In the Book of Wisdom the evil spirit, there first called *diabolos*, the devil, is identified with the serpent of Genesis. He now resides in a subterranean hell, and heads an army of evil spirits, many of whom are undoubtedly Persian—*e.g.*, Asmodeus (Tobit), Pers. *Aehsma-dæva*. Others are mentioned in the Book of Enoch, which contains also the earliest form of the belief about the fall of the evil angels from heaven. The likeness to Ahriman begins distinctly in this, that the D. now adds hatred to God to his hatred of man, and although he does not make war directly on God, seeks to spoil his creation by waging war on man.

An extraordinary development of the doctrine finds expression in the New Testament. The D. has now taken his position as the author of all evil. The solution of the problem regarding the origin of evil is given in 1 John iii.: it comes from the D. His nature is the negation of all that is real and true in God, of light, of love, and of life. But being now cast out from heaven and all communion with it, he can no longer influence God against men; he therefore vents his rage directly on men themselves. He is especially the antagonist of Christ and of Christians; and necessarily so, since the mission of the Messiah (q.v.) was by a victorious struggle with Antichrist (q.v.)—the 'Prince of the demons,' the 'Ruler of the power of the air,' the 'Ruler of this world'—to establish the 'kingdom of heaven.'

In the early Christian centuries many influences combined to foster this notion of an antagonistic parallelism between the kingdom of light and the kingdom of darkness, and to establish more definitely the conception of a kingdom of the D. opposed to the kingdom of God; the persecuted Church representing the latter, the persecuting world the former. Hence expulsion from the Church was 'given over to Satan,' and every new convert to Christianity before being baptized, was exorcised, or had the D. driven out of him (see EXORCISM), and was required to abjure the D. and all his works. The notions about this opposition were most fully developed in the theory of redemption, which, as taught by Irenæus, was as follows:—Man having by the fall become the D.'s rightful property, it would have been unjust on the part of God to deprive him by violence of his own. Accordingly the D. was able to stipulate that, if he gave up his claims on man, Christ should be handed over to him. But in this transaction he was outwitted, for when he got Christ he found that he could not keep him. Having swallowed the 'bait' of his human nature, he was so tortured by the 'hook' of his divinity that he was glad to let him go.

During the following centuries, and on through the Middle Ages, the doctrine of the fall of Satan and the evil angels was fully developed. To account for the fall of man, the fall of the angels had to happen before that event. According to Augustine, they were created on the first day of Genesis i., when God said 'Let there be light,' and fell on the second, when He divided the waters under the firmament from the waters above the firmament. The details of their fall were filled in from texts of Scripture. Thus the fall of the archfiend was due to pride and envy. According to St. Bernard's exposition of Isaiah xiv. 12, 13, he was cast out of heaven because, although entitled as a seraph to stand above the throne of God (Isa. vi. 2), he presumed to *sit* in the presence of the Eternal. The other angels fell through lust (Gen. vi. 4). To the D. was now (before the 9th c.) given a body of an endless variety of form and feature, borrowed from the different pagan mythologies — fiery eyes, red protruding tongue, large horns, a long tail, the hoof of a horse (of the centaurs), or the cloven hoof of the satyrs, &c. He and his imps made a prey of men at large. Now too arose the notion that a compact could be made with the D., by which the soul could be exchanged for the object of one's greatest desire. This led, in the 13th c., to the execution of witches and sorcerers, the supposed servants and accomplices of the D. (See WITCHCRAFT.) It may here be noticed that the name Lucifer (Lat. 'light-bringer') was given to the D. from a mistaken interpretation of the apostrophe in Isaiah xiv. 12. 'How art thou fallen from heaven, O Lucifer, son of the morning.'

The vulgar conception of the D. in modern times has been materially affected by the writings of two men—Milton and Göthe. Milton by his *Paradise Lost*, familiarised his countrymen with the theological traditions of Italian literature and art, from which the whole scheme of his drama was borrowed; but it had the effect, in the mind even of those who could not look beneath the surface, of divesting the D. of his flesh and blood, horn and hoof nature, whilst in reality the poet idealised Satan altogether, and the hero of his drama was Evil in the abstract. The design of Göthe, in his *Faust*, was very similar. Mephistopheles was simply 'our own ignorant, besotted, dogmatising, superstitious, animal nature, cultivated and developed at the expense of the intellectual in us.' The poet's aim was to show that this is the real nature of the Evil Spirit to which was given so materialistic a form in the Middle Ages, that this is the real 'Ruler of the world' of apostolic times.

Recent writers on the D. speak of him as a *fallen majesty*, because even 'those who profess belief in his existence live absolutely as if they held no such belief'; and how great is the contrast between the belief of the present day and that of the Middle Ages may be seen by a study of witchcraft. Those who now refuse to believe in the existence of such a being hold, nevertheless, that there is embodied in the conception of a personal D. a great truth—that no action, in respect of morality, stands purely on its own merits, but involves a principle which extends through all time and all space; the principle, namely, that by any sinful action, or by resisting evil on any particular occasion, we take the side of, or we resist, evil in the abstract, or *all* evil, past, present, and to come. The belief in the existence of the D. may be said, at present, to be on its trial. There is, beyond all question, a profound and widespread *suspicion* of the unreality of a personal Agent in the mind of Christendom; but so many grave issues seem to depend on the acceptance or rejection of the doctrine, that men will probably remain undecided in their convictions till they clearly see what the surrender of the belief really implies. If anything be imperilled which sustains and strengthens the religious life, men will prefer to acknowledge a forbidding mystery rather than allow their sense of the dire nature of evil to be permanently weakened. See Roskoff's *Geschichte des Teufels* (Leipz. 1870), Buckle's *History of Civilisation*, and Kuenen's *Godsdienst van Israel* (Haarl. 1869; Eng. transl. 1875).

Devil's Bit. See SCABIOSA.

Devil Fish, belonging to the genus of Rays, is a fish possessed of a stunted head, on each side of which are winglike fins. Its tail has spines and is long and slender. Its mouth, which is over 2 feet wide, is under-jawed and furnished with teeth arranged in many rows. The pectorals extend beyond the head and look like unto horns. This fish occurs in the equatorial portions of the Atlantic Ocean, and the largest specimens have been seen near Jamaica. Some have been caught weighing as much as 5 tons and almost 18 feet long by 18 feet broad. The fish is hideous and strong, but of a timid nature and easily scared by man. See CEPHALOPTERA.

Devil Fish.

Devise' is an English law-term signifying properly a gift of real estate by a last will and testament; a form of conveyance, *mortis causa*, which the English law admits. The giver is called the *devisor*, and he to whom the estate is given is called the *devisee*. But the term is now applied to all legacies. The power of D. extends not only to property possessed by the testator at the time of making his will, but to all that he may acquire subsequently. See WILL.

Devi'zes, a town in the centre in Wiltshire, near the Avon and Kennet Canal, 22 miles N.N.W. of Salisbury. It has silk-throwing mills, and snuff and malt manufactures. Its corn-market is the largest in the W. of England. Until 1885 it returned one member to Parliament. D. took its rise from a castle built here in the reign of Henry I. by Roger Bishop of Salisbury. The name is a corruption of the Latin *Devisæ*, so called from being the point on the road from London to Bath where the Roman and Celtic districts *divided*. Pop. reg. sub-dist. 13,015; mun. bor. 6426; and parl. div. of county 48,297.

Devonian System (Ger. *Obere Grauwacke*), the name given by Sedgwick and Murchison to the rocks developed in the S. of England and the Rhine lands near Coblenz, which occupy a geological position above the Silurian and below the Carboniferous formations. The Old Red Sandstone (q.v.) of Wales, Scotland, and Russia is similarly situated; but in how far these two series, differing considerably from each other both as regards their lithological and fossil character, are strictly contemporaneous it is impossible to say, since in no place do they touch. There seems to have been a physical barrier stretching across England and the N. of Central Europe S.E. towards the Black Sea, on the S. side of which salt-water deposits of the D. type were formed, and on the N. large lagoons or inland sheets of water, giving rise to the Old Red Sandstone. The D. S. is divided into—(1) *The Lynton Beds*, or Lower D., a series of hard unfossiliferous sandstones resting on chlorite slates, which contain traces of animal life in the form of corals and gasteropods; (2) *The Ilfracombe Beds*, or Middle D., grey schists and limestone, the latter containing a very typical brachiopod, the *Stringocephalus Burtini*, besides numerous corals, crinoids, and gasteropods quite distinct from the Silurian and Carboniferous forms; (3) *The Barnstaple and Marwood Beds*, or Upper D., consisting of sandstones and shales, which abound in marine fossils, a number being identical with those of the Carboniferous system. In the district of the Rhine, Harz, and Thïolinger-Wald, these three subdivisions are also recognised. In N. America the rocks seem intermediate in character between the true D. and the Old Red Sandstone. Fossils corresponding to the types of both formations are obtained, and the upper strata show the same carboniferous character as in England. Land plants are numerous in the N.E., and coal seams, the oldest known in the world, occur here.

Dev'onport, a borough and naval arsenal in Devonshire, England, on the Hamoaze, the estuary of the Tamar, 2 miles W.N.W. of Plymouth, and 248 miles W.S.W. of London. It was named *Plymouth Dock* until 1824. The town stands on a height, and is defended on the N., E., and S. sides by a wall 12 feet high, and a fosse cut in the solid rock to a depth of from 12 to 20 feet, while the sea-entrance is protected by forts with heavy batteries. The houses are generally well-built, and the streets regular, with marble footpaths. Water is supplied from Dartmoor. The importance of D. springs from its dockyard and arsenal, which contain everything necessary for building and equipping ships of war. The docks cover an area of 100 acres. A basin and two of the docks were begun in the reign of William III., and two other docks in the reign of George III. The north basin, finished in 1868, is 900 feet long by 400 wide. The port-admiral and governor have official residences in D., and there are extensive barracks and military hospitals. Besides ropemaking, sailmaking, and anchor-making, there are breweries, soapworks, and a large trade in victualling ships. D., comprising the parish of Stoke Damerel and the township of East Stonehouse, returns two members to Parliament. Pop. parl. bor. 70,204; county bor. 54,803.

Devonshire (the Roman *Damnonia*, a Latinised form of the Celtic *Dyfnaint*, 'the deep valleys'), a county in the S.W. of England, bounded N. by the Bristol Channel, S. by the English Channel, W. by Cornwall, and E. by Dorset and Somerset. It has a rocky, precipitous coast-line of 160 miles, in the N. indented by Barnstaple or Bideford Bay, in the S. by Plymouth Sound, Salcombe Haven, Tor Bay, Exmouth, and Lyme Bay. The county is in great part hilly, and famous for its beautiful streams and valleys. The small *coombes* on its N. coast are not surpassed in picturesque daintiness by any coast scenery in Britain. The centre and S.W. is occupied by Dartmoor (q.v.), and in the E. are Exmoor and Blackdown, also tracts of elevated heath. The rivers flowing N. are the Taw and Torridge; those entering the English Channel are the Exe, Teign, Dart, Tamar, and Tavy. The Dart is specially notable for its wild beauty and its legendary renown. Along the S. coast the climate is extremely mild, in winter attracting many invalids. The famed vale of Exeter includes over 120,000 acres of the finest land in England. Of the 1,667,097 acres, which constitute the area of the county, 240,949 are under corn crops (oats, 122,539 acres); 131,311 under green crops (potatoes, 11,934); 205,137 under clover, sainfoin, and grasses in rotation; 629,369 under permanent pasture; 32 under flax; and 1432 under small-fruit cultivation. Nursery grounds occupy 318 acres, and 124,387 acres of mountain and heath land are used for grazing. Woods and plantations cover 84,098 acres. The chief exports are live stock, the famous cider, and dairy produce, especially butter and clotted cream. There are manufactures of druggets, serges, linen, carpets, leather, &c., and also valuable pilchard, mackerel, dory, and mullet fisheries. The formation of D. is for the most part Devonian, interposed with igneous rocks, but in the N.E. it is Carboniferous. The tin-mines are among the most celebrated in the world; the other minerals are copper, lead, iron, silver, gypsum, Bovey coal, marble, and porcelain clay. Exeter is the capital, and the other chief towns are Plymouth, Devonport, Tavistock, Tiverton, and Barnstaple. D. contains eight Parliamentary divisions, each of which returns one member :—Eastern, or Honiton, pop. 52,025; Mid, or Ashburton, 53,005; N.-Eastern, or Tiverton, 52,763; Northern, or S. Molton, 46,719; N.-Western, or Barnstaple, 61,331; Southern, or Totnes, 49,642; Torquay, 57,450; Western, or Tavistock, 50,616. D. was the seat of an early civilisation, through its intercourse with Phœnician or Carthaginian merchants. At Plymouth and elsewhere large collections of bronze weapons and ornaments have been found, showing these to have been gathering-places of pre-Roman traders. The Tamar is the old border river of the W. Saxons and Britons, and overhanging it is Hingston Down, the *Hengestesdun* of the Chronicle, where Ecgberht defeated a united British and Danish force in 835. The sloping bank of the river is dotted with barrows of unknown antiquity. Pop. anc. county 631,808; adm. county 455,353; and reg. county 636,225. See also articles, CATTLE, HORSE, PIG, SHEEP.

Devonshire, Dukes of. The House of D. takes its rise in the 12th c. in the Counts or Earls of Devon. In 1556 the earldom reverted to the Cavendish family (see CAVENDISH), the third of whom was created Duke of D. in 1694. Excepting the present Duke, the House of D. has never taken a very prominent part in English politics, but has been distinguished for its firm adherence to the Whig party. The most notable members of the family are **William Cavendish, First Duke of D.,** born 25th January, 1640, served in the navy, opposed James II. in Parliament, was a witness in favour of Lord Russell, became Earl of D. in 1684, and in 1694 Duke of D. He was one of the regency during William III.'s absence, and died 18th August, 1707.—**Georgiana Spencer, Duchess of D.,** youngest daughter of John, Earl Spencer. Born 9th July, 1757, she married William Cavendish, Duke of D., in 1774. Her beauty, wit, audacity, and accomplishments made her one of the most celebrated women of her day. The Duchess was an ardent Whig, and the firm friend of Fox. She wrote *Memorandums of the Face of the Country in Switzerland* (1799), and a poem, *The Passage of St. Gothard* (1803), not undistinguished by elegance and fancy. She died 30th March, 1806.—**William Spencer Cavendish, Sixth Duke of D.,** son of William Cavendish and Georgiana Spencer, was born 21st May, 1790. He was a strong advocate of Catholic emancipation, was Lord Chamberlain in the Grey Ministry, and supported Reform. He took great interest in art, as well as in politics. He died unmarried, 18th January, 1858, and was succeeded by his cousin, **William Cavendish, Seventh Duke of D.,** born 27th April, 1808. He was for some time Chancellor of the Universities of London and Cambridge. He died 21st December, 1891, and was succeeded by his son, **Spencer Compton Cavendish, Eighth Duke of D.,** born 23rd July, 1833. See article CAVENDISH.

Dew is the deposition of moisture from the air, which has been cooled below the minimum temperature at which it can retain in suspension the quantity of vapour present. This critical temperature is called the *dew-point;* and it is the temperature at which the deposition *begins* to take place if the air be subjected to a continual cooling process. During the day the heat of the sun evaporates the moisture of the earth's surface, and saturates the earth with vapour; but towards and at sunset this action is arrested, the surface radiating the heat it formerly absorbed, and cooling, if unchecked, below the dew-point, whereupon the D. is deposited. Such is the theory established by Dr. Wells, and generally accepted now. Clouds, by obstructing radiation, check this deposition; and winds, by constantly renewing the air in contact with a given surface of ground, have the same effect, since sufficient time is not permitted for the required cooling to take place. D. falls chiefly on calm, serene nights, and earliest upon the objects which radiate fastest. When the temperature is at or below 0° C., the D. takes the form of hoar-frost, the vapour passing at once into the solid state. The D. falling in England annually has been estimated by Dalton as equal to a bed of water 5 inches deep.

Dew'as, a town of the state of Dewas, under the Manpur agency, on an affluent of the Chambal, and capital of a petty state of the same name, taken under British protection, 18th December, 1818. It is governed by two chiefs, descended from two brothers of a Rajput family, who intermarried with Mahrattas, and destroyed the purity of their blood. These chiefs possess equal authority, and have each the right of adoption. A hill near the town is crowned by a temple, dedicated to the goddess Chamunda Devi, whose form, in gigantic proportions, is cut on the cliff. Numerous pilgrims visit the spot every year. Pop. of town 15,068. The area of state is 882 sq. miles, and the pop. is estimated at 152,073.

Dew'berry, a Rosaceous plant allied to the Bramble (q.v.), which belongs to the same genus, common in many parts of Europe and Asia. There are two species in N. America. Both produce an edible fruit, that of the American species being much superior. A kind of 'wine' is made from the juice of the British D. See RUBUS.

De Wett'e, Wilhelm Martin Leberecht, a famous German theologian, was born at Ulla, near Weimar, 14th January, 1780, studied at Jena, and was appointed Professor of Theology at Heidelberg in 1809. Called to Berlin in 1810, he was Professor of Theology there till 1819, when he lost his chair for meddling with politics, but was soon after appointed Professor of Theology at Basel, where he remained till his death, 16th June, 1849. D., following out the principles of Jacobi (q.v.), laboured, like Schleiermacher (q.v.), to introduce a more pious mode of contemplating the mysteries of Christianity, in opposition to the merely intellectual mode of Rationalism. Hence he was regarded by Rationalists as a mystic, although those who know only his free criticism of the sacred canon and mythological treatment of the Old Testament class him with the Rationalists themselves. In reality he advocated, though in a conditional and philosophical manner, old Lutheran orthodoxy.

De Witt, Jan, a great Dutch statesman, was born at Dort in 1625. His father, Jakob De Witt, was a strong opponent of William II., Prince of Orange, and the hatred descended to the son, who, after receiving a careful education, entered public life, and was sent by the States of Holland to Zeeland, to persuade that province against an Orange policy. De W. further showed ability of another sort by publishing a mathematical treatise titled *Elementa Linearum Curvarum*. At this time he was chosen Pensionary of Holland, and in this capacity he did his best to deprive the House of Orange of power, and even to abolish the office of Stadtholder. He so far succeeded that in 1654, at the end of the war with England, an article was secretly inserted in the treaty with Cromwell, in virtue of which the House of Orange was deprived of all state offices. Subsequently, however, the influence of De W. declined, particularly after Holland was invaded by the French (1672), and the Orange party carried the elevation of William III. to the office of commander of the Dutch forces. In the first campaign the troops were beaten, and the popular hatred against De W. rose so high that he and his brother Cornelius, who had been accused of conspiring against the Prince of Orange, were attacked and murdered by a mob, at the Hague, 20th August, 1672. The *Memoirs of De W.*, published in 1667, contain valuable information about the political history of the time.—**Cornelius De W.,** brother of Jan De W., was born at Dort, 23rd June, 1623. When young he served in the navy, and on the fall of the Orange party in 1650, was made burgomaster of Dort, and deputy for W. Friesland and Holland. He was an able coadjutor to Jan De W., and showed great political talents. He distinguished himself in a sea-fight under De Ruyter in 1672, but was shortly afterwards murdered along with his brother.

Dews'bury, a town in the W. Riding of Yorkshire, on the left bank of the Calder, 30 miles S.W. of York, and 186 miles N.N.W. of London by railway. It is noted for its manufactures of blankets, woollen cloths, carpets, shoddy, &c. In the vicinity are collieries and ironworks. The parl. bor. of D., which returns one member, consists of the bor. of D., and part of the bor. of Batley, parts of the townships of Soothill and Thornhill, and the district called Ravensthorpe. Pop. parl. bor. 72,986; mun. bor., reg. sub-dist., and civ. par. (each) 29,847.

Dextrine. See BRITISH GUM.

Dey' (perhaps from Turkish *dai*, 'an uncle by the mother's side'), the former title of the chief of Algiers, corresponding to the Bey of Tunis and Tripoli. The D. was first appointed by the Algerians about 1600. The office became independent of the Sultan about 1623, and was abolished at the French conquest of Algiers in 1830.

Deyster, Louis de, a Flemish painter, born at Bruges in 1656. He studied under Jean Maas, resided for six years in Rome, and also for some time in Venice, after which he returned to his native place. Of a deeply religious disposition, he rarely went into society, and somewhat of the gloom of his life is reflected in his works. Of these, the principal are 'The Death of the Virgin,' 'The Resurrection of Christ,' 'The Appearance of Christ to the Three Marys,' and the 'History of Judith,' in several parts. His manner is bold and large, evincing a strong Italian taste, while his colour is bright, warm, and pure. To give prominent effect to the work, on the chief parts of his subject he occasionally slurs and sacrifices the setting. In later life D. abandoned his art for music. He died at Bruges in 1711. His daughter, **Anne D.** (died 1746), won considerable reputation both in music and painting. She wrote a Life of her father. See Deschamps, *Vies des Peintres Flamands*, vol. iii.

Dhalac', or **Dahlac el Kebeer,** an island in the Red Sea, 9 miles from the coast of the Buré Peninsula, Massowah, Abyssinia, of very irregular form, and about 120 miles in circumference. It is of coral formation, and is mostly sandy, with a few grassy spots in the rainy season, affording pasture to asses, goats, sheep, and antelopes. Dubellu, the principal village, imports millet and dates from the opposite coast of Arabia, and exports pearls, sharks' fins, and turtles. D. having no springs, rain-water is preserved in tanks and cisterns. The surrounding islets form the D. Archipelago.

Dha'mi, one of the twenty-six Cis-Sutlej hill-states of India. Area, 27 sq. miles; pop. 3985 of whom 3940 are Hindus and 38 are Mohammedans. It has an elevation of 4000 feet above the level of the sea. In feudal subordination to the government of the Punjab, it pays £72 of its annual revenue as a tribute. Chief productions, grains and opium. Fateh Singh is its ruler and is a Rajput by caste.

Dhar, a town in the Bhopawar Agency, Central India, nearly 2000 feet above the level of the sea, is surrounded by a mud wall, while the fort is defended by walls 30 feet high. Pop. formerly estimated at 100,000, is now 18,430. The *state* of the same name, of which D. is the capital, and in which opium is largely cultivated, besides sugar-cane, cotton, tobacco, turmeric and linseed, has an area of 1775 sq. miles, and a pop. of 169,474.

Dhar'war, a town in the S. of the province of Bombay, capital of a district of the same name noted for its cotton growing. It has government schools for Mahrattas and Canarese. The fort is said to have been built in 1403 by an officer of Ram Rajah; in 1685 it was captured by the Mogul Emperor and in 1753 it fell to the Mahrattas. Hyder Ali took it in 1778, but in 1791 the Peshwa retook it by the help of the British, to whom it passed in 1818. Pop. (1891) 32,841.—The *district* of D. has an area of 4603 sq. miles, and a pop. of 1,051,314 of whom 903,739 are Hindus, 131,000 Mohammedans, 4222 Christians, 12,159 Jains, 135 Parsees, and 27 are Jews. Canarese is the prevalent language. The chief manufactures are silk and cotton goods; also cotton carpets. There are three annual fairs in the district, which attract a great number of pilgrims to the different shrines.

D'Herbelot, Barthélemy, a great French Orientalist, was born of good family at Paris, 4th December, 1625. After studying Eastern tongues, and travelling to Italy, he received from Louis XIV. a pension and Professorship of Syriac in the Collége de France in 1692. D. died at Paris, 8th December, 1695. His great work, *Bibliothèque Orientale, ou Dictionnaire Universel contenant tout ce qui fait connaître les Peuples de l'Orient* (Par. 1697), written originally in Arabic, is a treasury of learning relating to the literature, history, religion, &c., of the Arabs, Turks, and Persians, still unsurpassed in Oriental scholarship. D. also wrote *Anthologie Orientale* and *Dictionnaire Arabe-Persien-Turc*. Editions of the *Bibliothèque* were published at Paris in 1697, and at Maestricht in 1776. A supplement was added in 1781, containing the *History of Tartary* by Vixtelon, and a translation by Galland of remarkable Oriental sayings.

Dhole, or **Kohl'sun,** a species of wild dog inhabiting the western frontiers of British India. In size it averages an ordinary retriever, and exhibits a rich brown or bay colour, darkest on the feet, muzzle, and tail. In habits the D. is shy, although when hunting in packs it may evince courage. The ears are pointed and erect. The term D. is also applied to nearly allied varieties of dogs common in Ceylon and elsewhere, and often known by the name of Red Dogs. The genus *Chryseus* includes the latter varieties.

Dhol'ka, a town in the district of Ahmedabad, province of Bombay, British India, 22 miles S.W. of Ahmedabad, surrounded by a mud wall. Pop. 16,494, of whom 11,203 are Hindus, 5161 are Mohammedans, 124 are Jains, and 3 are Parsees. The inhabitants are mostly the descendants of soldiers of fortune who entered the district in 1297. Chief manufacture is female robes.

Dholpore', or **Dholpur,** a capital of a Jât state of the same name, Rajputana, 34 miles S.S.W. of Agra. A town on the same site existed in the 11th c. and surrendered to Babar in 1526. Then it was moved to the north to be clear of the floods arising from the Chambal. Two centuries later the present town was built by an ancestor of the reigning prince. Near D. is a lake of 41 acres of water, on the shores of which are 114 temples, where annual fairs are held. Pop. 9739.—The *state* is separated from Gwalior by the Chambal, and was increased by a grant of territory in 1805. Area, 1154 sq. miles; pop. 279,890, of whom 259,787 are Hindus, 17,423 are Mohammedans, 2649 are Jains, 25 are Sikhs, and 6 are Christians. In some parts where irrigation is possible the soil is very fertile; wheat, barley, rice, and cotton being produced in considerable quantity. The Maharaj Rana, the native prince, has a council of three to assist him in the government of the country, and his state is under the political superintendence of the British Agent.

Dhubbui', a semi-ruined town of India, in the protected state of Baroda, on a tributary of the Nerbudda, 7 miles S.E. of Baroda. It is surrounded by colonnaded walls, affording extensive views of the fine alluvial country, and has richly-sculptured temples, and an immense tank, approached by splendid flights of stairs. Monkeys swarm in the deserted buildings. Pop. 500.

Dhun'chee, or **Dhan'chi,** an annual plant of the natural order *Leguminosæ*, a native of India, where it is cultivated for the sake of its fibre, which, as it bears frequent wetting, is valuable for nets, &c., though, from its contracting too much when drying, it is unfitted for ropes, ships' cordage, and such uses. It is also found in the W. Indies and tropical Africa. It is prepared in much the same way as Sunn (q.v.).

Dhwalagi'ri, or **Dhaulagiri** (*Dewalagiri*, 'the White Mountain'), one of the loftiest peaks of the Himalayas, is situated in Nepal, and has a height of 26,826 feet.

Diabe'tes (Gr. *diabetes*, 'a flowing through,' from *dia*, 'through,' *bainein*, 'to go') is a disease which is accompanied by much thirst. Two kinds are described by medical writers, *D. Mellitus* and *D. Insipidus*. The former is a disease of which we know neither the origin nor pathology, and consequently its treatment is not satisfactory. It is characterised by increased discharge of fluid, containing sugar allied to Grape-Sugar (q.v.), and always of a high specific gravity. The patient complains of great thirst, hot dry skin, general debility, &c. He gradually becomes emaciated, with a sweet breath, a great tendency to disease of the lungs, and generally a voracious appetite. Sugar is found in the blood, and in most of the secretions and excretions of the body. *D. Mellitus* probably depends on disordered functions of the liver, possibly due to irritation of the nervous system. The treatment consists in abstaining from sugary and starchy food as far as possible, and living chiefly on animal food. Milk has been highly recommended. Of medicines, opium, iron, and quinine are the best. Turkish baths are sometimes beneficial, but in point of fact *D. Mellitus* is seldom if ever cured. *D. Insipidus* is a different disease; the chief symptoms are great thirst, and an enormously increased discharge of fluid, of a light specific gravity, but containing no sugar. Steel-drops may be taken with advantage.

Diab'lerets, a mountain in the Bernese Alps, has a height of 10,672 feet, and is chiefly notable on account of two enormous and destructive landslips (hence its significant name), which took place on its sides in 1714 and 1749 respectively. It is composed of limestone, and the huge masses were undermined by the percolation of glacier-water.

Dia'chylon, lead plaster, made by boiling together litharge (oxide of lead), olive oil, and water. D. mixed with resin and soap, and spread on cloth, forms the common or sticking plaster. The name was applied by the Greeks to an emollient plaster composed of the juices of herbs.

Di'adem (Gr. *diadēma*, from *dia*, 'across,' and *deō*, 'I bind'), originally the blue and white band, or fillet, worn by Asiatic monarchs round the *tiara*, fastened behind, the ends being allowed to fall loosely over the shoulders. Sometimes it was broad and adorned with costly jewels, as in the case of the Persian kings; sometimes narrow and plain, or plaited, as in that of Bacchus, who is generally represented in ancient sculptures with this ornament, and is mentioned by Pliny as its inventor. The diadems of the Egyptian divinities had the figure of a serpent upon them. Alexander the Great adopted the D. from the Persians, and Antony, during his amour with Cleopatra, assumed the Egyptian badge. Gradually it became the recognised emblem of sovereignty among the Western nations, and was assigned by sculptors to various divinities. None of the Roman emperors wore it till the time of Diocletian. By the addition of gold and gems it went on increasing in size till it became the modern Crown (q.v.).

Diæ'resis (Gr. *diairesis*, a 'dividing'), a term used in grammar to denote the resolution of a diphthong or of a contracted syllable into two syllables, as Lat. *aulæ*, *aulaï*, *silvæ*, *silüæ*. The term D. is also applied to the mark .. placed over one of the vowels to indicate that it is to be pronounced separately from the preceding or succeeding one, as the case may be.

Diagno'sis (Gr. from *dia*, 'thoroughly,' and *gignoskein*, 'to know') means, in medicine, that knowledge of a disease which the physician can obtain by careful examination of the patient. To make a perfect D. the family and the personal history of the patient must be considered, the condition and functions of the organs of the body, and the abnormal symptoms present carefully noted.

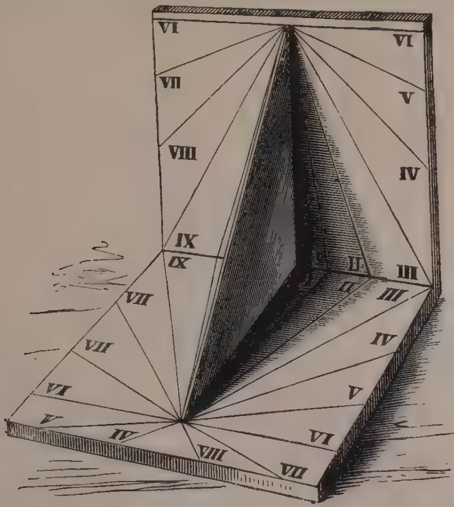
Diag'onal is a line joining any two non-adjacent angles of a rectilinear figure. A pentagon has 5 diagonals, an octagon 20, and a nonagon 27. The D. of a solid is a line joining any two non-adjacent solid angles: a cube has 4.

Diagonal Scale, a form of scale used for the accurate and convenient measurement of small subdivisions of any given unit of length. If we suppose, as an illustration, the unit to be one inch and the required subdivision to be into one-hundredth parts, it is easily seen that although it would be possible to divide a straight line, measuring an inch in length, into one hundred equal parts, and then to make measurements upon a scale so constructed, the smallness of the intervals would make both the operation difficult and the measurement inconvenient. By means of a D. S. this could be done easily and without having to set out any smaller dimension than $\frac{1}{10}$th of an inch. The process is as follows:—Draw eleven parallel lines at any convenient distance (say $\frac{1}{8}$th of an inch) apart, calling them O., I., II., III., ... X., beginning at the bottom. Crossing all these at right angles, draw two parallel lines exactly one inch apart, and divide this inch upon lines O. and X. into tenths. Let the line marking the left-hand end of the measured inch intersect O. and X. in 0, and number the tenths 1, 2, 3, &c., towards the right. Then draw lines joining 0 on O. with 1 on X., 1 on O. with 2 on X., and so on, and the D. S. is complete. The lines OX. and 01 intersect in the point o upon O., and are $\frac{1}{10}$th of an inch apart upon X.; at each intermediate line I., II., III., &c., they are therefore 1, 2, 3, &c., *tenths of one-tenth*, that is, hundredths, of an inch apart, and similarly with the lines 12, 23, &c. Thus any required dimensions in hundredths of an inch can be measured upon one or other of the intermediate lines; for example, forty-nine hundredths is the distance from the line OX. to the line 45 measured upon the parallel IX. and so on.

Diag'oras, a Greek poet and philosopher, son of Telecleides, was a native of Melos, one of the Cyclades. He is said to have been a disciple of Democritus of Abdera; and from his open avowal of disbelief in the popular theology he was branded as an atheist. Besides this, very little regarding his career is known for certain. He had, however, taken up his abode in Athens as early as 424 B.C., for Aristophanes, in his comedy of the *Clouds*, which was performed in that year, refers to him as a celebrity. From the epithet *Melian*, applied to Socrates in the passage, it has been conjectured that the latter was a pupil, or, at all events, an acquaintance of D. In 411 B.C. D., having got involved in a lawsuit about impiety, found it expedient to flee from the city. Though a price was set upon his head, he managed to reach Pallene, from which, after a time, he went to Corinth, where he died. While irreligion was the ostensible ground of accusation, the real cornerstone of his offending was doubtless of a political nature. All accounts represent D. as a man of exemplary conduct, stainless morals, and signal earnestness of purpose. Among his philosophical works was one entitled *Phrugioi Logoi*, in which he explained and defended his opinions. D. seems also to have had some reputation as an orator.

Di'al (Low Lat. *dialis*, from *dies*, 'a day, a space of time'), or **Sun-Dial**, an instrument of great antiquity for measuring time. Since the invention and introduction of clocks and watches, it has become of less and less use, till now it is regarded as a mere astronomical toy. Herodotus says the Chaldeans taught its use to the Greeks; and Anaximander gets the credit of having made a D. in 550 B.C. L. Papirius Cursor placed the first one seen at Rome on the temple of Quirinus, and divided the day into twenty-four hours (B.C. 293).

A D. usually consists of a plane surface, in the centre of which is fixed the *style*, whose shadow cast by the sun upon the plate indicates the time by its position. From the same centre are drawn the lines which represent the hours, and it is the laying down of these lines which constitutes the great difficulty attending the making of a D. That edge of the style whose shadow gives the time must point towards the pole of the heavens—or, more correctly, must be parallel to the axis of the earth. It is apparent, then, that at any given time the sun, the edge of the style, and the shadow will be in the same plane, which plane, passing through the centre of the earth, rotates uniformly with the sun, taking twenty-four hours to complete one revolution. The problem is then reduced to finding the lines of intersection on a given plane of twenty-four other planes, which all pass through the same line given in position, and which make with each other the same angle of 15°. These lines of intersection will not in general make the same angles with each other; a fact which may be easily shown by slicing an orange in a direction not at right angles to the axis, when it will be seen that though each lith is of the same size, the exposed surface of each on the newly-cut circle will not be so. It is not necessary that the D. be horizontal, or even plane, though in the latter case the laying down of the hour-lines is rendered much more difficult, and indeed is best done practically by comparison with a standard D. Next to the common horizontal D., the *vertical D.* is the one most frequently met with. It is usually fixed upon the wall of a church or house, and if possible faces one of the cardinal points. If it does not do so, it is termed a *declining vertical D.*, and the investigation of its hour-lines becomes much more complicated. The style is usually the straight edge of a thin plate, or a wire; but a slit or hole in a thin plate, allowing the light to pass through, will answer the purpose just as well. The time indicated by the D. is of course the true solar time, and agrees with the mean time, or that shown by a good clock only at four different times of the year, which occur at about the middle of April, the middle of June, the beginning of September, and the end of December. This disagreement with mean or civil time, and the necessity of applying a correction which varies from day to day, are decided objections to the employment of sun-dials as time-indicators. Further disadvantages arise from the impossibility of getting a clearly-defined edge to the shadow cast by the style, and consequently of obtaining even an approximately accurate estimate of time from a D. of convenient size; and also from atmospheric refraction, which has the effect of throwing the shadow a trifle towards noon at all times. Accordingly, a correction must be made, which varies with the sun's altitude, and which must be subtracted for all hours before noon, and added for all hours after noon. On the more elaborately constructed sun-dials tables of corrections for every day in the year were frequently inscribed. For an account of some curious dials, see Brewster's edition of Fergusson's *Lectures;* also Delambre's *Astronomie Ancienne*, and Montusla's *Histoire des Mathématiques*.



Dial.

Di'alect, in the narrowest sense a local variety of a language, has, since the development of philology and consequent recognition of the connections between various tongues, been applied to languages of kindred origin. Thus Greek, Latin, German are spoken of as Aryan dialects, having sprung from a common Aryan source. In the earlier and more restricted use of the word, the Greek language contained four distinct dialects, the *Doric*, *Æolic*, *Ionic*, and *Attic*. The Doric, marked by the broad sound of the *a*, was simple, rough, and unpolished. It prevailed in the Peloponnesus. The Æolic, resembling the Doric in roughness, was peculiar to Bœotia, the adjoining districts, and various Æolian colonies. The Ionic was soft, flowing, melodious, especially rich in combinations of vowels. It was confined to part of Asia Minor and the neighbouring islands. The Attic was at first closely similar to the Ionic, but through the spread of commerce and the influence of the Dorians and Æolians, became a distinct D., more succinct and nervous than the Ionic, more polished and euphonious than the Doric and Æolic. Through the political and literary greatness of Athens the Attic became the Greek D. in which writers of every state wrote. It was at first restricted to Athens and the neighbourhood, but after the Roman conquest was generally, though not universally, adopted throughout Greece. The process of gradual dialectic divergence from a common stock is strikingly shown in the rise of the Romance languages from the Latin. The Latin tongue, even in its palmiest era, embraced two dialects—the polished Latin of the literary and refined classes, and the *sermo plebeius* or *rusticus*. These differed widely in vocabulary and accent; the classic *verberare*, *equus*, and *pugna*, for example, being represented in the vulgar Latin by *battuere*, *caballus*, and *battualia*, while *stabulum*, *oraculum*, *duplicare*, *ponere*, &c., are contracted in the plebeian D. to *stab'lum*, *orac'lum*, *dupl'are*, *pon're*, &c. From this vulgar Latin, which must be distinguished from the *Low Latin*, a corrupt literary medium extinguished during the barbarian invasions, arose the *Romance* or *New Latin* dialects, comprising the French, Provençal, Spanish, and Portuguese, the Rhæto-Romanic of S. Switzerland and the Wallachian. Before the Gothic invasions began to influence the Latin speech, that language was tending to simplify its inflections, and after the barbarians settled in the empire, grammatical disorganisation immensely increased. The Gothic tribes, discarding the inflectional endings, 'seized,' says Littré, 'on the solid part of the word, the kernel which offered them resistance;' and thus, for example, the Latin *sollicitare*, *ministerium*, *æstimare*, become the French *soulcier*, *mestier*, and *esmer*. Before the end of the 8th c. the *Lingua Romana Rustica* was the common speech of the Gothic settlers round the Mediterranean, and gradually various dialects became defined, from what had, for a time, been a kind of linguistic debris. These different dialects did not arise from an original variety of speech among the Teutonic tribes, but from historic events subsequent to the general adoption of the *Lingua Rustica*. Thus the Spanish was modified by the Arabic of the Saracen conquest of Spain. Through time the Romance dialects diverged more widely, and each branched into various minor dialects, one of which, generally through some fortuitous circumstance, became at last the classic national speech. The same process is seen in the Teutonic tongues. The Alemannic, Frankish, and Suabian were the dominant German dialects until the High German was rendered the national speech by the influence of Luther's High German translation of the Bible. Similarly Tuscan was rendered the classic D. of Italy because used by Dante for his *Divina Commedia*. For the various dialects of English, see ENGLISH LANGUAGE. The use of the word D. is somewhat vague and perplexing. In one sense every language is a D. in regard to its kindred tongues and the speech whence it mainly sprang, while a local variety of a language, such as Scottish in relation to English, is likewise correctly spoken of as a D. After an indefinite amount of linguistic variation and development, a minor D. may become an independent tongue, as Portuguese, which was at first considered a corrupt D. of Spanish. Scottish is not a different language from English, nor is it in any sense a corrupt form of the latter. It was originally Northumbrian English, and its first peculiarities showed themselves when it was cut off from Southern influence by the union of the English Earldom of Lothian with the old Gaelic kingdom of Scotland and the Cymric principality of Strathclyde. It is now a mere ruin, but it still preserves in its splendid decay many old English forms which have long ceased to adorn the classic tongue of the South. See Gidel's *Littérature Française*, Whitney's *Language and the Study of Language*, Oliphant's *Standard English*, and Skeat's *Bibliographical List of the Works published or in MS. illustrative of various Dialects of English*.

Dialec'tic (from the Gr. *dialegomai*, 'I hold conversation with') means a conversation, controversy, dispute; and hence the D. art meant the art of discussing a subject by questioning another. Plato applied the term to the process of metaphysical speculation as well as of logical inference; and this use of it has been revived in recent times; for example, by Hegel. Aristotle limited the term to the logic of probabilities as distinguished from positive demonstration. The word is also employed in its universality as equivalent to logic, the science of the formal laws of thought, and, in a narrower sense, as the application of the laws of reason rather to the discussion or defence of any point than to the attainment of truth.

Di'allage, an hydrated, calcareous augite, varying in colour from pale green to grey and brown. *Bronzite*, so named from its colour, is a nearly allied mineral, being the hydrous representative of the magnesian augites. *D. rock* is a generally palish green or grey rock, granitic or porphyritic in appearance, and composed of labradorite and D.

Di'alogue, a conversation, is especially applied to dramatic conversations, and to writings in which two or more persons are represented discussing any topic. Among the ancients, who were fond of this form of literature, and used it for gay and serious themes, Plato, Cicero, and Lucian (*Dialogues of the Dead*) are memorable. In later times it was adopted in Italy by Petrarca, Machiavelli, Algarotti, Galileo, Gelli, &c.; in France, by Sarrasin, Malebranche, Fénélon, Fontenelle, Diderot, St. Mard, and Galiania; in Germany and the Low Countries, by Erasmus, Lessing, Mendelssohn, Engel, Jacobi, Herder, Schelling, Wieland; in England by Ascham, Spencer, Berkeley, Hurd, Addison, Lyttelton, and others. The chief English work in D.—outside the drama—is Landor's *Imaginary Conversations*, which are of almost peerless beauty of style. The distinctive feature of the light literature of the present day is the inordinate amount of space devoted to D. The *short story* has simply become the text of a play with the stage directions cut down to the minimum, and all the descriptive elegance, which adorns the writings of the less modern school, is conspicuous by its absence.

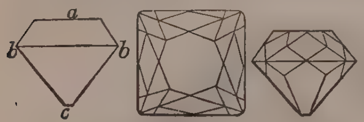
Diamagnet'ic, a term applied by Faraday to those bodies which appear to be repelled by either pole of a magnet. Bismuth and antimony had long been recognised as having such a property, but they were regarded as mere curiosities till Faraday in the course of his experiments showed that matter of almost every kind, solid, liquid, and gaseous, was capable of being repelled or attracted by a magnetic pole. Substances which, like iron and nickel, are attracted by a magnet, are called for distinction *paramagnetic*. If a rod of a paramagnetic solid, or an elongated cylinder of thin glass, containing a paramagnetic liquid, be suspended between the poles of a strong magnet, it will either arrange itself *axially*, or in the line joining the poles; and if a D. substance be similarly treated, it will arrange itself *equatorially*, or at right angles to the line joining the poles. A very ingenious method, invented by Plucker, of showing the magnetic nature of a liquid, is to pour a little into a watch glass which rests upon the poles. If the liquid be paramagnetic, its upper surface becomes simply concave; but if D., there are two concavities, one over the termination of each pole. A stream of gas, if directed through between the poles, will continue in its course intersecting the axial line if the gas be paramagnetic, but will be divided so as to pass on both sides of this line if it be D. Another method employed by Faraday to make the effect more apparent was to float a soap-bubble filled with the gas in the magnetic field. This test was found very delicate. These phenomena, at first sight so irreconcilable, are easily explicable upon Faraday's theory of action through a medium, especially when taken in connection with the experimentally established fact that a substance ordinarily D. acts as a paramagnetic body in a medium more D. than itself, and a paramagnetic body acting in a medium more paramagnetic than itself behaves as a D. substance. In other words, these D. bodies behave with respect to the magnetic attraction in the same way as a balloon ascending does to the gravitating attraction of the earth. Taking air as the medium, the more important paramagnetic bodies are: iron, nickel, cobalt, manganese, palladium, platinum, chromium, sealing-wax, plumbago, shell-lac, charcoal, oxygen, &c.; and the D.: bismuth, antimony, gold, copper, silver, zinc, tin, cadmium, mercury, sodium, rock crystal, alum, glass, phosphorus, sulphur, india-rubber, litharge, wood, starch, sugar, beef, apple, blood, water, alcohol, hydrogen, nitrogen, carbonic acid, coal-gas, &c.

Diamanti'no, the name of a river and of two towns in Brazil. The river, supposed to join the Paraguay, rises in the province of Matto Grosso. Eighty miles N.N.W. of Cuyaba it is joined by the Ouro, where the smaller of the two towns named D. stands. The name was given to it from the diamonds found in the neighbourhood. Pop. 4500. The larger town, formerly *Tejuco*, is in the province of Minas Geraes. It lies 5700 feet above the sea, is well built, and has a fine climate. Pop. 10,050.

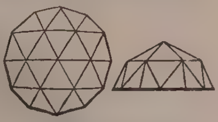
Diam'eter, in elementary geometry, a straight line passing through the centre of a figure. For central curves and surfaces of the second order, each D. bisects a system of parallel chords. This property has led to a wider definition of the term applicable to all curves, viz., a D. is the *polar line*, with respect to the curve, of an infinitely distant point. See POLES and POLARS.

Di'amond (Fr. *diamant*, a corruption of the Gr. *adamantinos*, 'unbreakable'), the hardest and most brilliant of all precious stones, and, excepting the ruby, the most precious. It is generally colourless or pale yellow, but is occasionally blue, green, or red. It reflects all the light which falls on it at an angle of incidence greater than 24° 13′, and its power of refraction is 2·487, that of common glass being 1·525. To these qualities are due its brilliancy and sparkle. Being the hardest of all known substances, it can only be cut and polished with its own dust. The D. is composed of pure carbon in a peculiar allotropic condition. Attempts to produce diamonds by artificial means have not proved altogether unsuccessful, but the process involves too much expense for the results to be commercially useful. D. is combustible in oxygen, the combustion producing pure carbonic acid, just as happens in the burning of common charcoal, and under high heat can be changed into a form of graphite or black-lead. Diamonds are at present obtained from three localities—India, Brazil, and Cape Colony. In India they are pretty widely distributed, occurring in the Deccan in the alluvium of rivers, in Bundelcand, and at Sumbulpore on the Mahanuddy. The D. is much scarcer in the East than formerly. In the 17th c. the famous D.-mines are said to have occupied 60,000 persons. A large proportion of the diamonds brought to the market at the present day are found in Matto Grasso, Brazil, where also the D.-yielding soil is widespread. The discovery of rich D. deposits in Griqualand West, S. Africa, was only made in 1867. From that time till the beginning of 1876 the washings had yielded diamonds to the value of £12,000,000, being at the rate of £2,000,000 yearly. In 1875 there were over 60,000 diggers in the fields, of whom 15,000 were Europeans. In 1889 diamonds to the value of £4,325,137 were exported from Cape Colony; in 1890 and 1891 the value of the export exceeded £4,000,000, but in 1892 there was a slight falling off, and in 1893 it was estimated at £3,821,443. The total value of diamonds exported (1867—1893) is estimated at £66,421,630. The stones found are mostly small and of inferior colour or water. One stone, however, the 'Star of South Africa,' found in 1869, weighed $83\frac{1}{2}$ carats, and was valued at £20,000, and another of 147 carats was unearthed in 1873, while a valuable blue one was found in 1876. The existence of diamonds in Australia has also been demonstrated, and they have been found in Borneo, Sumatra, and Java, and in the Ural Mountains.

The cutting and polishing of diamonds, upon the success of which the beauty of the stones depends, is chiefly performed by Jews in Amsterdam, and the industry demands great care and skill. In many cases the rough stones require to be split or cleaved into form before cutting is begun, and for the success of this delicate operation the workman must take advantage of the cleavage lines of the stone. Diamonds are chiefly cut into the form of single or double brilliants. In this form the stone consists of two principal parts—the bezil and the pavilion. The bezil extends from the table *a* to the girdle *b*, and the pavilion from the girdle to the cutlet *c*. The facets which touch the table are called star facets; those which touch the girdle either from above or below are skill facets. In the single-cut brilliant the table is square, and the whole stone presents thirty-eight facets. The other forms of the D. are the table-cut, a form only found in old stones, and the many-sided rose-cut, in which brilliancy is sacrificed to size.



Top and Side View of Double Brilliant.



Top and Side View of Rose Diamond.

The value of a D. depends on its brilliance, purity of colour, freedom from flaws or specks, and its shape and size. By a D. of the first or second 'water' is meant one comparatively free from clouding and imperfections. A peculiarity, such as a blue, green, or red hue, gives the stone an exceptional, and sometimes an exorbitant, value. Diamonds are subject to great fluctuations in value, and the discovery of the Cape deposits caused a considerable depreciation in price. Up to a weight of 5 carats (20 grains) the value is estimated by the weight, and Harry Emanuel has given a table of the value of perfect brilliants, from which we make the following extracts. It should be stated that the table in question refers to a period previous to the discovery of Cape diamonds. A brilliant weighing half a carat, £5 10s.; three-quarters, £9 10s.; one, £18; one and a half, £38; two, £65; two and a half, £88; three, £125; four, £220; five, £320. Above that weight the price of the stones increases rapidly, and the value becomes a question of individual bargaining.

A few diamonds of uncommon size are known to exist, some of which have a remarkable history. The Koh-i-noor ('mountain of light'), which is now among the British crown jewels, is a D. which has figured in Indian annals from a very remote period, and been the object of much cupidity and intrigue. When it came into the possession of the Queen, in 1850, it was an irregularly-shaped and rather lustreless mass, weighing 186 carats. By subsequent cutting its weight was reduced to $102\frac{1}{2}$ carats, but it was formed into a brilliant of unequalled purity and sparkle, and its value is now estimated at £1,000,000 sterling. The largest D. is asserted to be the Braganza, a Brazilian stone in the Portuguese crown collection. Its weight is stated at no less than 1880 carats, but the genuineness of the stone is doubted. Next in weight comes the Mattan D. of Borneo, an uncut stone weighing 367 carats. Of other well-known stones are the Orloff, in the Russian crown collection ($194\frac{1}{4}$ carats); the Regent, or Pitt, which belonged to the French crown jewels ($136\frac{3}{4}$ carats); the Emperor of Austria's brilliant ($139\frac{1}{2}$ carats); and the Brazilian Star of the South (125 carats). The King of Portugal also owns a Brazilian stone of $138\frac{1}{2}$ carats, and the Sultan of Turkey, the Shah of Persia, and some of the Indian native princes, are known to possess some valuable stones.

There are several ordinary methods of testing the genuineness of a so-called diamond. Being harder than any other substance, a diamond cannot be scratched or marked except by another diamond. Friction electrifies a true diamond, but heat does not, as is the case with the topaz, &c. If a small hole be made in a card and examined through the diamond, only one hole will be observed; should the substance be no diamond, two holes will be seen, in place of one. The setting of a real stone cannot be seen through it, whereas through a false one the setting is plainly visible.

Diamonds and diamond dust have been discovered in meteoric bodies. In 1886 three meteoric stones, which had fallen in S. Russia, were analysed and disclosed the existence of minute particles of diamond dust. Since then diamonds have been found in similar bodies both at Penza and Arizona.

Diamonds have an industrial value for the cutting of glass and the polishing of gems. The stone used in the D. rock-boring machines in use is the carbonado, boart or black D. of Brazil, of no lustre or value as a gem, but possessing the hardness of the precious D. See Dieulafait's *Diamonds and Precious Stones*, &c. (1874), and Emanuel's *Diamonds and Precious Stones*, &c. (1875); and Streeter's *Precious Stones and Gems* (1877).

Diamond Beetle, a genus of Coleoptera or Beetles, belonging to the *Tetramera*, and so named from its gorgeous hues and lustres. It is allied to the Weevils (q.v.), and is coloured of a golden green, with two black bands on the thorax. It is found in Brazil and other parts of S. America.

Diamond Harbour, on the left side of the Hoogly, the port of Calcutta, from which it is distant 38 miles S.S.W. by railway, and 41 by river. D. H. is very unhealthy, especially during and immediately after the periodical rains. The adjacent rice-fields yield heavy crops. Here are stationed harbour-master and customs officers, and the arrivals and departures of all shipping are telegraphed to Calcutta several times a day. There is no village, but an ancient graveyard exists, which may point to a former occupation of the locality by a resident population.

Diamond Necklace, a costly ornament which gave rise to one of the strangest episodes in French history. It was made for Madame du Barry by Bœhmer, the King's jeweller, was formed of 500 diamonds, and valued at about £80,000. On the death of Louis XV., it could find no purchaser, and the Cardinal de Rohan, a rich libertine, persuaded by a clever adventuress, De Lamotte, that the Queen viewed him with favour, procured it as a gift for Marie Antoinette. On 1st February, 1786, Rohan took the ornament to Versailles, and next day, Villette, an accomplice of De Lamotte, carried it off with the words *De par la reine.* Having thus duped Rohan, De Lamotte and her associates fled from Paris, and began to sell the diamonds, but were shortly flung into the Bastille along with Rohan. De Lamotte was branded and imprisoned for life, but the others were acquitted. The affair led to much scandal, and fastened an odium on the Queen among the Parisian populace, which clung to her to the last, and helped to sharpen the people's fury against her. See Carlyle's *D. N.* in his *Miscellaneous Essays.*

Dian'a, a Roman goddess, identified in the confusion of the mythologies with the Greek Artemis, the goddess of hunting, was the daughter of Jupiter and Latona, and twin-sister of Apollo. The place of her birth was Delos (q.v.). As the huntress-queen, she is represented as a full-grown maiden, of masculine figure, with bare limbs and buskined feet, armed with bow and quiver, and attended by hounds. As sister of the Sun-god, she is regarded as the Moon-goddess, and represented as wearing a crescent on her forehead. As a benignant goddess invoked by women in travail, she is called *Lucina*, *Ilithyia*, and *Genitalis;* in the cross-roads, she was worshipped as *Trivia*, and from her triple character as a celestial, terrestrial, and infernal deity, she received the name *Triformis.* She was the goddess of chastity. At Ephesus she had a splendid temple—one of the seven wonders of the world—in which she was represented as 'the many-breasted,' symbolising the fertility of the earth. At Aricia, according to Strabo, she was ministered to by a priest, one of whose qualifications always was that he had murdered his predecessor. At Sparta she was propitiated by human victims; but goats, kids, boars, and oxen were her usual offerings. The name D. is the feminine form of *Dianus* or *Janus*, and is akin to the Lat. *Juno*, the Gr. *Zeus*, and the Sansks. *Dyaus*, 'the sky.' The solar origin of the myth is apparent even in its later and poetised form.

Diana Monkey, a species of Catarrhine monkeys, found in Guinea, Congo, and other parts of Africa, and attaining a length of about 4½ feet. It is distinguished by a long white beard, and by a crescentic white line on the forehead. The fur is generally chestnut, the lower parts being bright orange. The hands are black. The D. is intelligent and of cleanly habits.

Dia'no, a small town in the province of Salerno, S. Italy, 45 miles S.E. of Salerno, near the river Calore. It has a strong castle, and several churches and convents.

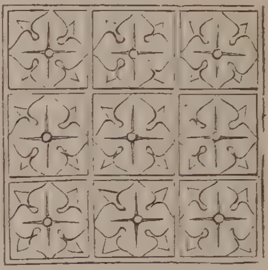
Dian'thus. See PINK.

Diapa'son, in music, is a word used in several senses. In ancient writings it was used for the octave; in France at present it means *pitch;* while in this country it sometimes signifies the whole range or compass of a voice or instrument. In the organ some of the principal stops are called *diapasons;* they are of 'eight-feet pitch,' the note corresponding to any key being of the same pitch as in the pianoforte.

Diapason Regulator, an instrument invented by Duhamel, and improved by Breguet, which is capable of measuring minute intervals of time. It consists essentially of a revolving, slowly advancing cylinder, on which a sinuous line is produced by a style fixed laterally to a prong of a diapason or tuning-fork. The time of vibration of the fork being known, the number of sinuosities, impressed while a certain occurrence lasts, gives, by a simple calculation, the time of duration. Breguet fixed the apparatus to clockwork, so as to regulate the motion of the cylinder, and lengthen the time during which the fork vibrates.

Diapede'sis (Gr. 'a leaping through'). Under certain abnormal conditions, both red and colourless corpuscles of the blood may leave the blood-vessels without rupture of their walls. This is D. The red corpuscles sometimes escape during venous congestion, when, in consequence of the high pressure, the plasma is first squeezed out, and afterwards the red corpuscles. The colourless corpuscles leave the vessels by virtue of their power of amœboid movement in Inflammation (q.v.). When the web or mesentery of a frog is seen under the microscope in a state of inflammation, the colourless corpuscles may be observed clinging to the walls of the vessels, and actually passing through these into the surrounding tissues. The conditions seem to be sufficient slowness of the blood stream, and a peculiar adhesiveness of the colourless corpuscles, the result of inflammation.

Di'aper (from '*d'Ipres*,' because manufactured at Ypres in Flanders; Fr. *diapre*, *diaspre*, 'marbled, or variegated'; Ital. *diaspro*, Lat. *diasprus*, 'an ornamental textile stuff'; Lat. and Gr. *iaspis*, 'jasper,' which was much used in ornamenting jewellery) is a variety of linen or other cloth, figured with a pattern, and produced by a process of twilling, in use chiefly for table-linen and towelling. D.-work in architecture, in mural painting, and decorative work generally, is the covering of a flat surface, which might otherwise have a monotonous and bald appearance, with a repeated floral or arabesque pattern. The **D.** is often used in heraldic painting to relieve and vary fields of black and white, but this arbitrary decoration does not form part of the heraldic bearing.

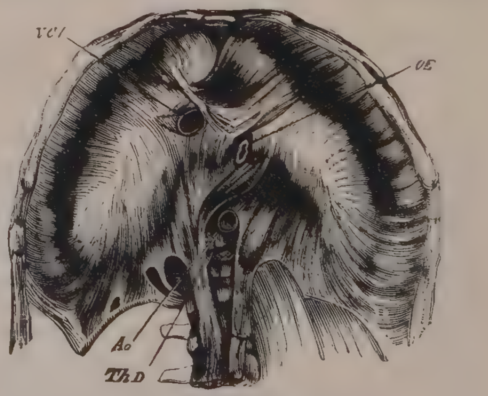


Diaper.

Diaphan'oscope (Gr. *diaphanos*, 'transparent,' and *skopeō*, 'I see'), a box, with or without a lens, for exhibiting transparent photographs or other pictures. It is frequently combined with a Stereoscope (q.v.).

Diaphoret'ics (Gr. *diaphoretika*, from *diaphorein*, 'to throw off') are medicines which promote insensible perspiration by opening the pores of the skin, or by stimulating the glands which secrete the sweat. Acetate of ammonia, antimonials, Dover's powder, and very specially the drug *Jaborandi* (q.v.), are examples; and hot baths, as the Turkish bath, may also be regarded as D. After using them, great caution is necessary for some time to prevent the patient catching cold.

Di'aphragm (Fr. *diaphragma*, 'a partition wall'; in Eng. *midriff*, Old Eng. *midrif*, 'the middle of the *hrif*, or bowels'). This is a partition between the abdominal and thoracic cavities, formed partly of membrane and partly of muscle. The muscular fibres arise from the bodies of several of the upper lumbar vertebræ, from two arches external to



Diaphragm viewed from the lower side.
V.C.I., Vena cava inferior; *Œ.*, Œsophagus; *Ao.*, Aorta; *Th.D.*, Thoracic duct.

these, from the cartilaginous end of the sternum, and from the cartilages of the six lower ribs. They all pass towards the centre, and unite with a strong tendinous membrane, of a trefoil shape, called the central tendon of the D. The D. is perforated by three large holes for the passage respectively of the aorta, the œsophagus, and the vena cava. During relaxation of the D., as after death, it presents an arched form, the convexity of which is directed towards the thorax. By contraction of the muscular fibres the D. centre descends, the convexity becomes less, and consequently the vertical diameter of the thorax is increased, as in inspiration. When the D. relaxes the centre ascends, as in expiration. The D. is present only in mammalia. See RESPIRATION-MECHANISM.

Diaphragm, a perforated plate, employed in optical instruments for cutting off all superfluous light, thus increasing the sharpness and brightness of the image.

Diarbek'r (anc. *Amida*, Arab. *Amid*, Turk, *Kara-Amid*), a fortified town, and the capital of a vilayet of the same name, Asiatic Turkey, lies on the Tigris, 195 miles N.E. of Aleppo. It is the seat of a Nestorian metropolitan, of a Jacobite patriarch, and of a Roman Catholic and an Armenian bishop, and has a great khan, occupied by the garrison, and many mosques, churches, baths, and bazaars. The climate is hot and unhealthy in summer, but cold in winter. The Tigris, which is here crossed by a stone bridge, is often frozen over. D. lies in the trading-way between Bagdad and Constantinople. Its manufactures, which have suffered from the introduction of European goods, are chiefly morocco leather, cotton and silk stuffs, copper utensils, and pipe-heads. It was formerly one of the most flourishing trading places in Turkey, but its pop. of 400,000 was decimated by the plague in 1756-57. Pop. 39,200, of whom 17,300 are Mohammedans and 12,200 Armenians. D. occupies the site of the ancient *Amida*, which became a Roman colony in 230 A.D., and the seat of a Christian bishop in 325. It was fortified by the Emperor Constantine. After being in the hands of various Turcoman dynasties and of the Persians, and being sacked by Timur (1394), it was finally annexed to Turkey by Selim I. in 1515.—The *vilayet* forms the E. portion of Kurdistan, and is watered by the Tigris and Euphrates. It is in part inhabited by nomads. Area, 18,074 sq. miles; pop. 471,462.

Diarrhœ'a (from Gr. *dia*, 'through,' and *rheō*, 'I flow'), a disease characterised by frequent *purging*. It is generally accompanied with pain, nausea, foul tongue, a bad odour in the breath, and flatulence. It has many causes, as indigestible food, unripe fruit, new vegetables, meat which has commenced to decay, too fat meat, &c., cold, damp, heat—the last called 'summer cholera'; or it may be due to drinking foul water or partaking of some purgative medicine. D. is also a frequent symptom of some other disease, specially Phthisis (q.v.), and typhoid fever and cholera. The treatment depends on the particular cause. When D. is due to some irritating substance in the bowels, a small dose of opening medicine is beneficial to the patient; when due to irritation of the bowels, opium is one of the quickest and most efficacious remedies. Of astringents, gallic acid, chalk, and lime-water are the best. D. is not generally a fatal disease, except in aged and very young persons, or in those affected with consumption and other wasting diseases. It is much more common in hot than in cold climates, in the former of which it often partakes of the dysenteric form.

Diarthro'sis, a term used in anatomy to denote a particular form of joint, such as that of the elbow. Here we have plates of cartilage covering the articular surfaces of the bones. The joint is lined in every part by a membrane, termed a *synovial* membrane, which secretes a fluid which lubricates the joint. The bones are held together by strong fibrous ligaments, constituting membranous capsules, bands, or cords; and they are likewise kept in apposition by the tension of surrounding muscles and by the pressure of the atmosphere. See JOINTS.

Di'ary (Lat. *diarium*, from *dies*, 'a day') at first meant the daily allowance of food to slaves, and afterwards a notebook of daily incidents, which is its present signification.

Diaschis'ma, the Greek name for a small interval which occurs between the true pitches in two keys of a note which, in the tempered scale, is made alike in both. See ENHARMONIC and TEMPERAMENT.

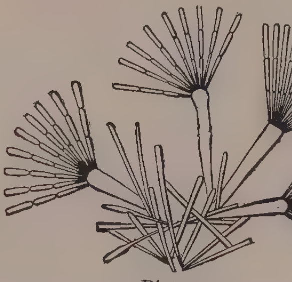
Di'astase is a nitrogenous substance developed during the germination of seeds, and is characterised by the remarkable property of causing starch to be converted first into dextrine, and later into grape-sugar. (See GLUCOSE.) In the process of malting grain is allowed to sprout, and the germination is then checked by heat. The malt thus prepared contains a store of D. more than sufficient to convert the starch contained along with it in the grain into sugar. On *mashing* or boiling the malt with unmalted grain, the starch in both is converted into grape-sugar, which dissolves in the water and forms the *sweet wort* of the brewer. The grape-sugar in the wort is subsequently converted into alcohol during the process of fermentation. The proportion of D. in malt is very minute, seldom exceeding 0·002 to 0·003 per cent.; but the smallness of the quantity is compensated by the extraordinary activity of the D., 1 part of the latter sufficing to convert 2000 parts of starch into grape-sugar. D. has never been prepared in a sufficiently pure state for analysis. In the impure condition it may be obtained by extracting malt with water, maintaining the solution for some time at a temperature of 70° C., filtering from the albuminous principles coagulated by this treatment, and finally precipitating by absolute alcohol. Prepared in this manner D. is a white powder.

Dias'tole is dilatation of the heart and arteries when the blood enters their cavities. It is the opposite to *systole*, when the heart and arteries contract to send forth the blood. See CIRCULATION OF THE BLOOD, HEART.

Diather'manous (Gr. *dia*, 'through,' *thermos*, 'heat'), a property possessed by certain substances, notably by rock-salt, of allowing radiant heat to pass through them in the same way as transparent bodies permit of the passage of light. See HEAT.

Diath'esis (from Gr. *dia*, 'through,' and *thesis*, 'a placing or arranging') is a term used by the older physicians to describe the constitution of an individual rendering the person peculiarly liable to certain diseases. It is transmitted from parent to child. We speak of the gouty D., the cancerous D., tuberculous D., &c.

Diatoma'ceæ, or **Di'atoms,** an order or sub-order of green-spored Algæ, yellow-brown in colour, and containing a large quantity of silex or flint in their fronds. Their mode of reproduction resembles that of the *Desmideæ* (q.v.). In their adult state they are mostly free-moving, but in their young state many of them are attached by a slender pedicle, which in some genera is repeatedly dichotomous. The separate joints, which often remain connected for a long time, are called *frustules*, and are in most cases adorned with beautiful sculpturing, so that even in a fossil condition the species can be easily distinguished. In many, if not in all, cases there are minute openings in the frustules, through which they derive their nourishment from the medium in which they live. They are found both in salt and fresh water, on damp rocks and walls, flower-pots, glass of hot-houses, and often in col-



Diatomaceæ.

lections of powdery-looking matter, at the bottom of standing pools. The Tripoli limestone beds, of great thickness, are almost built up of extinct species in a fossil condition, hence this rock is well adapted for polishing. In Sweden large quantities are found in a fossil state in the mountains, and under the name of *Berg Mehl* (mountain meal) are mixed with flour as food, though they can have no direct nutritive qualities. The order is found in every part of the world, and on the Polar Seas in such abundance as to give the green discoloration to those parts which the whalers note as the favourite haunts of the true whale. Dr. Hooker also found the Antarctic Ocean stained of a brown colour with them. They form the food of many mollusca; hence in the stomachs of fishes which have fed on these mollusca, and in the guano of birds which have lived on the fishes, numbers of unique forms are frequently found. An immense number of species has been described, and the list is always being increased by new discoveries. But it is doubtful if some of the so-called new species are not immature forms of others already known.

Diaton'ic ('by tones') a term used in music to describe the arrangement of the notes of the scale upon which all our music is based. The Greek 'D. genus' seems to have been based upon the scale of C major, and not to have included the same relative intervals in any other key, and the fact that a D. scale could be based upon any note of any pitch whatever had to fight its way into full recognition during the first ten centuries of our era. It should be remembered that while the D. scale—with such modifications as those which occur in what we call *minor* scales—is the only one which satisfies *our* ears, and the only one possessing certain mathematical properties, it is only one of a great number of possible scales. The Eastern nations, for instance, use sub-divisions of the scale which are as intolerable to our ears as European music is unpleasing to them.

Di'atribe (Gr. *dia* 'through,' *tribein* 'to rub'), a name applied originally to a prolonged discussion or critical analysis, now synonymous with a bitter invective or severe criticism.

Diaz, or **Dias, Bartolommeo,** was one of the distinguished Portuguese navigators of the second half of the 15th c., whose feats are sung in Camoens' *Lusiad*. In 1486 he led an expedition fitted out by João II. beyond the point on the Guinea coast which had been reached by Cam and D'Aveiro. With two vessels of only 50 tons burden D. pushed on to Algoa Bay, subsequently named by the British Port Elizabeth. Sailing along the Kafir coast, he entered in lat. 34° 30' the Great Fish River (called by the Dutch 'Grote Vis River'), but at the Island of Cruz was compelled by the entreaties of his sailors to turn back. He gave the name of Cabo Tormentoso ('Cape of Storms') to what was shortly afterwards known as the Cabo de Buena Esperanza ('Cape of Good Hope'). Returning to Lisbon in December, 1487, he accompanied Vasco di Gama on a portion of his famous voyage, for which D. had built the ships *St. Raphael* and *St. Gabriel*. He perished in a great storm which shattered the fleet of Cabral after the discovery of Brazil in 1500. See Lopez, *Historia da Conquista da India*.—**Miguel D.,** born in Aragon, was a friend and companion of Colombus. Leaving the colony of Isabella, he established himself near the mouth of the river Ozema, in Haiti, from which he introduced his countrymen to large gold-mines. When in 1500 Bobadilla superseded Columbus as governor, he was made governor of the islands, &c., of the New World, D. was Alcalde of Santo Domingo, and resisted the entrance of the new governor. After a period of disgrace he was made governor of Porto Rico. He died in 1514. See the Histories of Columbus by Lamartine and W. Irving, and Las Casas.

Dibble, a simple implement once used in fields, now only in gardens. It is of wood, and is 15 inches long with a cross-head for the handle; the shaft is round and tapering, of about two inches in diameter. Dibbling is too slow for farm practice, although found by experiments in thick sowing to yield better results than drilling. Experiments with oats in dibbling, drilling, and sowing broadcast show that of 360 grains placed in the ground there resulted of dibbled plants 270; of drilled plants, 257; of broadcast, 226. Yet drilling is much more advantageous up to a certain point than dibbling. Of 180 seeds, dibbling yielded 150 plants, and drilling 163.

Dibdin, Charles, the musician and song-writer, was born at Southampton, 15th March, 1745. His musical talent showed itself very early; an opera, *The Shepherd's Artifice*, of which he had written both the words and the music, being produced at Covent Garden Theatre in 1761. D. remained before the public as singer, actor, or theatrical manager until 1805, when he retired in somewhat straitened circumstances. Government, however, granted him a pension of £200 a year until his death, 25th April, 1814. D. is best known for his sea-songs, of which he wrote (both words and music) nearly 1200. Coming at a time when the English navy was actively employed, and naval affairs were in everybody's mouth, these spirited songs won unbounded popularity, which not a few of them still retain. A fine edition with drawings by Cruikshank was published in 1861. Besides his sea-songs D. wrote a *History of the English Stage* (Lond. 1795), and *Professional Life* (Lond. 1802). His two sons, **Charles** (died 1833), and **Thomas** (died 1841), were both theatrical writers of some mark.—**Thomas Frognall D.,** nephew of the writer of sea-songs, was born in 1776 at Calcutta. Having studied at Oxford, he joined the legal profession, but took orders in 1804; from which time till his death, 18th November, 1847, his life was devoted to bibliography. D.'s works show wide research and tireless industry, but are marred by lack of exact scholarship and critical discernment. The chief are *Typographical Antiquities of Great Britain* (1810-19), *Bibliographical Decameron* (1817), *Library Companion* (1824), and *Reminiscences of a Literary Life* (1836).

Dibranchia'ta (Gr. 'two-gilled'), the name applied to an order of Cuttlefish (q.v.) distinguished by the possession of two branchiæ or gills, and not more than eight or ten arms; by the arms being provided with suckers; by the presence of an ink-sac, and by the shell being internal, or, if external, not chambered. In this order are the paper nautilus or *Argonaut*, the *Octopi* or *Poulpes*, the Squids, *Spirula*, the extinct *Belemnites*, &c. The companion order, *Tetrabranchiata*, is represented by the pearly nautilus alone.

Dice (plur. of *die*) are small cubes made of ivory or bone, with black dots, ranging in number from one to six, on each of their sides, and much used in games of chance or hazard. When D. are fairly made, there is no way of shaking the D.-box so as to throw a given number, but professional gamblers sometimes 'load' their dice—*i.e.*, plug them with lead on a particular side — so that the highest number generally turns up. Any game played with dice, except backgammon, is held to be illegal by statute 13 Geo. II. c. 19.

Dicen'tra, a genus of Fumariaceous plants (the *Diclytra* or *Dielytra* of De Candolle). *D. Cucullaria* is the 'Dutchman's Breeches' of the United States; *D. Canadensis*, the squirrel corn; *D. farinosa*, a species from Virginia and N. Carolina, much cultivated in our gardens; but the best-known species is *D. spectabilis* of Northern China and Siberia, one of the most beautiful of the genus, introduced into Britain in 1846. It can be grown in the open air, but requires the protection of the house in most situations before it can attain to full perfection. It is one of the favourite plants of the Chinese.

Dichlamyd'eous (Gr. *dis*, 'twice,' and *chlamys*, 'a covering'), a botanical term expressive of a flower having both calyx and corolla. De Candolle divided Dicotyledonous (q.v.) plants into D. (including *Thalamifloræ*, *Calycifloræ*, and *Corollifloræ*) and *Monochlamydeæ*, which formed a subclass by itself.

Dichot'omous (Gr. *dichotomos*, 'cut into two equal parts'), a botanical term signifying having the divisions always in pairs, and equally applicable to branches, veins, the forking of ferns, and the fronds of algæ. The stem of the mistletoe and the branching of the Doom Palm (q.v.) are examples.

Dich'roism (from the Gr. *dis*, 'twofold,' and *chrōa*, 'colour'), a property possessed by certain crystals and minerals, which present different colours when viewed by transmitted light in different directions. Thus mica is nearly opaque in one direction, but transparent and of a different colour in another. Crystals of chloride of palladium are deep red when viewed along, and a bright green when viewed across, the axis.

Dick Bequest, The, is a fund established by James Dick, 'of Finsbury Square, London, to encourage active schoolmasters, and gradually to elevate the literary character of the parochial schoolmasters and schools in the counties of Aberdeen, Banff, and Moray.' Dick, born at Forres, 1743, on his death, in 1828, left the bulk of a large fortune for the above purpose. The bequest amounted finally to £118,787; the annual income remaining to be distributed, after deducting all expenses, is on an average about £4000. To ensure the literary proficiency of the schoolmasters, the trustees instituted an examination in literature and science; and no teacher could participate in the D. B. till he had passed this examination. Again, to ensure the efficiency of the teaching they attached a certain money value to instruction in the higher branches, and the manner in which these were taught was taken into account, as judged by a 'visitor' or inspector. A scheme relating to this bequest was made by the Commissioners appointed under the Educational Endowments (Scotland) Act of 1882, and was approved of by the Queen in Council on 1st May, 1890. The whole of the property is now vested in a governing body of thirteen elected persons. The endowment may now be applied only within the district, consisting of the counties of Aberdeen, Moray, and Banff, with the parishes of Abernethy and Duthil; every part of the burghs of Aberdeen, Elgin, Banff, and Forres being excluded. Besides providing for the continued payment to schoolmasters in the district who had been in receipt of an annual payment since Whitsunday, 1873, and for payments (£15-50) to teachers appointed to the district prior to 1st May, 1890, the scheme allows the governors to make annual grants to School Boards within the district for the purposes of higher instruction under certain conditions, and such grant may range from the fixed payment of £15 to £50 (£1-35 being additional, as capitation grant). Exceptional grants, £60-200, may also be made to School Boards for efficient instruction in Latin, Greek, and Mathematics under a University graduate; and special grants may be made for supplying appliances for scientific instruction. For additional information the reader is referred to the handbook of the scheme of the Dick Bequest Trust, as it is now named.

Dick'ens, Charles, an English novelist, was born at Sandport, near Portsea, Hampshire, 7th February, 1812. His father, John D., for some time a clerk in the Navy Pay Office, seems to have been an amiable, though unfortunate and improvident man; his family were sometimes in great straits while he was an inmate of Marshalsea Prison, and in consequence D. had at an early age to shift for himself. The first place he filled was a menial one in a blacking warehouse; from this he went as a clerk to an attorney's office in Chancery Lane, London, where he showed a taste for theatricals; finally, he qualified himself for the post of parliamentary reporter. The first situation he obtained as such was on the *True Sun;* he next proceeded to the *Morning Chronicle*, where his ability and industry won him the admiration and encouragement of the editor, the well-known John Black. In the evening editions of the *Chronicle* D. first showed his powers as a humourist by his essays entitled *Sketches by Boz* (1836). The same year he married Catherine Hogarth, daughter of a fellow-labourer on the *Chronicle*. The *Sketches by Boz* were succeeded by a work which at once raised D. to the front rank among English humourists. This was the *Pickwick Papers*, which has probably evoked more innocent laughter than any other book in the world before or since. Some of the characters, such as the two Wellers and Pickwick himself, are immortal. D. was now recognised as a great artist, and was warmly appreciated by the first critics of the age. His next work was a novel with a more ambitious plot (*Nicholas Nickleby*), which, besides, had a moral 'purpose,' namely, to paint the weaknesses and barbarities of the cheap-school system. It was not less successful, and D. continued to pour forth fiction after fiction, all of which were greedily devoured, and most of which exposed social sores and delineated individual peculiarities. The chief are *The Old Curiosity Shop*, *Barnaby Rudge*, *Oliver Twist*, *David Copperfield* (in the opinion of many his finest work), *Martin Chuzzlewit* (the fruit of a voyage across the Atlantic), *Dombey and Son*, *Bleak House*, *Hard Times*, *A Tale of Two Cities*, *Little Dorrit*, *Great Expectations*, and *Our Mutual Friend*. D.'s faculty of humour began to flag towards the end, and his pathos had always a tendency to become maudlin, yet many of his characters, such as Little Nell, Mrs. Gamp, Agnes, Micawber, Tom Pinch, Fagin, and Pecksniff, are unique in literature. Probably no novels have had such a healthy and genial moral influence as those of D. His boundless energy required and found other vents. He was a clever actor, and wrote an opera, *The Village Coquettes*, which was acted once in 1836; he travelled much, and there is no livelier account of travel than his *American Notes for General Circulation* (1842). As a writer of Christmas stories he is unrivalled, in proof of which one need only name his *Christmas Carol*, *Chimes*, *Cricket on the Hearth*, and *Dr. Marigold's Prescriptions;* and as a public reader of his own works, he obtained great and merited popularity. D. even attempted journalism; he took part in starting the *Daily News* in 1845, and was long editor of a popular weekly magazine, *Household Words*. D. died 9th June, 1870, leaving behind him an unfinished novel, *The Mystery of Edwin Drood*. His Life has been written by his most intimate personal friend, the late John Forster (Lond. 1872-74).

Dick'son, David, a notable Scottish divine, born in 1583, at Glasgow, was minister of Irvine from 1618 to 1641, when he was elected Professor of Divinity in his native town; helped to draw up the Confession of Faith, and was ejected from the Church for nonconformity in 1662, the year of his death. D.'s works comprise commentaries on Hebrews, Matthew, and the Psalms, *Therapeutica Sacra*, and a *Treatise on the Promises*.

Dickso'nia, a genus of Ferns, mostly arborescent. The silky hairs from the caudex of D. of Madeira and of D. of Java are used in Holland and Germany as a styptic, and for stuffing beds, cushions, &c. The hairs of the latter species are imported under the name of *Pakoe Kidang*. D. of Australia is now a common ornament of our greenhouses, while others are found in Juan Fernandez, Brazil, St. Helena, Colombia, and Java.

Dicotyle'dons, Dicotyledo'neæ, Dicotyle'dones, or **Dicotyle'donous Plants,** one of the two great subdivisions of flowering plants, distinguished by the plants having two seed lobes, netted veined leaves, the wood of the stem in concentric circles, and the parts of the flower generally four or five, or multiples of four or five. About 7000 genera and 70,000 species belong to this division, which is again subdivided into—(1) *Thalamifloræ* (q.v.); (2) *Calycifloræ;* (3) *Corollifloræ* (q.v.); (4) *Monochlamydeæ* (q.v.); and sometimes (5) *Gymnospermæ* (q.v.), or naked-seeded plants, all the other divisions having the seeds enclosed in seed-vessels, or *Angiospermous*. Hooker and Bentham add another group intermediate between *Thalamifloræ* and *Corollifloræ*, called *Discifloræ*. See COTYLEDON, ROOT AND STEM.

Dicot'yles. See PECCARY.

Dicra'nium, a genus of Mosses (q.v.), containing numerous species, some of which are very common on the ground, moist rocks, or more rarely on trunks of trees in Britain.

Dicta'tor, in republican Rome, an extraordinary magistrate, with absolute power, appointed, when the state was in great peril, for the execution of some unusual public act, such as the celebration of solemn games. A D. was chosen for six months by one of the consuls, in obedience to a senatorial decree, but was expected to resign on fulfilling the duty for which he was elected. The office was at first confined to patricians, but was afterwards thrown open to the plebs. Although an autocrat in military matters, a D. had to conform to law in civil acts, and when chosen for some special purpose, might be successfully opposed if he sought to control other affairs. It is said that a D. could not spend public money without permission of the senate, and it seems to have been illegal to wield dictatorial power beyond the limits of Italy. A D.'s insignia were four lictors who carried *secures* or axes in their fasces. The office was established, it is said, B.C. 501, fell for a time into disuse, was revived during the second Punic War, after which it became extinct, the prolonged dictatorships of Cæsar and Sulla being unconstitutional. On Cæsar's death the office was abolished.

Dic'tionary (Low Lat. *dictionarium*), a book in which words with their peculiar meanings are arranged in alphabetical order; or, in a wider sense, a book in which a subject, or a branch of a subject, is treated under heads alphabetically classified. A D. demands a certain definite, systematic arrangement of information, and is thus distinguished from a mere catalogue. A D. of the Greek language is generally spoken of as a *lexicon*, and a D. of geography as a *gazetteer*. The terms *glossary* and *vocabulary* are almost synonymous with a D. of a language. For dictionaries of facts, see ENCYCLOPÆDIA.

Dictionaries of Words.—The earliest of such dictionaries is the *Lexeis Homerikai* or *Homeric Lexicon* of the time of Augustus, but the first which has any pretensions to completeness is the Greek D. of Suidas, a Greek lexicographer of the 11th c. The Latin *Thesaurus* of Robert Estienne (1535), shows a marked advance in D.-making upon the work of Suidas, and the Greek *Thesaurus* of Henri Estienne (1572) has been the basis of succeeding Greek dictionaries. Other dictionaries deserving mention are the *Etymologicum Magnum*, a Greek lexicon of the 10th c., worthless in its etymologies, but a storehouse of interesting and quaint traditions; the *Phraseologia Generalis*—a Latin D.—by W. Robertson (1681); the *Etymologicon Linguæ Latinæ* of Vossius; the Latin D. of Forcellini (Padua 1771); the Latin D. of Freund. The best Greek and Latin dictionaries published in England are the Latin-English D. and English-Latin C. of W. Smith; the Latin-English D. of Riddle and White; the Greek-English Lexicon of Liddell and Scott. Notable polyglot dictionaries are Whiter's *Etymologicon Magnum* (1800-22); Minsheu's *D. of Eleven Languages* (Lond. 1617). Among the best dictionaries of foreign tongues are the *Dictionnaire de l'Académie Française;* the Italian *Vocabolario degli Academici della Crusca;* and the Spanish *Diccionaria de la Lengua Castellana compuesto por la Real Academia Española* (Madr. 1726). Among English dictionaries may be specified Elisha Cole's English D. (1677); Booth's *Analytical D. of the English Language;* Johnson's English D. (1755), a really great work, but very defective in etymology; Jamieson's *D. of the Scottish Language* (1808); Bouchier's and Wright's Dictionaries of archaic and provincial words; Crabb's *Technological D.* (1859); Webster's D.; and from the Clarendon Press the enormous *New D. of the English Language on Historical Principles*, edited by Dr. Murray; Cassell's *Encyclopædic Dictionary;* Collins' and Ogilvy's Dictionaries; Nuttall's *Standard Pronouncing Dictionary*, and Lloyd's *Encyclopædic Dictionary*, &c.

Dic'tum de Ken'ilworth, an edict of Henry III., given at Kenilworth Castle, commuting penalties incurred by certain rebel barons into five years' rent of their legally forfeited estates.

Dicty'ogens, one of Lindley's subclasses of Monocotyledons (q.v.), which, while agreeing with the general characteristics of the class, differ from it in having the wood of their rhizomes arranged in a concentric manner like that of Dicotyledons (q.v.), while the leaves have reticulated or netted veins. *Dioscoreaceæ*, *Smilaceæ*, *Trilliaceæ*, &c., are among the most important orders of D. It may, however, be noted that some *Araceæ* and *Liliaceæ*, not included among D., have also netted veined leaves.

Dic'tys Creten'sis, the alleged author of a Latin history of the Trojan war, which differs widely from Homer, chiefly in excluding all supernatural agency. It is asserted in the preface that the original was composed by D. of Cnossus, who accompanied Idomeneus to the Trojan war, that it was buried in the author's grave till exhumed by an earthquake in the time of Nero, that it was then brought to Rome by one Eupraxis and translated into Greek, from which Greek translation the Latin version was made by Q. Septimius Romanus. All that is actually known about it is, that a Greek work under the name of D. is frequently quoted by the Byzantine writers, which was probably written in Greek about the time of Nero, and afterwards translated into Latin. The chief literary value of the work consists in its being the principal channel through which the legendary lore of Greece flowed into the romances of the Middle Ages, passing thence into popular tales and ballads. D. is generally printed along with Dares (q.v.). The best edition is that by Diederich (Bonn, 1837).

Dicyn'odon, a genus of extinct reptiles, included by Owen in the fossil order *Anomodontia*. In D. the front portions of the jaws were toothless, and formed a beak-like structure, which probably was invested by a horny sheath. No teeth were developed in the lower jaw, but each half of the upper jaw bore a large tusk-like tooth, which (like the tusks of living elephants, or the front teeth of rodents) grew throughout life from a permanent pulp. This genus—of which *D. lacerticeps* is a familiar species—occurs only in rocks of Triassic age in S. Africa and India. These animals were fitted to move on land, and had well-developed limbs.

Didac'tic Po'etry (Gr. *didaskein*, 'to teach') is that species of poetry which has for its avowed object the instruction, as distinguished from the mere entertainment or gratification, of the reader. Many poems of the highest order, whether lyric, epic, or dramatic in form, are, of course, in a sense D., but the term is generally restricted to such as seek to inculcate information on some definite subject or range of subjects. When the theme is happily chosen, and the work executed in a masterly style, the advantages of verse over prose are undoubted, and the result has been that, in almost all languages, we find an abundance of D. P., embracing an almost endless variety of subjects. Among the Greeks the *Works and Days* of Hesiod; among the Romans the *De Rerum Natura* of Lucretius, the *Georgics* of Virgil, and the *Epistles* and *Satires* of Horace, are notable examples; while numerous D. poems, in English and other European tongues, have attained to the rank of classics. No small charm is imparted to such works by the skilful introduction of episodes and illustrations, such as the tale of *Aristæus and his Bees*, and the legend of *Orpheus and Eurydice* in the *Georgics*.

Didel'phys. See OPOSSUM.

Di'derot, Denis, a French encyclopædist, born at Langres in October, 1713, was the son of a respectable cutler, who had him partly educated for the Church at the Collége d'Harcourt. Declining to enter either the Church or the law, D. supported himself by teaching mathematics, Latin, and Greek. In 1744 he married Mlle. Annette Champion, whom he speedily deserted for the more witty, but less virtuous, Madame de Puisieux. To this period belong his *Pensées Philosophiques* (which was publicly burned) and his *Lettre sur les Aveugles*, which introduced him to Voltaire, who contested its atheistic conclusions, and to the prison of Vincennes, where he was visited by Rousseau (Confess. B. viii.). On his release he formed a lasting attachment for Mlle. Voland: his letters to her, from 1759 to 1774, give a graphic account of the 'family of atheists,' *i.e.*, D'Holbach, Galiani, Grimm, &c. D. now tried the drama, but his plays *Le Père de Famille* and *Le Fils Naturel* were pronounced to be stilted and pretentious failures. In 1758 D. and D'Alembert replanned the great *Encyclopédie*, which till then (7th vol.) had been chiefly a translation from Ephraim Chambers' *English Encyclopædia*. D. wrote the *Prospectus* and the *Système des Connaissances Humaines*, and took charge of the department of history of ancient philosophy. He steadily excluded all Jesuit and Jansenist contributors from the theological department; and after the withdrawal of D'Alembert, confronted alone the storm of opposition which the *Encyclopédie* excited from the court, the Church, the theatre, the Sorbonne, and the law. He had as friends only Madame de Pompadour, M. de Choiseul, and M. de Malesherbes; but he refused Voltaire's advice to fly to Russia, and continued for thirty years to work with the courage of his convictions. He wrote the articles on the mechanical arts; but in his editorship and his occasional compositions he displayed the most wonderful range of information and facility of composition. D. was frequently the dupe of his own good nature, so that he must have died in poverty had the Empress Catharine not pensioned him. Louis XV. declined to help D.'s candidature for the Academy, saying, 'He has too many enemies.' In 1773 he visited his benefactress at St. Petersburg. His chief later works are *Jacques le Fataliste*, *La Religieuse*, and *Essai sur les Règnes de Claude et de Néron*. He died 30th July, 1784, from a slight stroke of apoplexy. D. had frequently suffered from overeating. Before his death he had just eaten an apricot, and asked his wife, 'How the deuce can that hurt me?' In spite of the calumnies of La Harpe and the mistakes of Naigeon, D. appears to have been occasionally visited by religious feeling. See his article PROVIDENCE in the *Encyclopédie*. D. was one of the most industrious and enthusiastic writers of the 18th c., and disseminated his opinions with rare courage and unflagging toil. His works are pregnant, fresh, and vigorous, but he produced no literary masterpiece, his best work being probably his dialogue *Le Neveu de Rameau*, a brilliant realistic satire, which Göthe translated. His style is rambling, opaque, and declamatory, for which he has been called the most German of French authors. His richness of thought and expression were better seen in conversation than in writing:—Marmontel says that to know D. from his writings only, is not to know him at all. There is a complete edition of D.'s works in 15 vols. (Par. 1798), and another in 20 vols. (Par. 1875-77). See Morley's *Diderot* (Lond. 1875), Bersot's article on D. in his *Études sur le Dix-huitième Siècle*, Carlyle's *Miscellanies*, and Morley's *Diderot and the Encyclopædists* (1878).

Di′do, or **Elis′sa**, daughter of Agenor or Belus, King of Tyre, married her uncle Sichæus (by some called *Acerbas*), priest of Hercules. Sichæus having been murdered by Pygmalion, the son and successor of Belus, who desired to obtain his immense treasures, the disconsolate D., taking with her her husband's wealth, sailed with some Tyrians, touched at Cyprus, where she secured wives for her followers, and at last safely landed on the African coast. Here she purchased from King Jarbas (Hiarbas) as much land as could be enclosed by a bull's hide—no small extent of territory, inasmuch as she cut the hide into the narrowest thongs possible—and on the site built Byrsa (Bull's Hide). Strangers flocked to the new colony, which every day acquired greater commercial importance. D. then, with the consent of the Libyans, built Carthage, which rapidly grew in power and prosperity. Then King Jarbas, smitten with the charms of the Tyrian princess, asked her in marriage, and threatened her with war in the event of refusal. D. asked and obtained three months to consider the proposal; but before the expiry of the time she erected a funeral pile, and, sword in hand, offered herself a willing sacrifice to the manes of Sichæus. After her death she was worshipped as a divinity. Ancient writers are not agreed as to the date of the founding of Carthage, but it probably took place from forty to one hundred years before the building of Rome. The anachronism committed by Virgil in the *Episode of Æneas and D.*—one of the most charming creations of antiquity—has been frequently remarked by ancient and modern writers.

Dido, the name of a beautiful genus of *Lepidoptera*, or Butterflies, belonging to the family *Nymphalidæ* of that order, and found in Brazil and Guiana. The wings are blackish-brown above, with markings of pale green, whilst the under surface is chocolate-coloured, with green patches bordered with silvery white. The caterpillars are green, with red and white stripes. The wings in the D. (*Cethosia D.*) have a stretch of 4 or 5 inches.

Di′dot, the name of a famous French family of publishers, printers, and papermakers.—1. **François D.**, born at Paris in 1689, founded (*à l'enseigne de la Bible d'Or, Rue Pavée*) the celebrated firm in his native city, and issued, among other works, Abbé Prévost's *Voyages*, in 20 vols. He died 2nd November, 1757.—2. **François Ambroise D.**, son of François, was born in 1730, and carried typography to greater perfection than had been previously known in France. His editions include Longus (1778), Tasso (1784-86), and Bitaubé's translation of Homer (1787-88). He died 10th July, 1804.—3. **Pierre François D.** (born 1732, died 1795), was brother of the former, to whose success he greatly contributed by improvements in the manufacture of paper.—4. **Pierre D.**, eldest son of François Ambroise D., born 1760, is principally remembered for his splendid folio editions of Virgil (1798), Horace (1799), and Racine (1801-5), Denon's *Voyage dans la Basse et la Haute Egypte* (1802), and also for Boileau's *Œuvres* (5 vols. 1815), all characterised by faultless orthography and printing. He died 31st December, 1853.—5. His brother, **Firmin D.** (born 1764), is well known in connection with the process of stereotyping, which he applied extensively. By this means he vastly reduced the price of books, selling his *Virgil*, a gem of printing, for sevenpence. It enabled him also to issue an immense number of French, Italian, and English classics. He died 24th April, 1836.—6. **Henri D.** (born 1765, died 1852), son of Pierre François, had a strong mechanical taste, and acquired some reputation as an engraver. The 'microscopic' letters founded by him are miracles of clearness and delicacy.—7. **D. Saint Léger**, brother of the preceding, manager of the paper factory of Essonne, invented the machine for making the paper called *Sans Fin*. The business long carried on under the name of Firmin Didot Frères became Firmin Didot Frères, Fils, & Cie. From the enormous catalogue of their publications we may enumerate the *Bibliothèque Française*, *Collection des Classiques Français*, *Bibliothèque des Auteurs Grecs*, the edition of *Thesaurus Græcæ Linguæ*, and the *Nouvelle Biographie Générale*. See Werdet's *Études Bibliographiques sur la Famille des D.* (Par. 1864).

Didymi′um. This metal accompanies Lanthanum and Cerium (q.v.) in all their compounds found in nature, and derives its name from the circumstance (*didumos*, Gr. 'twins'). D. was discovered in 1841 by Mosander. Its symbol is Di, and its atomic weight 48. Neither D. nor its salts have any practical importance.

Die′, St., a town in the department of Vosges, France, on the Meurthe, 25 miles E.N.E. of Épinal. It is a bishop's see, and has a cathedral and fine church. There are manufactures of cotton, and a trade in corn, cattle, flax, leather, ironmongery, &c. In the neighbourhood are iron and copper mines, paper mills, and dyeworks. Pop. commune 18,136; arrond. 108,028.

Dieff′enbach, Johann Friedrich, a celebrated German surgeon, was born 1st February, 1792, at Königsberg, became Professor of Clinical Surgery at Berlin in 1832, and died 11th November, 1847. His chief works are *Chirurg. Erfahrungen* (1829-34), *Durchschneidung der Sehnen und Muskeln* (1841), and *Die Operative Chirurgie* (1844-49), the last unquestionably placing him among the first surgeons of the world.

Die′go, San, a town of California, at the southern extremity of the state. It has one of the best harbours on the Pacific coast, 6 miles long, with a depth of 6 or 7 fathoms close to the shore. The town is divided into the old, or Spanish, and the new, or American. There is a trade in hides, tallow, fish, and salt; and gold, copper, quicksilver, and coal are said to be found. Pop. (1880) 2637; (1890) 16,159.

Dielec′tric, the name given by Faraday to the medium which separates two conductors of electricity, and through which Induction (q.v.) acts. Faraday discovered that the charge induced upon a conductor, placed at a given distance from a charged conductor, varied with the D. employed, being dependent upon what he termed the specific inductive capacity of the D. He was thus led to the conception of the theory of action through a medium. Specific inductive capacity is the induction across any surface due to unit normal charge, and is therefore unity for air, since, in this case, the induction is equal to the charge. A complete discussion of the theory of the D. and of action through a medium will be found in Clerk Maxwell's *Electricity and Magnetism*.

Diep′enbeck, Abraham Van, a Dutch painter, born at Hertogenbosch (Bois-le-Duc) in 1607, became famous as the first painter on glass of his time, but, abandoning glass-painting, entered the school of Rubens at Antwerp, devoting himself to study under that master. After a tour in Italy, he returned to Antwerp, and re-entered the studio of Rubens in the capacity of assistant in 1641. His versatility was great, and, besides such pictures as his 'Crucifixion' (at Coblentz), his 'Elizabeth and Clelia' (Berlin), &c., he showed excellent taste and great facility in painting on tapestry and panelling, and in designing title-pages and other decorative work. His 'Temple of the Muses,' a series of fifty-nine designs from Ovid's *Metamorphosis*, and a work of great genius, was reproduced in copperplate by the best engravers of the time. His colouring and composition were excellent, his ingenuity exhaustless, but his work was always hurried, and wanting in finish. Many examples of his glass-paintings are preserved at Antwerp. In 1641 he was elected Director of the Academy at Antwerp, where he died in 1675. See Decamps, *Vies des Peintres Hollandais*.

Dieppe′ (Old Norse, *Duipa*, 'the deep water'), a seaport and watering-place of France, department of Seine-Inférieure, at the mouth of the Arques, here divided into two streams, 45 miles N. of Rouen by railway. It is a fortified town of the fourth rank, the seat of a tribunal of the first instance, and of a communal college; has a Gothic church, St. Jacquès, dating from the end of the 13th c., the beautiful church of St. Remi, a castle of the 15th c., hospitals, an exchange, and a theatre. There are elegant bathing *établissements*, and several public squares, numerous fountains, fine quays, and promenades. The harbour consists of large basins, and admits vessels of 1200 tons. There is a regular steam service with Newhaven, and great numbers of Englishmen pass through D. on their route for Rouen and Paris. The exports are cottons, silks, woollens, fruits, &c., and the imports iron, steel, coal, and timber. D. has manufactures of lace, articles of ivory and bone, as also ship-building yards, sugar-refineries, distilleries, and sawmills. Its leading industry is, perhaps, in herring and cod fisheries, and in the management of the enormous beds of oysters in the vicinity. To the W. of D. lies the suburb of Pollet, remarkable for the entire contrast its inhabitants present to those of Upper Normandy in speech, dress, and manners, on which account they have been taken for the descendants of the Saxons who settled here in the times of the Merwings. D. is first known historically in 1196, and subsequently became a flourishing French port. It rose to the height of its prosperity under François I. The ships which carried the first French colonists to Canada sailed hence. But the fortunes of D. sank with the revocation of the Edict of Nantes (1685), and the town was all but destroyed by the English and Dutch forces, 17th July, 1694. It was rebuilt by royal command on the Peace of Rijswijk, and again bombarded by the English, 14th September, 1803. The Germans, under Manteuffel, seized D., 9th December, 1870. Pop. commune 22,771; arrond. 108,390.

Die-Sinking, the art of producing a design, usually incised, on a block of steel, called a die, which forms a matrix for the reproduction of a number of identical dies, used in striking medals, &c. The art is best displayed in the making of medals and coins. A piece of fine-grained steel is fashioned into a rough dye-block, and is strengthened by a ring of iron to prevent its cracking. The rough die-block having been softened by annealing, and a smooth surface formed on it on the lathe, the die-sinker sketches and engraves in outline his design upon it. After delicate manipulation with differently shaped tools or gravers of many sizes, he produces a finished 'matrix.' While the die is being engraved, technically called 'roughed,' the die-sinker takes frequent casts, in clay or type-metal, to test the correctness and progress of the work. A number of duplicate dies are prepared, as injury might result to the original from continual use in the press. The first step in the multiplication of dies is to harden the matrix, by protecting the design with a charcoal paste, heating the steel to a bright cherry-red, and then exposing it to a falling stream of water. It is next cleaned, tempered by being raised to a certain temperature, and slowly cooled in oil or water, and 'lapped,' or polished. A piece of steel of the same quality as the die is now turned on the lathe to the form of a truncated cone, made quite smooth, and carefully annealed. The matrix being placed beneath a powerful press, the narrow end of the annealed piece of steel or 'punch' is placed upon it, and by a succession of light blows is sunk into the matrix till the design appears in perfect relief upon the punch. The blows require to be slight, as the punch is apt to crack, and softens after each blow. From the punch, which is strengthened with an iron collar and hardened, a series of impressions are obtained on soft steel, and from these, subsequently hardened, the medals or coins are struck by means of a press. All metals, except tin, have to be annealed after each blow in the press, to prevent cracking. Dies for stamping notepaper, &c., and for fine kinds of metal ornaments, are prepared by the die-sinker. For inferior stamped metal ornaments the dies are chiefly cast, and afterwards touched up with a graver.

Di′es Incep′tus pro Comple′to Habe′tur, a legal maxim, signifying that a day begun is a day ended. See COMPUTATION OF TIME.

Di′es I′ræ, the name given (from the opening words) to the great Latin hymn on the judgment-day—the crowning effort of mediæval piety in song. The modern world has nothing comparable to it in awe-stricken devotion and hallowed fear. The hymn has been ascribed to the General of the Minorite Order, Matthäus Aquasparta (died 1302), to Cardinal Frangipani (died 1294), to Malabranca, Bishop of Ostia (1274), to Bonaventura (q.v.), to St. Bernard (q.v.), and even to Gregory the Great (q.v.). But Luke Wadding, the learned historian of the Franciscan Order (*Annales Minor.*, Lugd. 1625), assigns the authorship to Thomas of Celano, a native of the Abruzzi, and pupil and friend of St. Francis of Assisi. Thomas died about the middle of the 13th c., and his name is first mentioned in connection with the poem about the end of the 14th c. There are three different texts of the D. I.—(1) that of the Roman Missal, which is the one best known; (2) the Mantuan; (3) that given to the Cathedral of Zürich (about 1475) by Felix Malleolus (Ger. *Hämmerlein*), Provost of Solothurn and Chorherrn. The relative value of these texts is still the subject of critical discussion. The hymn itself first became part of the liturgy of the Church in the latter half of the 14th c. It has been repeatedly translated into German, English, and other tongues. Lisco, in his monographs on the D. I. and the *Stabat Mater* (Berl. 1840-43), enumerates sixty versions of the former, of which August Wilhelm von Schlegel's is probably the best. Crashaw, Macaulay, and Lord Lindsay are among those who have tried to render it into English.

Di′esis, in music, a small interval occurring under the same circumstances as *Diaschisma* (q.v.).

Diest, a strongly fortified town in the province of Brabant, Belgium, 32 miles E.N.E. of Brussels, with manufactures of hosiery, beer, and gin. The Church of St. Sulpitius is the only building of note. Pop. 8531.

Die′terichs, Joachim Friedrich Christian, a great veterinary surgeon, was born at Stendal, Prussia, 1st March, 1792, entered the Veterinary College of Berlin as a bursar in 1813, and, after examination, was named, in 1817, superior veterinary surgeon. He was sent to France at the expense of the Government to study stud-keeping and horse-breeding, and pursued the same study further in Würtemberg, Bavaria, Austria, and Hungary. On his return he occupied a chair in the Veterinary College of Berlin till 1823, was appointed to a post in the General Military School of Berlin in 1830, and appointed Professor in Ordinary in 1841. His works, which have been translated into various languages, are widely used in Germany.

Dietet'ics is that department of science which treats of food. The question of the kind of food best suited for man may be treated either theoretically or practically. Theoretically, food may be considered as consisting of various alimentary or proximate principles, each of which has specific physiological properties; or, practically, food may be regarded as composed of these collectively, in such proportions and in such physical states as fit the food for the maintenance of life. It is the practical aspect of the question of food which forms the subject of D. As an example of a natural food, take milk. It contains the following alimentary principles:—Nitrogenous matter (casein chiefly, with small quantities of other albumenoid matter), fatty matter, or butter, a carbo-hydrate, in the form of sugar of milk (lactine), and inorganic matter, comprising salts and water. Here we find a combination of principles present, designed in the economy of nature for the purpose of sustaining life during an early period of mammalian existence. An egg is another example of a compound food or material containing all the principles necessary for the development and growth of the body of the chick. It has also been shown by experiment that food containing a combination of principles is required to nourish the body of an animal. Thus gelatine, albumen, fibrine, and fat, taken separately, nourish animals for a very limited period, and in an incomplete manner. A truly nutritious food must contain a mixture of these, along with saline materials and water. In addition, a certain amount of sapidity or flavour is required to make the food palatable.

The nature of the food required by a healthy man is also affected by the exigencies of the climate in which he lives, and by his habits of life. Exercise and exposure to cold increase the demand for food, while a state of inactivity and a warm climate have usually the opposite effect. Again, dwellers in the Arctic regions consume an enormous quantity of the most efficient kind of heat-producing material—oleaginous matter, or fat—while the inhabitants of the tropics live chiefly on vegetable products, containing principles, such as starch, belonging to the carbo-hydrate group of bodies. In a temperate clime, we find men living more on a mixed diet. The following table, by Moleschott, may be regarded as representing the necessary combination of alimentary principles for maintaining health, in a person of average height and weight, in a temperate climate, and with a moderate amount of either nervous or muscular work:—

Dry Food.	In oz. avoir.	In grains.
Albuminous matter	4·587	2,006
Fatty matter	2·964	1,296
Carbo-hydrates, such as starch, sugar, &c.	14·250	6,234
Salts	1·058	462
	22·859	9,998

Water from 50 to 80 ounces. The 23 ounces of water-free material correspond to about 42 ounces of ordinary food. For a healthy, average-sized man, doing a moderate amount of work, a sufficient diet of ordinary food would consist of about 8 oz. for breakfast, 6 oz. for luncheon, and 16 oz. for dinner—in all, 30 oz.

When we examine the dietaries of persons engaged in various ways, we find a correspondence between the work done and the food consumed, and here, as has been well said, there is a harmony between the dictates of experience and the suggestions of science. In order to ascertain the value of any dietary, the composition of the constituent articles requires to be known. The following table, compiled from Dr. Letheby's Cantor *Lectures on Food*, represents the percentage composition of several of the more common articles of diet:—

	Water.	Albumen.	Starch.	Sugar.	Fat.	Salts.
Bread	37	8·1	47·4	3·6	1·6	2·3
Biscuit	8	15·6	73·4		1·3	1·7
Wheat flour	15	10·8	66·3	4·2	2·0	1·7
Oatmeal	15	12·6	58·4	5·4	5·6	3·0
Rice	13	6·3	79·1	0·4	0·7	0·5
Peas	15	23·0	55·4	2·0	2·1	2·5
Potatoes	75	2·1	18·8	3·2	0·2	1·0
Arrowroot	18	...	82·0	...	...	...
Turnips	91	1·2	5·1	2·1	...	0·6
Cabbage	91	2·0	5·0	3·0	0·5	0·7
New milk	86	4·1	...	5·2	3·9	0·8
Cream	66	2·7	...	2·8	26·7	1·8
Cheese	36·8	33·5	...	...	24·3	5·4
Lean beef	72	19·3	...	...	3·6	5·1
Fat beef	51	14·8	...	...	29·8	4·4
Mutton	72	18·3	...	...	4·9	4·8
Veal	63	16·5	...	...	15·8	4·7
Fat pork	39	9·8	...	...	48·9	2·3
Tripe	68	13·2	...	...	16·4	2·4
Poultry	74	21·0	...	...	3·8	1·2
White fish	78	18·1	...	...	2·9	1·0
Salmon	77	16·1	...	...	5·5	1·4
Egg	74	14·0	...	...	10·5	1·5
Butter	15	...	...	...	83·0	2·0
Beer and porter	91	0·1	...	8·7	...	0·2

The following table shows the relation between the amount in ounces of dry food and the habits of life of the individual:—

	Nitrogenous matter.	Fat.	Carbo-hydrates.	Mineral matter.
	oz.	oz.	oz.	oz.
Bare subsistence—diet as in prisons, hospitals, &c.	2·33	0·84	11·69	...
Adult in full health, with moderate exercise	4·215	1·397	18·960	0·714
Active labourers, such as soldiers during war	5·41	2·41	17·92	0·68
Hard-working labourers, such as navvies	5·64	2·34	20·41	0·72

As regards the effect of animal and vegetable food on the system, the following statements may be made:—(1) Animal food increases the amount of fibrine in the blood, renders the blood richer in red corpuscles, and produces firmness of muscle with an absence of superfluous fat. (2) Vegetable food increases the deposition of fat, is less stimulating than animal food, and appeases hunger for only a short time; otherwise its nutritious value, if capable of being digested, is quite as great.

Diet of Infants.—The proper food for an infant is the milk of the mother. Failing this, the nearest approach to the best food is the milk of another woman. A wet-nurse should be free from constitutional taint, and in a healthy condition. Her milk should be sufficient in quantity and good in quality, and she should have borne a child about the same time as the mother of the infant given into her charge. But if no wet-nurse can be got, the next best substitute for the mother's milk is the milk of the cow. This milk, as seen in the following table, is the nearest approach to what is wanted, and it is easily procurable:—

	Milk of			
	Woman.	Cow.	Goat.	Ass.
Nitrogenous matter	3·35	4·55	4·50	1·70
Butter	3·34	3·70	4·10	1·40
Sugar and salts	3·77*	5·35	5·80	6·40
Water	89·54	86·40	85·60	90·50
	100·00	100·00	100·00	100·00

* Understated.

To render cow's milk suitable for the infant, it is usually diluted with water and sweetened with sugar. Farinaceous food, consisting of bread, biscuit-powder, flour, rusks, &c., are not really suitable for infant life, although much used. Liebig's food, derived from malt-flour, wheat-flour, cow's milk, bicarbonate of potash and water, is more suitable. As regards practical dietetics and the food for invalids suffering from various diseases, see Dr. Pavy's *Treatise on Food and Dietetics.*

Die'trich of Bern, one of the characters in the old German epic the *Niebelungen Lied* (q.v.), and a favourite hero in German legend and song. In the *Niebelungen Lied* he is one of Etzel's (Attila's) chief vassals, and revenges the death of Siegfried by bringing Gunther, the Burgundian king, and Hagen, Siegfried's murderer, captive to Queen Chriemhilt. D. is only of secondary importance in the *Niebelungen Lied,* but is the central figure in a great cycle of Gothic tales. In the *Heldenbuch,* or *Book of Heroes,* written by Wolfram von Eschenbach and Heinrich von Ofterdingen, D. is represented as seeking adventures in a fairyland in the Tyrol, and as riding to Chriemhilt's rose-garden, and forcing the almost invulnerable Siegfried to hide beneath Chriemhilt's veil. Other sagas tell how D. was head of a band of heroes, and was crowned Emperor of Rome. In the comparatively late tale of *D. and Sigenot,* D. is shut up in a tower, and, like Ragnor Lodbrog, is attacked by snakes, but escapes. The story of *D. and Ecke* greatly resembles the Volsunga saga, and, according to some, can be connected with the *Iliad.* It paints D. as the bravest of all warriors, and as beloved by the beautiful Queen Seburk, whose pleading for D.'s life, according to Cox (*Mythology of the Aryan Nations,* i. 305), symbolises the Dawn pleading for the life of the Sun. D. likewise appears in German legend as a ghostly midnight hunter, answering to King Hugh in France and Herne the Hunter in England. This heroic and mythical D., or Thiderick, is identified with the great Ostrogothic conqueror Theodoric of Verona (q.v.). See Ludlow's *Popular Epics of the Middle Ages.*

Di'ets of Compear'ance, in the law of Scotland, are the days on which a party to a civil or criminal process is cited to appear in court. In criminal cases, the indictment, or Criminal Letters (q.v.), must be called on the precise day for which the accused is cited.

Diez, Friedrich Christian, an illustrious Romance scholar, was born at Giessen, 15th March, 1794. After serving as a volunteer against Napoleon in 1813, and living as a private tutor at Utrecht, he went to Bonn in 1822, where he was appointed Professor of Modern Literature in 1830. He died 2nd June, 1876. By his two great works, *Grammatik der Romanischen Sprachen,* and *Etymologisches Wörterbuch der Roman Sprachen,* which have been translated into English and French, D. founded the philology of the Romance languages. Among his other works are *Die Poesie der Troubadours* (1826), and *Ueber die erste Portug. Kunst und Hofpoesie* (1863). A 'D. Memorial,' in the shape of scholarships for the studies to which his life was devoted, was established in 1878.

Diff'erences, in heraldry, devices to indicate feudal alliance and dependency, but not blood-relationship. Another view is that D. are used by the brothers and other descendants of a family after the death of their father, while marks of Cadency (q.v.) are employed during his lifetime. D. are effected in ways innumerable, by modifications of tincture and of all the charges—ordinaries, sub-ordinaries, and miscellaneous. Women cannot bear D.

Differences, Calculus of Finite, a branch of pure algebra, of the greatest importance in the discussion of series and questions of annuities, &c. The law which the successive terms of many series, at first sight very irregular, follow, is made quite evident by taking what are known as successive differences. The following numbers give an example of this :—

Series,	18		27		40		58		82		113		152
First differences,		9		13		18		24		31		39	
Second differences,			4		5		6		7		8		
Third differences,				1		1		1		1			

The law is evident in the row of second D., while the fourth obviously vanish. It is apparent, then, that given any term and the corresponding differences, the other terms can be calculated.

Differen'tial, in music, is a third note produced when any two tones are sounded simultaneously. Its pitch is that corresponding to the *difference between the number of vibrations* of the two primaries. The D. has an important effect on the consonance of certain intervals. See Consonance.

Differential Calcu'lus. See Calculus.

Differential Equa'tions are equations in which differential coëfficients of the variable quantities enter. They are divided into two classes, *ordinary* and *partial*—the former having only one independent variable, the latter more than one. D. E. are also distinguished by their *order* and *degree* —the order being that of the highest differential coëfficient present, and the degree corresponding to the highest power to which any differential coëfficient is raised.

Differential Thermometer. See Thermometer.

Diffrac'tion, or, according to Newton, *Inflexion,* is an optical phenomenon which takes place when a ray of light passes very close to an opaque body. It was first observed by Grimaldi, and much studied by Newton, who supposed it to be due to a kind of molecular force subsisting between the opaque body and the light corpuscles. Let a narrow beam of sunlight, entering a darkened room, fall upon a plate which is perforated by an exceedingly small hole or slit. If the light transmitted through this minute aperture be received upon a white wall or sheet, the small light-spot will be surrounded by several concentric rings of coloured light with intermediate rings of darkness. The experiment may be varied so as to present most startling and beautiful phenomena, all of which, however, can be explained upon the undulatory theory of light with a simplicity almost inconceivable. D. is, in fact, a case of Interference (q.v.). If a small opaque disk be interposed in a beam of sunlight, the shadow cast is found to have a small bright spot in the centre. This is another case of D.; and a general idea of the manner in which it is explained may be got from a consideration of the effect an obstacle has upon a wave travelling along the surface of a sheet of water. Where the crests of the two halves so formed meet, a larger wave will be produced, but where crest meets hollow, there will be no wave apparent; and darkness is the absence of that undulatory motion which constitutes light. The complete explanation requires the aid of higher mathematics, for which we refer to Fresnel's memoir before the Academy of Sciences *Sur la D. de la Lumière* (1826). A *D.-grating* is a transparent surface ruled with numerous lines, so close that they cannot be singly observed. By means of such an apparatus a series of most perfect spectra is obtained when a beam of sunlight, transmitted through it, is received upon a screen. These spectra are free from the objection which holds for prismatic spectra, that the violet portion is too much extended. Further, it is easily demonstrable, upon the principles of interference, that the distance of any portion of the spectrum from that point on the screen which is in the same line with the sunbeam and the centre of the grating, is proportional to the wave-length of the light at that part of the spectrum. This greatly increases the value of such gratings, which are, however, exceedingly scarce.

Diffu'sion, the gradual intermingling of two liquids or gases. If over a strong and coloured saline solution, such as sulphate of copper, or bichromate of potash, water be poured gently so as not to disturb the solution, the process of D. will become very apparent. For measuring the rate of D., however, this method is not sufficiently exact. Sir William Thomson employed a number of glass beads, whose specific gravities were different, but all intermediate between those of the two liquids. As D. goes on, the beads gradually separate, and indicate by their positions the specific gravity at any depth of the solution. Another method adopted by the same physicist was to measure the refractive indices of the various layers of the diffusing liquids. There are many pairs of liquids, such as water and oil, which do not mix, and therefore do not diffuse, and there are others in which the D. is only partial, the final result being the lighter liquid mixed with a small proportion of the heavier floating upon, and distinctly marked off from, the heavier liquid, mixed with a small proportion of the lighter. This is the case with ether and water.

Every gas is capable of D. into every other gas—a fact first remarked by Priestley. Graham, who investigated the phenomenon thoroughly, has shown that the rate, at which the D. of any substance goes on, is proportional to the rate of variation of the strength of that substance in the fluid as we pass along in the direction of the D.; exactly the law which holds for conduction of heat and electricity. He also deduced from his experiments that the rates of D. of two gases are inversely proportional to the square roots of their densities—the lightest diffusing most rapidly. If a porous solid be intercepted between the two gases, D. takes place, according to Graham, in the same way that it would have done if there had been no septum present; Bunsen, however, regards the phenomenon as dependent upon capillarity, and doubts the truth of Graham's law of densities. There is another class of cases, differing from the last in the fact that the diaphragm is not in the ordinary sense porous. Thus, if a soap-bubble be blown with carbonic acid gas, the gas is continually passing through—being absorbed on the interior surface, passed in a state of solution through the film, and given off at the exterior surface. Hydrogen and other gases behave similarly with respect to caoutchouc; but their rates of passage have no connection with those of ordinary D., being rather a chemical than a mechanical action.

Graham distinguished what he called *colloïd* and *crystalloïd* substances; the former being capable of uniting temporarily and loosely in various proportions with other substances, the latter always combining in definite proportions. Glue is a *colloïd* body, forming a jelly with various proportions of water; salts are *crystalloïd*. They are easily distinguished by the difficulty with which all colloïd bodies diffuse through a porous solid, crystalloïds diffusing with ease. If a colloïd substance be combined with some liquid or crystalloïd solution in different proportions throughout its mass, D. takes place through the colloïd body till the structure is homogeneous—an interesting analogy to the tendency which an unequally heated body has to come to a uniform temperature. It is on this theory that Graham explains the passage of hydrogen through iron and palladium at a high temperature, the metals acting, with respect to the gas, as colloïd substances. See Graham's *Memoirs* in the *Philosophical Transactions* prior to 1851, Graham's *Chemistry*, Bunsen's *Gasometry*, translated by Roscoe, and Clerk Maxwell's *Theory of Heat*.

Digamma, a letter once occupying the sixth place in the Greek alphabet, which gradually fell into entire disuse. It was called D., *i.e.*, double gamma, from its resemblance to two gammas placed one on the other, Ϝ Ϝ. The D. existed in the time of Homer, but is not found written in any extant copy. In pronunciation it answered to the English *v*. The manner of its disappearance may be illustrated by a comparison of the Greek *aiōn*, *oinos*, with the Latin *ævum*, *vinum*.

Dig′by, a seaport in the Dominion of Canada, province of Nova Scotia, on the Bay of Fundy. It has an active industry in the curing of pilchards, which are prized on account of their flavour, and are known as *Digbies* in the fish trade. There are also valuable herring and mackerel fisheries, and some shipbuilding and lumbering. Pop. town 1381; district 19,897, of whom 9302 are Roman Catholics and 6233 are Baptists.

Digby, Sir Kenelm, the son of Sir Everard D., one of the men who suffered for participation in the Gunpowder Plot, was born 11th July, 1603, at Gayhurst, in Buckinghamshire. He distinguished himself at Oxford, and after two years' travel on the Continent, was knighted by James I. Charles I. appointed him to numerous offices, and in 1628 he sailed with a squadron to the Levant, where he defeated the Venetians. He also fought against the Algerines. Originally a Protestant, D. became, in 1636, a Roman Catholic. When the civil war commenced he was imprisoned as a Royalist, but was released in 1643. For a long time he resided and studied in France, returning to London in 1661, and dying there, 11th June, 1665. D., who was a learned man, and an adherent of what is known as 'the corpuscular philosophy,' was the author of numerous works, including *A Treatise of the Nature of Bodies*, an interpretation of *The Twenty-second Stanza in the Second Book of Spenser's Faerie Queene*, and *Two Treatises on the Nature of Bodies and of Man's Soule*. His private memoirs were published in 1827.

Di′gest, the name given to the Pandects of the civil or Roman law, as containing *Legalia præcepta excellenter digesta*. See CODE.

Diges′ter, Papin's, a strong metallic vessel, tightly fitted with a lid, and provided with a safety valve. It is used for subjecting bodies to a higher temperature than could be obtained by merely boiling water in the usual way; for the steam, being unable to escape, increases the pressure upon the water, the boiling-point of which is consequently raised.

Diges′tion. This is a term given to the processes by which the food is changed into a condition suitable for being absorbed into the blood-vessels or by the lacteals. During the course of D. the food is changed physically and chemically; it passes through various organs, and it is acted on by various juices. In the mouth the food is divided and comminuted by the teeth. It is mixed, at the same time, with the various fluids which compose the saliva. Having been reduced to a pulpy mass, it is, by the action of the tongue, passed backwards into the pharynx, and by the successive contractions of the muscles of the pharynx it is propelled into the œsophagus. This tube leads from the pharynx into the stomach, which is a receptacle for the food, and the cavity in which the chief digestive processes occur. In the stomach the food is subjected to three actions:—(1) to a triturating movement, effected by the contractions of the muscular walls of the stomach, by which it is thoroughly mixed with the juice, secreted by glands in the lining membrane of that organ and called the *gastric juice*; (2) to the chemical action of the gastric juice; and (3) to the influence of a temperature of about 100° F. The food is thus further reduced into a pultaceous or gruel-like mass called *chyme*, and as it is partly liquified, portions successively pass into the small intestine (see STOMACH), while the larger masses are left behind in the stomach to be further acted upon. In the small intestine (see INTESTINE), which is about 15 to 20 feet in length, the chyme is mixed, as it is slowly propelled along the bowel, with—(1) the intestinal juice; (2) the bile; and (3) the pancreatic juice. By these juices certain of the constituents of the food are further acted upon, and the alimentary matters, thus liquified and prepared, are gradually absorbed by the blood-vessels of the intestinal mucous membrane and by the lacteals, and become *chyle*. The indigestible portion of the food is passed by the muscular action of the walls of the small intestine (see PERISTALTIC ACTION) into the large intestine, from which, with certain refuse or excrementitious substances, it is expelled by the act of defæcation.

The action of the various digestive fluids on the proximate constituents of food may here be briefly summarised, while reference is made, as to the structure of the various organs and as to the composition of the various fluids, to the following headings:—MOUTH, PHARYNX, DEGLUTITION, ŒSOPHAGUS, STOMACH, GASTRIC JUICE, INTESTINE, LIVER, SALIVA, and PANCREAS. Five digestive fluids act on the food:—

(1.) *Saliva*, which converts starch into sugar, and assists in Deglutition or Swallowing (q.v.).

(2.) *Gastric juice*, which acts on the albuminous matters, converting them into *Peptones* (q.v.), or soluble modifications of albumen.

(3.) *Bile*, which separates the refuse from the nutritious matter of the chyme, neutralises any excessive acidity of the chyme caused by the gastric juice, aids in the absorption of fat by covering the surface of the mucous membrane with an alkaline fluid, stimulates the peristaltic action of the bowels, and arrests putrefactive changes. See BILE, LIVER.

(4.) *Pancreatic juice*, which emulsionises fatty matter, splits up certain fats into glycerine and the corresponding fatty acid, converts starchy matter into sugar, and converts peptones into two substances called Leucine and Tyrosine (q.v.), which are then absorbed and taken to the liver.

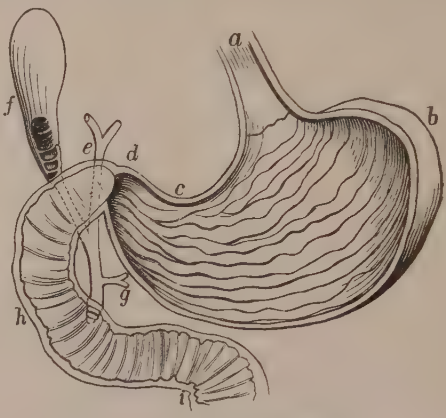
(5.) *Intestinal juice*, which, so far as is known, combines the actions of all the other juices, and acts on the albuminous, starchy, and fatty principles.

The conditions favourable for good D. in the stomach are—(1) a temperature of about 100° F.; (2) constant movement of the walls, which brings in succession every part of the food in contact with the mucous membrane and gastric juice; (3) the removal of such portions as have been fully digested, so that what remains undigested may be brought more completely into contact with the solvent fluid; and (4) a state of softness and minute division of the aliment.

According to the celebrated experiments of Dr. Beaumont upon St. Martin, a Canadian, who, on 6th June, 1822, met with a severe gunshot injury, the result of which was a permanent fistula or opening into the stomach, the rapidity of D. varies according as the food is more minutely divided, whereby the extent of surface with which the gastric fluid can come in contact with it is proportionately increased. Liquid substances are for the most part absorbed by the vessels of the stomach at once, and any solid matter suspended in the liquid, as in soup, are concentrated into a thicker material before the gastric juice acts upon them. A full meal, consisting of animal and vegetable substances, may be converted into chyme in about an hour, and the stomach may be left empty in two and a half. Rice and tripe, in St. Martin's case, were digested in about 1 hour; eggs, salmon, trout, venison, and apples, in 1½ hours; tapioca, barley, milk, liver, and white fish, in 2 hours; turkey, lamb, and pork, in 2½ hours; beef, mutton, and fowls, in 3½ hours; and veal in about 4 hours. The following circumstances no doubt also affect D.:—(1) the quantity of food taken—the stomach should be moderately filled, but not distended; (2) the time which has elapsed since the last meal, which should be always long enough for the food of one meal to have completely left the stomach before more is introduced; (3) the amount of exercise previous and subsequent to a meal, gentle exercise being favourable and over-exertion injurious to D.; (4) the state of mind, tranquillity of temper being usually essential to quick and due D.; (5) the bodily health; (6) the state of the weather; (7) the period of life, D. being more active in the young than in the old.

The quantity of digestive fluids secreted daily, according to the estimates of Bidder and Schmidt, which are probably (with the exception of the last two) at least 25 per cent. too high, is, in pounds avoirdupois:—Saliva, 3·5; bile, 3·5; gastric juice, 14·1; pancreatic juice, 0·44; intestinal, 0·44.

The survey of the digestive functions throughout the animal series leads us to contemplate very wide variations in the form and complexity of the assimilative apparatus. In the Protozoa (q.v.), or lowest animals, the bodies of which are composed of the simple albuminous substance known as Sarcode or Protoplasm (q.v.), food particles are taken into the interior of the body, and are there digested amid the protoplasmic substance. This substance, therefore, constituting of itself a living being, assumes the functions of a digestive system. Even in these lower animals, an essential difference from plants may be perceived in the process of D., in that they receive their nutritive matters within their bodies, and digest them internally, whilst in plants the process of nutrition goes on in the external surfaces and outer tissues of the organisms. Some of the protozoa (*e.g.*, *Gregarinæ*), and some more highly organised animals also (*e.g.*, tapeworms), live by simple imbibition—that is, by simply absorbing the fluids on which they subsist. And in such forms no distinct or specialised mouth, stomach, or other digestive apparatus exists. In none of the protozoa, except in the Infusorial (q.v.) animalcules, does a mouth exist; and in the latter no digestive system is specialised, food being digested by the protoplasm of which the body is composed. In the Cœlenterate animals (represented by the hydræ, zoophytes, corals, &c.), a stomach-sac may be wanting, as in all Hydrozoa, and food is digested simply within the general cavity of the body. But in the sea-anemones and other actinozoa a distinct stomach-sac is specialised, although this latter structure is open inferiorly, and communicates thus with the body-cavity. Tentacles are also now found, by means of which the food is drawn towards the mouth-opening, which is always developed. In Annuloida or echinozoal animals (such as sea-urchins, starfishes, sea-cucumbers, &c.), a perfect digestive system is usually to be found, although, as in the tapeworms, already noticed, a digestive apparatus may be wanting, possibly in consequence of their degraded condition as internal parasites. In Annulosa (such as worms) the digestive system is of tolerably perfect structure, and when we advance to the higher members of the latter sub-kingdom (such as insects, spiders, crustacea, &c.), we find not only a perfect digestive apparatus, but many supplementary organs in addition. In insects, a crop and gizzard, stomach, intestine, biliary or liver tubes are found, with a heart and blood-vessels for the circulation of the nutritive fluid. In higher crustacea, such as lobsters, &c., the digestive structures become still further specialised, the liver especially becoming better developed. In Mollusca (such as cuttlefishes, snails, oysters, &c.), salivary glands, teeth-like structures for the trituration of the food, and a large liver exist. In Vertebrata, and among fishes representing the lowest group of the class, the digestive system may include not only a mouth, teeth, stomach, and intestine, but also a liver, pancreas or sweetbread, and other structures. In Amphibia (q.v.) a spleen is also present, and in reptiles some further specialisation exists. In birds no teeth are developed; but a gullet, crop, gizzard, and proventriculus or true stomach, together with an intestine, intestinal cæca, liver, pancreas, spleen, and other glands are found.



The Stomach laid open behind.

a, the œsophagus; *b*, the cardiac dilatation; *c*, the lesser curvature; *d*, the pylorus; *e*, the biliary duct; *f*, the gall-bladder; *g*, the pancreatic duct, opening in common with the cystic duct opposite *h*; *h*, *i*, the duodenum.

It may be noted that vertebrates differ from all lower animals in possessing a distinctly developed lacteal or Absorbent System, that is, a special system of vessels, the function of which is to receive the products of D. from the digestive canal and transfer them to the blood system, where they mingle with the current of the circulation and thus repair the bodily waste. And as a rule of the most universal character throughout the entire animal series, it may also be remembered that the digestive system of an animal feeding upon plants or vegetable food is longer and of more complicated nature than that of an animal feeding upon flesh. The contrast between the digestive systems of a grain-eating and a flesh-eating bird in this respect is seen to be very marked; and the contrast is equally well observed in the difference between the digestive system of the larval frog or tadpole and that of the carnivorous adult frog.

In mammalia broad variations in the form and complexity of the digestive systems are noticeable. In some the system is comparatively simple, whilst in others—as in some marsupials, but most notably in the case of the ruminants (sheep, oxen, &c.), or those that 'chew the cud'—the stomach evinces a highly complex nature. The structure of the ruminant digestive system will be noted under the head of Ruminant (q.v.) and Rumination (q.v.). Variations exist in the mammalian digestive organs chiefly in the relative length of the intestinal canal, in the nature and number of the teeth, in the development of the tongue and other appendages, and in the glands connected with the system.

Dig'it (Lat. *digitus*, 'the finger'), in arithmetic, the name given to each of the symbols, 0, 1, 2, 3, &c., to 9; in astronomy, the twelfth part of the diameter of the sun or moon. In anatomy the name is applied to the fingers and toes of the *Vertebrata*.

Digital'ine is the active principle of the common foxglove. It is colourless, crystalline, and sparingly soluble in water; dissolves more readily in alcohol and ether, and is very bitter and poisonous. Considerable doubt exists as to its true chemical composition. It belongs, however, to the class of bodies called Glucosides (q.v.), for when boiled with dilute acids it takes up water and splits into Glucose (q.v.) and other products. D. is a valuable medicine.

Digita'lis, a genus of plants of the natural order *Scrophulariaceæ*. They are biennials or perennials, with erect stems and large showy flowers in long one-sided racemes. They are natives chiefly of Europe and the N. of Asia. D. is often cultivated in gardens, especially the yellow *D. grandiflora*. Only one species is native in Britain—*D. purpurea*, the common purple foxglove. It grows from 2 to 4 feet high, with beautiful flowers spotted inside. It occurs in dry hilly places, roadsides, and plantations. It abounds in Western and Central Europe, and extends as far as Scandinavia. The *leaves* of *D. purpurea* are used in medicine. They are collected from wild plants in Britain when about two-thirds of the flowers are expanded. They are used as powder, tincture, and infusion. In large doses D. is an irritant poison, and in small doses it depresses the heart's action. It is a valuable medicine in certain kinds of heart-disease, and very specially in dropsies depending on heart-disease; but being cumulative in its action, it should be administered with great caution. Its active principle is Digitaline (q.v.).

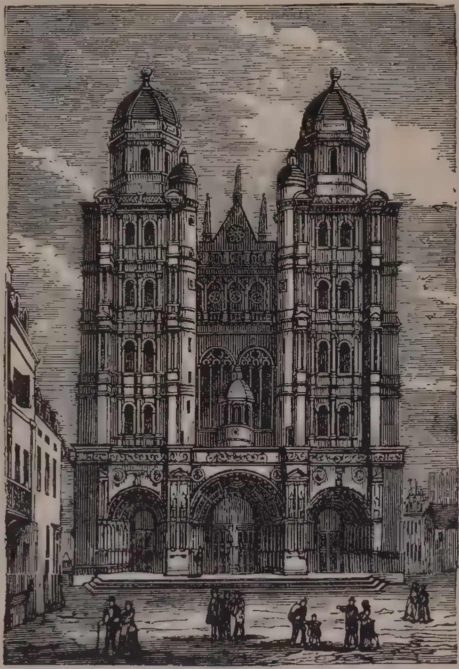
Digitalis.

Digitigra'da ('toe-walkers'), the name applied to that section of the mammalian order of *Carnivora* of which the included members walk on the tips of their toes, the heel being raised from off the ground. Examples of such forms are found in the *Felidæ* (tigers, lions, cats), *Canidæ* (dogs, wolves, &c.), &c. Some forms (*e.g.*, *Mustelidæ* or weasels) are termed *semi-plantigrada*, since they apply only part of the sole to the ground in walking; whilst the bears are wholly *Plantigrade*, and apply the entire sole of the foot to the ground.

Digne, the capital of the department Basses-Alpes, in a wild mountain gorge on the left bank of the Bléone, 45 miles N.E. of Nice. It is surrounded by walls flanked with towers, is the seat of a bishop (since 340), of a Communal college, and of a theological seminary, and has manufactures of woollens, colours, hosiery, &c., and an active trade in dried fruits, wine, honey, wax, and cutlery. In the vicinity is the beautiful Castle of Malijay, and the village *Les Mées* (pop. 1993), where a pleasant wine resembling champagne is made. D. is the Roman *Dinia* (probably from the Cymr. *din*, 'a fortified height'; cognate with the Gael. *dun*), and was the capital of the Bodiontici, but has no antiquities. Napoleon issued at D. his proclamation of 4th March, 1815. Pop. commune 7261; arrond. 43,208.

Di'hong, or **Dihang**, the name of a part of the Dzangbo or Machang Sanpo, chief tributary of the Brahmaputra. It forms the portion between Tibet and the confluence with the great river in Assam. Some 15 miles E. is the Dibong, the lower part of the Kempu, another branch of the Brahmaputra.

Di'jon, the capital of the department Côte d'Or, France, in the valley of the Suzon, where it is joined by the Ouche, 195 miles S.E. of Paris by railway. It lies near the base of the vine-clad Mont-Afrique, at the N.E. end of the Côte d'Or range, and has gardens, promenades, and tree-shaded ramparts, which make it one of the finest towns of France. The chief buildings are the Cathedral of St. Bénigne, rebuilt for the third time at the end of the 12th c., and having a graceful spire 300 feet high; the church of Notre Dame, pronounced by Viollet-le-Duc the finest Burgundian building of the 13th c.; that of St. Michael, in which the external details are Grecian and the interior pure Gothic; the town hall, formerly the palace of the Dukes of Burgundy, and containing in its magnificent saloons a rare collection of scientific and art subjects, and a valuable library of 50,000 volumes.



Cathedral of Dijon.

The seat of a celebrated academy and of various educational institutions, D. has also manufactures of woollen cloths, blankets, glue, mustard, beer, baskets, iron, saltpetre, &c., and a trade in grain, wine, oil, and wool to the value of seventy million francs yearly. During the Roman invasion a village on the slope of Mont-Afrique was occupied by Cæsar as a camp, and fortified, receiving the name of *Dibio*, or *Dibis-dunum* (Celt. 'the fort on the two waters'). It subsequently prospered, and in the Middle Ages became the capital of Burgundy. The Germans besieged D. on the 31st October, 1870, after which it capitulated, and was for a time the head-quarters of Werder. A struggle between Manteuffel and the armies of Bourbaki and Garibaldi took place in the vicinity, 21st to 23rd January, 1871. Pop. town 65,428; arrond. 163,966.

Dik'owa, or **Dikoa,** a town of the Sudan, in the kingdom of Bornu, 60 miles S. of Kuka, and 30 of Lake Tchad. It is the centre of a great cotton-field, and carries on extensive cotton manufactures. Pop. 12,050.

Dilapida'tion, in English law, when an incumbent allows the chancel, parsonage, or outhouses to decay, or pulls down any building, or destroys trees, belonging to his benefice, he is subject to an action for D. at the instance of his successor. But an incumbent is not bound to maintain painting, papering, or other ornament. Under the Ecclesiastical Dilapidations Acts of 1871 and 1872, surveyors of D. are appointed for each diocese, who are to inspect buildings and report to the bishop. If the incumbent refuse or neglect to repair in accordance with the report, the bishop may sequestrate the revenues of the benefice for the purpose. When the works are executed, the incumbent is protected from further liability for five years. The Act provides for fire insurance, &c. A successor can proceed against his predecessor, or, if dead, against his executors, or against an alienee, if the benefice had been passed to avoid the charge of dilapidations.

Dil'atory Defence', a term of Scotch law for a plea for avoiding the conclusions of an action without entering on its merits, such as the pursuer's want of title.

Dilemm'a is in logic an argument presenting two or more alternatives, each of which is fatal to the opposite argument. Any position which presents a choice of evils is spoken of as a D. The popular equivalent is a *fix*.

Dilettan'te (Ital. pl. *dilettanti*, Lat. *diligentes* or the post-classical *dilectores*), a term used in England, France, and Germany to denote an amateur, primarily of music, but afterwards of the kindred arts. The name first meant 'a lover of art'; it was then applied to one who dabbled in art; and has lastly become a depreciatory term conveying the notion of a shallow critic or trifling virtuoso.

Dilettanti Society, The, was founded in 1734 by a gentleman who had travelled in Italy. It met at the Thatched House Tavern in St. James's Street, at first merely for informal talk on the subject of art. In 1764, however, the society's funds having increased, its members, who were about sixty in number, sent out an expedition to Greece. The monuments of ancient times were examined, and the enterprise bore rich fruit in two volumes on the *Antiquities of Ionia*. A second expedition was despatched to Asia Minor in 1811, which resulted in two works, *The Unedited Antiquities of Attica* (1817) and *Antique Sculpture* (1835). This society, by its liberality and judiciousness, did much to elevate and correct the public taste.

Dil'igence, a term of Scotch law, used in three unconnected meanings:—1. In its ordinary sense, as indicating the care which the law requires every one to bestow on the subject of a contract. (See CRIME, CULPA, DOLE.) 2. It means the warrant of a court to enforce attendance of witnesses or production of writings. 3. The term is applied to the process of law by which persons, lands, or effects are attached in execution of Sentences and Decrees (q.v.), or in security of debt. In the second sense, the English general equivalent term is *Subpœna* (q.v.).

Diligence. In France a stage-coach is called *La D.* It has generally three divisions—the *coupé*, the *intérieur*, and the *rotonde* or *banquette*. In booking, a receipt should be taken. As with ourselves, the system of diligences has been almost superseded by that of railways. In Scotland, the word was, in former times, used to denote a stage-coach. Every one will remember the celebrated *Hawes Fly* or *Queensferry D.* of *The Antiquary*. In Spain, *La Diligentia*—the name one would suppose being satirically bestowed—still flourishes; but no one who dislikes dirt, vermin, and the smell of garlic should travel by D. in Spain. Owing to the 'poverty' of the horses, the ordinary Spanish D. is drawn by 7 horses or more, as many as 11 being sometimes harnessed together—an odd number is usually preferred. While one man holds the reins, another, armed with a long-thonged, short-handled whip, extends the team by dragging the three leaders as far as he can from the D. along the road in the direction to be taken. Then, at a signal from his companion, he brings his thong smartly down on the backs of the leaders, which start off at a gallop, followed by the remaining pairs. As each pair passes the whipper, they receive their fair share of 'persuasion,' and as the D. at length rolls by, the man leaps upon the box, and joins the driver in shouts of 'Anda! Anda!' The gallop gradually decreases to a trot, the trot to a walk, and eventually the team pulls up; whereupon the same programme is repeated again and again until the next posting-house or the final destination is reached.

Dilke, Charles Wentworth, a well-known English critic and journalist, was born 8th December, 1789, served in the Navy Pay-Office, took to literature, contributed to the *Westminster Review*, &c., became (1830) editor and proprietor of the *Athenæum*, and established the *Daily News* in 1846. He edited *Old English Plays* (Lond. 1814), wrote ably on Junius and other curious questions of literary history, and died at Alice Holt, Hampshire, 10th August, 1864. See *The Papers of a Critic, Selected from the Writings of the late C. W. D., with a Biographical Sketch by his Grandson* (Murray, 1875), containing original letters from Charles Lamb, Keats, Hood, Haydon, Lord Lytton, Dickens, Savage Landor, &c.—**Sir Charles Wentworth D.,** eldest son of the former, was born in London, 18th February, 1810, studied at Westminster School and Cambridge, and was one of the active originators of the Industrial Exhibition of 1851. A member of the Society of Arts from 1844, he received a baronetcy in 1862. He died at St. Petersburg, 10th May, 1869.—His son, **Sir Charles Wentworth D., The Right Hon.,** was born at Chelsea, 4th September, 1843, graduated at Cambridge in 1866, and travelled round the world, giving his experiences in *Greater Britain*. He was elected for Chelsea in 1868, and re-elected in 1880, when he became Under Sec. for Foreign Affairs (April, 1880, to December, 1882), and President of Local Government Board (December, 1882, to June, 1885); but being defeated at the Chelsea election in 1886, he withdrew for a time from public life. He was, however, returned to Parliament as member for the Forest of Dean Division of Gloucestershire on 15th July, 1892, and again at the general election in 1895. He is a Liberal Home Ruler.

Dill, a genus of Umbelliferous plants. The common D., a common plant of the Cape of Good Hope, Egypt, the Mediterranean countries, &c., is aromatic, and used as a flavouring material for pickles, sauces, &c., while the seeds, or rather fruits, are used as a remedy for flatulence, and to alleviate the painful effects of purgative medicines on infants, in the form of *D.-water*. Sowa D. of Bengal produces a fruit much used as an ingredient in curries. It is believed to be the 'anise seed' of the New Testament.

Dillenia'ceæ, a natural order of Dicotyledonous plants, allied to *Ranunculaceæ* (q.v.), natives principally of Australia, India, and equinoctial America. Above 230 species and 30 genera are known. Of these, *Dillenia*, *Candollea*, and *Tetracera* are examples. Most are astringent, and are used for applying to wounds, and, in Brazil, for tanning. The acid calyces of some species of *Dillenia* (*D. scabrella*, and *D. speciosa*), owing to their acid taste, form in India an ingredient in curries. The acid fruit of *D. speciosa* is eaten with sugar, and the juice mixed with water is in favour as a cooling drink in fevers. A decoction of the leaves *D. retusa* is employed in Ceylon for cleansing ulcers. The wood of some trees of the same genus (*D. pentagyna*, &c.) is also very hard and durable. Some species are also cultivated for the sake of their evergreen foliage and beautiful flowers.

Dill.

Dilman′, a town in the province of Azerbijan, Persia, 50 miles N.N.W. of Urumiyah, in the fertile plain of Selmas, and surrounded by gardens. The streets are clean, but the bazaars are ill supplied. Pop. 5280. Four miles distant from D. are the ruins of the old town of D.

Dilo′lo, Lake, in the interior of S. Africa, on the frontier between Lobale and Usamba, about 20 miles S.W. of Katema, is an expansion of the Liba, a branch of the Zambesi, and is 10 miles long, and has an extreme breadth of 4 miles. It was discovered by Livingstone in 1856. See his *Missionary Travels and Researches in South Africa.*

Dil′uents (from Lat. *diluo*, 'I wash away') are medicines which increase the watery portion of the blood, and render the secretions and excretions less acrid and viscid. The best diluent is water.

Dilu′vium (Lat. 'a washing away'), the name given in geology to such superficial accumulations of debris or matter as may have resulted from the wearing action of rivers, or been deposited on a land surface by the action of water. The muddy sediment left on land by the overflowing of a river is a *diluvial* deposit in this sense—the only one in which the term can be applied in modern geological science. Formerly the term *diluvial deposits* was given by the advocates of the 'diluvial' or 'flood' theory to collections of matter which they believed had been left by the flood of Noah—a flood credited by them with the power of having caused all recent events in the history of the world.

Dime′ (Fr. originally *disme*, from Lat. *decima*, 'tenth'), the tenth part of an American dollar; but, as in the case of the French *décime* (of which the name is merely a doublet), used but little in commercial life.

Dimen′sion (Lat. *dimensio*, 'a measuring'), in geometry, a line is of one D., a surface of two—length and breadth—and a solid of three. Thus also space is of three dimensions, three numbers being necessary and sufficient to fix the position of a point in space. The *dimensions* of an algebraic expression is obtained by taking the algebraic sum of the indices of the factors which enter.

Dimidia′tion (Lat. *dimidiatio*, 'a halving'), in heraldry, a mode of impalement in marshalling coats of arms, which was introduced as early as the beginning of the 14th c. It consists in cutting two shields by a vertical line through the fess-point, placing together the dexter half of the one and the sinister half of the other, and thus forming a new composition. But extraordinary effects were often produced by D., one of which is seen on the seal of the Cinque Ports—the sterns of the ships and the fore parts of the leopards showing unheard-of monsters. Impalement by complete coats of arms instead of halves has superseded D. in English heraldry.

Diminuen′do (in music). See DECRESCENDO.

Dimin′utives, words which convey the idea of diminution or of smallness compared with the meaning of the words whence they are derived. D. may be formed by adding a letter or letters, as *ie*, a diminutive termination now almost confined to Lowland Scotch, in *lassie, mousie, boatie;* or as *ock* in *hillock;* *kin* in *mannikin* and *lambkin* (comp. Ger. *chen*, as *mädchen*); *en* in *kitten;* *l* in *tiercel*, a small hawk, from *tierce.* The diminutive termination *ling*, as in *darling*, 'little dear,' was at first an Old English patronymic—thus in the Old English Bible Elisha's son is *Elising* (Latham)—and from signifying relationship, came to denote endearment, youth, or littleness. The ending *et*, as in *trumpet*, is of classical origin, and in the ending *let*, the *l* is German, and the *t* either English, as in *gimlet*, or French, as in *ringlet.* D. may also be formed by changing a vowel, *e.g.*, *top*, *tip.* D. frequently convey the idea of endearment, but also of contempt, as in *hireling*, *witling*, *lordling.* Adjectives as well as nouns can become D., as *whitish*, *greenish.* In Latin, D. end always in *lus*, *la*, or *lum*. They are common in all languages, the modern German and Tuscan being especially rich in them.

Dim′ity, a cotton fabric used principally for bed furniture, &c., said to owe its name from having been originally a manufacture of Damietta in Egypt.

Dimor′phism. Of late years, chiefly owing to the observations of Charles Darwin, it has been discovered that in several plants belonging to different orders two forms are found, the one form having long stamens and a short pistil, the other a long pistil and short stamens, and with different sized pollen-grains, but differing in no appreciable way. Such plants are called *Dimorphic.* The common primrose is an example. These two forms act towards each other almost exactly as if they were separate species, instead of merely forms of the same species, with no difference appreciable to the ordinary observer. In such a case, the pollen of the long-stamened form must be carried attached to the bodies of insects to fertilise the long-pistilled form, and that of the short-stamened form to fertilise the short-pistilled form; otherwise it acts like so much inert dust. The object of this and similar arrangements for cross fertilisation seems to be to prevent too close interbreeding. See also FERTILISATION and TRIMORPHISM.

Dimor′phous Bodies are those which crystallise in two distinct forms—that is to say, in forms belonging to different crystalline systems. (See CRYSTALLOGRAPHY.) Sulphur furnishes an excellent instance of dimorphism. Native sulphur (*i.e.*, sulphur occurring in the free state in nature) is found in octohedral crystals belonging to the rhombic system, and where crystals can be obtained artificially by allowing a solution of sulphur in bisulphate of carbon to evaporate spontaneously. But if sulphur be fused, and then allowed to cool slowly, it crystallises in quite a different shape. This second modification of sulphur is easily obtained by fusing a few pounds of sulphur in a dish, allowing the fused mass to cool until a crust forms on its surface, and then perforating the crust with two holes, through one of which the sulphur still remaining fluid is poured away, whilst the other serves to admit air. When all the fluid portions have been poured off, the dish is broken, and it will then be found that its surface is covered with a cake of solid sulphur from which transparent amber-coloured needles jut out. These needles are oblique prisms. Carbonate of lime is another D. body. It occurs in nature as two distinct minerals, viz., *arragonite* and *calc spar*, or *Iceland spar.* The crystals of arragonite are ortho-rhombic prisms; those of Iceland spar, rhombs.

Dinagepore′, or **Dinájpur,** a town of British India, province of Bengal, capital of the district of the same name, 261 miles N. of Calcutta. Pop. 12,204. It is a poor place, the houses being for the most part mere huts. The *district* of D. has an area of 4118 sq. miles. Pop. 1,555,835, of whom 740,442 are Hindus; 41 Brahmos; 802,597 Mohammedans; 103 Jains; 511 Christians; and 10,694 Animistic. Much area is occupied by *sola* woods, which produce only poor timber, and jungles, from which the people obtain beeswax and vegetable drugs and dyes. Big game abound as well as deer and hogs. Birds and fish are excellent sport, and most palatable food. Great quantities of cattle are raised. Chief crops are rice, maize, pulse, sugar-cane, tobacco, and jute. Neither drought nor flood ever visits the district. Scarcely any manufacture exists, as nearly all the people are agriculturists. Gunny cloths and wild grass fabric are made. Education has spread considerably, and there are now close on 500 elementary schools.

Din'an (from Cymr. *din*, 'a fortress'), a town in the department of Côtes-du-Nord, France, on the Rance, 14 miles S. of St. Malo, on the summit of a steep hill, upwards of 200 feet above the river, and surrounded by high old walls. The older streets are narrow and filthy, and many of the houses are built of wood. The most noteworthy edifice is the cathedral of St. Sauveur, an ornate Gothic edifice with a fine spire. D. has manufactures of linen, cotton, and woollen goods, nails, beetroot-sugar, &c., and some tanneries, salt-refineries, and barge-building yards. It has a good coasting and inland trade. In the neighbourhood are favourite chalybeate springs. Pop. town 10,444; arrond. 121,232.

Dinant' (Cymr. 'the fort on the stream'), a town in the province of Namur, Belgium, on the Maas, 14 miles S. of Namur. The principal buildings are the citadel, occupying the summit of a lofty pyramidal limestone rock, the Church of Notre Dame, and the Hôtel de Ville, formerly the palace of the Princes of Liége. There are manufactures of hats, woollen stuffs, stained paper, cutlery, &c., besides tanneries, breweries, soap-works, salt-refineries, and mills for sawing marble. D. is famous for its gingerbread. The town, which dates from the 6th c., was strongly fortified as early as the 12th c. Pop. commune 7048; arrond. 90,005.

Dinapore', or **Dinapur** (*Dánápur*), a town and military station in British India, headquarters of district of Patna, on the right bank of the Ganges, about 12 miles N.W. of Patna. Pop. of D. 44,419. In the mutiny of 1857 three native regiments here rose against their officers, and in spite of the presence of a European force, were allowed to withdraw from the cantonment with comparative impunity. A detachment, however, was sent from D. to help in the defence of the neighbouring Arrah, and failed disastrously, in spite of the bravery of our men. Two Europeans received the Victoria Cross for their acts of heroism before the enemy.

Dinar'ic Alps, the easterly range of the Central European system, extending along the Adriatic coast. It forms a southern continuation of the Julian Alps, and separates Bosnia and Herzegovina from the Austrian coast lands. It is some 230 miles long from Fiume to the river Narenta, and has few heights of more than 7000 feet.

Dindigal' (*Dindúkal*, 'rock of Dindu,' a demon), a town in British India, province of Madras, district of Madura, 247 miles S.W. of the city of Madras. It is neatly built, and the bazaar, which is well supplied, is lined with trees on both sides. The fort, on a rocky elevation, 280 feet high, is supplied with water from a well on the rock of enormous depth. Principal products of the district around are hides, tobacco, coffee, and cardamoms. Silks and muslins are made here, and formerly a famous blanket, called 'Carumba,' from the wool used. Hyder Ali used D. as a fortress to oppose the advance of the British, who took it, lost it, and acquired it finally by treaty in 1792. Pop. 20,203—14,589 Hindus, 2251 Mohammedans, and 3363 Christians.

Ding'elstedt, Franz von, a German poet and novelist, born 30th June, 1814, at Halsdorf, near Marburg, studied at Marburg, and was for some time teacher in the Gymnasium at Fulda. In 1843 he was appointed librarian and reader to the King of Würtemberg, in 1850 manager of the Court Theatre at Munich, in 1857 general superintendent of the same at Weimar, in 1867 director of the Court Opera at Vienna, and in 1871 of the City Theatre there. Delicacy of sentiment, pictorial beauty, and epigrammatic terseness of reflection are D.'s most conspicuous merits. He died 15th May, 1881.

Din'gle (Gael. *Daingean-ui-Chuis*, 'the fort of O'Cush,' the ancient family of proprietors before the English), the most westerly town in Ireland, a seaport and favourite sea-bathing place, county of Kerry, on the N. side of the bay of the same name, 39 miles W.N.W. of Killarney. The harbour admits vessels of 300 tons. Some of the older houses are built in the Spanish style, which gives the town a pleasantly antique appearance. D. exports corn and butter to Liverpool, and imports iron, coal, salt and earthenware. Pop. town 930; parish 1601.

Din'go, in natural history, a species of dog indigenous to Australia. In appearance and disposition it much resembles the wolf. Its average height is a little less than 2 feet, and its average length 2½ feet. Its general colour is a reddish-brown. The tail is bushy, like that of a fox, though in a less degree. The D. is a ferocious animal, and works havoc among the flocks of the colonists, delighting in killing as many sheep as it can. It does not bark or growl, like other dogs, but erects its hair-like bristles when angry. It is capable of domestication, but being less trustworthy than the shepherd's dog, it is generally treated as a foe, and exterminated as fast as possible.

Ding'wall (Scand. 'hill of justice'; Gael. *Inverpeffer*, 'at the mouth of the Peffer'), a royal burgh and the capital of Ross-shire, Scotland, lies at the head of the Cromarty Firth, 18 miles S.W. of its mouth in the Moray Firth, and 17 N.W. of Inverness by railway. It has an antique appearance, is approachable to vessels of 9 feet draught, and has some export trade in wool and cattle. D. is portion of the Wick parliamentary district, and along with Tain, Dornoch, Wick, Kirkwall, and Cromarty, it returns one member to Parliament. The chief objects of historical interest are the traces of an old castle of the Ross family, and a conical hill supporting a vitrified fort, probably the 'hill of justice' from which D. originally took name. In the vicinity the village of Strathpeffer, nestling in a sheltered and picturesque valley, attracts large numbers of invalids to its chalybeate and sulphurous springs. Pop. town 2300; parl. burgh 2290.

Din'ka, a pastoral people of Central Africa, in the Upper Nile district, to the S. of the confluence of the Bahr-el-Ghazal and the White Nile, and occupying an area of from 60,000 to 70,000 sq. miles. They are one of the most extensive and unique of African races, peculiar alike for their cleanliness, their civilised tastes and pursuits, and their ferocity in war. Very dark in colour, they are taller than Englishmen, and have thick lips, contorted features, and shallow foreheads. Their hair is cut short, and is adorned with ostrich feathers, in imitation of the heron. No covering is worn except by the women, who are scrupulously clad, and who wear heavy iron rings on their wrists and ankles. Both sexes break off the lower incisors, a practice that renders their language inarticulate. The dwellings of the D. are conical, well-built huts, and are scattered in clusters over the cultivated plains. Nearly the whole of their vast territory is a steppe of dark alluvial clay, unbroken by a single hill, mass of rock, or large tract of forest. Of the cultivated plants the chief are sorghum, penicillaria, beans, earth-nuts (*archis*), earth-peas, sesame, yams, and Virginian tobacco. The domestic animals are the ox (of the zebu race), the sheep, goat, and dog. A village of a few huts has seldom less than 2000, and sometimes as many as 10,000 cattle. An estimate of the total number of cattle gives three for each inhabitant. The ox, which is never killed, is the object of exclusive, almost religious care. Whatever of religion the D. has, centres in an institution called the Cogyoor, which embraces a society of necromancers and jugglers. There is much tribal disturbance. Since about 1855 the various efforts of the Khartum slave dealers to subdue the Dinkas have completely failed, and it is even at some risk that parties venture through their territory to reach Bongo, Niam-Niam, Mittu, &c. All the early captives taken to Egypt were converted into soldiers. See Dr. Schweinfurth's *Heart of Africa*.

Dink′elsbühl, one of the oldest towns in the circle of Middle Franconia, kingdom of Bavaria, on the Wernitz, 20 miles S.W. of Ansbach, has large manufactures of hosiery, paperhangings, &c. It is defended by walls and towers, and has a large Catholic church and a handsome Protestant one. Fortified under Heinrich I., and created a free city of the empire in 1351, D. was greatly reduced during the Thirty Years' War, and has since suffered much from religious dissensions. Pop. town 4496; district 24,868.

Din′mont, the name given in Scotland to a wether or gelded hogg after its first fleece has been cut.

Dinor′nis (from the Gr. *deinos*, 'terrible,' and *ornis*, 'a bird'), in natural history, the name of a genus of extinct wingless birds of great size, whose remains are abundantly found in New Zealand. The D. was first brought under the notice of the scientific world by a paper read by Professor Owen in 1839 on the fragment of a shaft of a femur, 6 inches long. From this fragment Professor Owen deduced the former existence in New Zealand of a large bird combining some of the leading characteristics of the ostrich and the dodo, and subsequent discoveries have proved the general accuracy of his deductions. The D. is generally known in New Zealand, alike to the Maoris and the colonists, under the name of the Moa. Scientific examination of the bones discovered in different parts of the colony has resulted in the establishment of several distinct species. The largest of these, *D. giganteus*, must have been from 10 to 11 feet high; while the *D. didyformis* attained a height of 4 feet only. The leg-bones of the D. are of an exceedingly massive description, and the toes of *D. elephantopes* rival in this respect those of the elephant, whence its name. Deposits of D. bones have been found in many parts of New Zealand, but especially in the provinces of Otago and Canterbury. The most remarkable discoveries of this nature have been made in the Dunstan district of Otago and the Glenmark district of Canterbury. In caves in the former locality there has been found a neck with the skin and some of the feathers attached, as well as a thigh-bone with a large piece of the flesh adhering to it. In the same neighbourhood were also found, 50 feet below the surface, some D. feathers in an excellent state of preservation. They were of a chestnut-brown for the basal two-thirds, shading off into black, with white tips. A vexed controversy has arisen among naturalists as to the probable date of the extinction of the D. On the one hand it is claimed that the freshness and situation of the remains prove that the D. has not been extinct for more than a century; and on the other, that it was exterminated by a race of *autochthones*, prior to the arrival in New Zealand, 500 years ago, of the Maoris, who have no legends regarding it. That the D. was hunted and eaten by a savage race is proved by the discovery of bones and egg-shells, some of them charred, in old native cooking places, along with stone implements. Being a slow, ungainly bird, unable to fly, its means of escaping pursuit were small. The remains of a large species of D. have been found in the Leichhardt Downs, Queensland, 86 feet below the surface. Further particulars regarding the D. remains discovered in New Zealand will be found in the *Transactions of the New Zealand Institute*, vols. iv. and v.

Dinornis.

Dinosau′ria, or **Deinosauria** (Gr. 'terrible lizards'), an order of extinct Reptiles, distinguished by the variable nature of the skin-scales, by possessing teeth, by the development of two pairs of limbs adapted for walking, and by the absence of clavicles or 'collar-bones.' The pelvis approaches very nearly in its character to that of Cursorial or Running Birds. The order is represented by such forms as *Megalosaurus*, *Compsognathus* (q.v.), and *Iguanodon* (q.v.), the remains of which occur in Oolitic and Cretaceous strata.

Dinother′ium, or **Deinotherium** (Gr. 'terrible beast'), an extinct genus of *Proboscidea* or elephant-like mammalia, the fossil remains of which occur in Miocene formations of Europe and of India. *D. giganteum* is a familiar species. In the D., molar and præmolar teeth are developed, the upper jaw possessing no incisor or canine teeth. The lower jaw possessed two large tusks formed by the lower incisor teeth, these tusks being bent *downwards* and backwards, instead of upwards as in living elephants. These animals must have attained a very large size, and probably used their tusks for grubbing up the roots of the aquatic plants upon which they fed.

Dinotherium.

Di′ocesan Courts. See CONSISTORY and COMMISSARY.

Di′ocese (Fr. from Gr. *dioikēsis*, 'administration') is the territory of a bishop's ecclesiastical jurisdiction. England is divided ecclesiastically into two provinces—Canterbury and York—each of which is subdivided into dioceses; each D. is subdivided into archdeaconries, and each archdeaconry into parishes. Formerly there were in Scotland the Archbishop of St. Andrews, entitled *The Primate of All Scotland*, and the Archbishop of Glasgow, entitled *The Primate of Scotland*. Under them were twelve bishops, who each had a D. Scotland is now ecclesiastically divided into presbyteries. See PRESBYTERY. The largest diocese in connection with the Church of England, and, probably, the largest in the world, is that over which the Right Rev. W. H. Stirling presides. It consists of the Falkland Islands and all S. America, except British Guiana, and therefore covers 7,115,511 sq. miles. The diocese of Mackenzie River covers 600,000 sq. miles, but the number of persons connected with the Church of England does not exceed 1000, while that of N. China is said to extend over 498,433 sq. miles, and that of Saskatchewan and Calgary reaches 300,000 sq. miles.

Diocletia′nus, Vale′rius, was born near Salona, in

Dalmatia, A.D. 245. He was of humble origin, but having entered the army, he served with distinction, and rose to high command under Probus, Aurelian, and Carus. In 284, after the murder of Numerianus, the troops assembled at Chalcedon and unanimously invested D. with the supreme power. His first act was to slay with his own hands Aper, captain of the guard, who was believed by the soldiers to be guilty of the late Emperor's death. The death of Carinus, the surviving colleague of Numerianus, in the hour of victory, and by the hands of his own officers, left D. undisputed master of the situation, and he used his victory with singular moderation. His reign is remarkable for the changes effected by him on the form and constitution of the sovereignty, and by the substitution of the dress, manners, and court style of Persia for those of Rome, revolutions which were intended to provide for the defence of the empire and for the security of the Emperor. In 286 D. assumed as colleague Maximianus Herculius; and, since the dangers that threatened the Roman dominions were increasing alike in Europe, Asia, and Africa, a further partition of authority was made. In 292 the two Augusti, D. and Maximianus, assumed as subordinate colleagues, under the title of Cæsars, Constantius Chlorus and Galerius. The empire was divided among the four potentates, and their efforts to re-establish it were crowned with success. Maximianus routed the Mauritanians, Constantius secured Britain, D. subdued Egypt, and Galerius triumphed in the East. These splendid victories were celebrated at Rome in the twentieth year of the reign of D. by a magnificent triumph, which was memorable as being the last ever witnessed in that city. In 305 D., now exhausted by anxiety and toil, abdicated the throne, and after eight years' retirement near Salona, died in 313. In 303 D. stained his name by authorising the last and fiercest of the ten great persecutions inflicted on the Christians by the Roman Emperors. See Mason's *Persecution of D.*

Dioda'ti, Giovanni, a Calvinistic theologian, was born probably at Lucca, 6th June, 1576. While D. was still a child, his family emigrated to Geneva on account of their Protestant opinions. Such was his precocity, that at the age of twenty-one he was appointed a Professor of Hebrew. Distinguished as a staunch reformer and an eloquent preacher, he became, in 1608, a pastor of the Reformed Church, and in 1609 a Professor of Theology. He played an important part in drawing up the articles of the Synod of Dort, where he represented the Genevan Church. He died at Geneva in 1649. D., who was the author of several theological works, translated the Bible into Italian (1607) and into French (1614).—His nephew, **Charles D.** (died 1638), was a schoolfellow and beloved friend of John Milton, who lamented his untimely death in one of his most exquisite poems, the *Epitaphium Damonis*. See Masson's *Milton* (vol. i.).

Di'odon, a genus of *Teleostean* (q.v.) fishes, belonging to the group *Plectognathi* (q.v.), and including forms popularly known as Globe-Fishes, Sea-Porcupines, and the like. They belong to the division of *Gymnodont* ('naked-toothed') fishes, a name applied to them from the projecting nature of the jaws, which appear in the front of the mouth, covered with shining ivory. The name D. itself ('double-toothed') is, in fact, derived from the apparently tooth-like form of the jaws. The nearly-allied genus *Tetraodon* (q.v.) has the jaws divided, so as to present the appearance of four teeth. Of the diodons, the *D. pilosus*, or hairy urchin-fish, and the *D. hystrix*, are familiar species. These fishes possess the power of inflating their bodies with air to a considerable extent; and their appearance when distended, together with the formidable array of spines with which their skin is provided, is very curious and imposing. This power of inflation serves apparently as a means of defence. The *D. hystrix* may attain the length of 12 or 14 inches, and with neighbouring species occurs chiefly in warm seas.

Diodo'rus Siculus, born at Agrium, in Sicily, was a contemporary of Cæsar and Augustus. He was the author of a universal history from the earliest times down to Julius Cæsar's Gallic wars, and in the preparation of this work he spent thirty years. It consisted of forty books, of which fifteen alone are extant, viz., books i.-v. and xi.-xx. It was called by the author the *Bibliotheca*, or *Library*, and was written in a lucid style; but its confusion and contradictions are so great as to deprive it of nearly all historical value. The best modern edition is that of Dindorf (Leipz. 1828-31).

Diœ'cious (lit. 'two habitations') is a term used in botany to express the fact of a plant having the flowers containing the stamens on one individual of the species, while those with the pistil are on another. Willows are common examples, hemp and the date-palm are less familiar. *Diœciously-hermaphrodite* plants are those in which the flowers are Hermaphrodite (q.v.), but yet in none of which both the stamens and pistils are perfect. In one flower the stamens may be perfect and the pistils imperfect, and *vice versâ*.

Diog'enes the Cynic, born at Sinope, in Pontus, B.C. 412, went early in life to Athens, where he became one of the few pupils of Antisthenes, the founder of the sect of the Cynics. The youth of D. had been spent in dissolute indulgence, but his character now changed, and he became emphatically an austere man, wearing coarse clothes, living on plain food, sleeping on the bare ground, and, finally, if the common story be true (although probably it is not), residing in a tub. At Athens D. was noted for his free and pungent raillery, and for his indiscriminate ridicule of all engaged in the pursuit of literature, art, or science. A ship in which he was sailing to Ægina was taken by pirates, and D. was carried to Crete, where he was sold to Xeniades of Corinth, whose 'ruler' he speedily became, and with whom he resided till his death, at the age of ninety, B.C. 323. In a well-known interview with Alexander the Great, which commenced by the king's announcing, 'I am Alexander the Great,' D. replied, 'And I am Diogenes the Cynic.' To the king's further inquiry whether he could serve him in any way, D. answered, 'Yes; you can stand out of the sunshine.' Alexander is reported to have said: 'If I were not Alexander, I should wish to be Diogenes.' The philosophy of D. inculcated the abnegation, so far as practicable, of all sensual gratifications.

Diogenes Laer'tius, a philosopher of Laërte in Cilicia, whence his surname, wrote a *History of the Greek Philosophers* in ten books. The work is valuable for the information, anecdotes, and quotations which it contains, but is utterly destitute of plan, precision, and critical ability. The period of D. is uncertain, being by some assigned to the 2nd, by others to the 3rd C. A.D. The first complete edition of the *Lives* is that of Basel (1533); the best modern edition is that by Hübner (Leipz. 1828-31).

Di'omede Islands, three in number (Fairway, Crusenstern, and Ratamanow), are situated in Behring's Strait, between East Cape and Cape Prince of Wales, and form, as it were, the fragmentary links of a chain which had once connected the continents of America and Asia. They are uninhabited and of small size.

Diome'des, in Greek legend, the son of Tydeus and Deïpyle, and successor of Adrastus in the kingdom of Argos, was one of the *Epigoni* who took Thebes. In the Trojan war he distinguished himself beyond all the Greeks except Achilles. He went to Troy with eighty ships, and under the protection of Athene exhibited matchless prowess, vanquishing in single combat Hector and Æneas, and wounding even Venus and Mars. With Ulysses he took the Palladium from Troy, slew Rhesus, and bore away his steeds. At the funeral games of Patroclus he won the chariot race, and overcame the Telemonian Ajax with the spear. On the conclusion of the war he returned to Argos, only to learn that his wife Ægialeia had been unfaithful in his absence. In wrath and disgust he went to Ætolia, but again setting out for Argos, was driven by a storm to Daunia in Italy. He there married Euippe, daughter of Daunus, assisted the Trojans against Turnus, and founded a number of cities. He died at an advanced age—some say by the hand of

Daunus—and was buried in one of the islands off Cape Garganus.

Dionæ'a. In the Southern States of America, and more particularly about Wilmington, in S. Carolina, is found the most remarkable *D. muscipula*—familiarly known as Venus' fly-trap. Every leaf bears at its summit an appendage which is probably the true blade, while what seems the leaf is only an expanded winged petiole. A mid rib divides this appendage into two equal parts, on the upper surface of which are three or four hairs, and along their margins are also rows of long closely-set hairs and bristles. On an insect alighting on the blade so as to touch the hairs, the two sides close so as to crush the insect to death, while at the same time a fluid is exuded. The researches of Darwin and others leave little doubt that this fluid acts as a digester, and that the substance of the fly or other animal matter is absorbed into the substance of the plant, and in some way assists in its nutrition. Not less remarkable is the fact discovered by Burdon-Sanderson, that this closing of the leaf of D. is accompanied with electrical phenomena, analogous in their nature with those which occur when nervous or muscular actions are induced in animals. See Darwin on *Carnivorous Plants;* Tate, *Proc. of Nat. Hist. Sect. of Midland Institute;* Thos. Balfour, *Trans. Bot. Soc. Edin.*

Di'on Cass'ius Cocceia'nus, a celebrated Greek writer and historian, was born at Nicæa, in Bithynia, A.D. 155. After his father's death (A.D. 180) he repaired to Rome, and under a succession of emperors attained the highest official positions. His greatest work is a *History of Rome* from the time of Æneas to that of Alexander Severus, in eighty books, of which only eighteen (36th-54th) with fragments of others are extant. Of some of the books there are abridgments by Xiphilinus and others. D. spent ten years in collecting materials for this work, and twelve more in its composition. In critical acumen, grasp, and vigour, he is far behind Thucydides, whom he took as his model; but his history is exhaustive, honest, and notwithstanding a rhetorical tinge and peculiarities of style and language, eminently valuable. Besides his history, D. wrote a book on *Dreams and Prodigies*, now lost. He died at his native Nicæa. The date of his decease is not known. The best edition of his works is that of Sturz (Leipz. 1824-43).

Di'on Chrysos'tomus ('the Golden-Mouthed'), also called *Cocceianus*, a surname derived from the Emperor Cocceius Nerva, whose favour and friendship he enjoyed, was born at Prusa, in Bithynia, about the middle of the 1st c. A.D. He improved an excellent education by foreign travel. Though confining himself to no particular sect or school, he had a preference for the Stoic and Platonic systems. Being looked on with suspicion at home, he went to Rome, from which, on account of Domitian's hatred, he was compelled to flee. After visiting Thrace, Mysia, Scythia, &c., he returned on the murder of Domitian, A.D. 96, and was honourably received by Nerva, of whose claims to the purple he was an enthusiastic advocate. Trajan, Nerva's successor, esteemed him so highly that he allowed him to ride with him in his golden chariot. D. died at Rome, A.D. 117. As a man he was beloved and esteemed, and as an orator universally admired. Of his works, eighty complete orations, and fragments of fifteen, on a vast variety of subjects, remain to attest his eminence as a rhetorician and as a writer of pure Attic Greek. His chaste style and brilliant oratorical powers won the golden opinion of Niebuhr. The critical edition of his works by Reiske (Leipz. 1784) is still considered the best.

Dionys'ius the Areop'agite was a member of the Areopagus at Athens, who, according to Acts xvii., was converted by the Apostle Paul, which is all that is said of him in the New Testament. The historian Eusebius relates that Dionysius, Bishop of Corinth, wrote an epistle to the Athenians, in which he mentions D. the A., St. Paul's convert, as the first Bishop of Athens. He is chiefly famous on account of certain writings, probably belonging to the end of the 5th c., which were forged under his name, and first appeared in the Monothelite controversy, about 523. The object of the writer, who has been called the father of mysticism in the Christian Church, was to show that the real doctrines of Christianity were identical with those of his own philosophy—Neo-Platonism; the substance of his system being that the universe is an efflux of the life of God. The writings, the titles of which are *The Celestial Hierarchy, The Terrestrial Hierarchy, Mystical Theology*, and *Twelve Epistles*, had an unbounded influence in the Greek Church from the first; and when translated into Latin by Scotus Erigena, helped greatly to develop the tendency to Pantheistic mysticism which afterwards prevailed in the Western Church. See Neander's *Kirchengeschichte*, and Hodge's *Systematic Theology*.

Dionysius the Elder, tyrant of Syracuse, was born in 431 or 430 B.C. He commenced life as a clerk in a public office, but early took part in the political affairs of Syracuse. In 406 he secured the deposition of the commanders who had failed in the conduct of the Carthaginian War, and was himself one of those appointed in their stead. He next succeeded in obtaining by intrigue the removal of his colleagues, and became general autocrator in 405. D. confirmed his power by ingratiating himself both with the troops and with the populace, subdued partly by firmness and partly by good fortune several revolts against his authority, and successfully attacked the Chalcidian cities of Sicily. In 397, after extensive preparations, he declared war against Carthage. In the first campaign he encountered no opposition, and took Motya, an important stronghold, but in the following year Himilco, with a great armament, totally defeated the Syracusan fleet, and compelled D. to shut himself up within the walls of Syracuse. A pestilence, however, broke out among the Carthaginians, and D. was thus enabled to attack them suddenly and successfully. The Carthaginians renewed the war in 393 and 392, but on both occasions were defeated by D., and peace was then concluded. Through his allies, the Locrians, D. obtained extensive influence throughout the S. of Italy, and during the remaining twenty years of his tyranny he embraced every opportunity of maintaining and increasing his power. He died in 367. Strange as it may seem in the case of so vigorous and unscrupulous a tyrant, D. devoted himself assiduously to poetry, and one of his dramas carried off the first prize at Athens. He also courted the society of men distinguished in literature and philosophy.

Dionysius the Younger, tyrant of Syracuse, was the son of the preceding, by Doris of Locri, and at the age of thirty succeeded his father, B.C. 367. D. had never been permitted to take part in public affairs, and being encouraged in vicious excesses by Philistus the historian, became unpopular with the Syracusans, whom he further alienated by the banishment of Dion. On the return of Dion, the Syracusans revolted against D., who repaired to Locri, which he ruled with the utmost cruelty for several years. He recovered Syracuse by treachery ten years after his expulsion, but was compelled to yield to Timoleon in 343. He spent the remainder of his life at Corinth in degradation and destitution.

Dionysius of Halicarnassus flourished in the 1st c. B.C., his death having occurred soon after 7 B.C. He went to Italy (B.C. 29), and spent twenty-two years at Rome in studying the Latin language and literature. His rhetorical and critical treatises—such as his *Ars Rhetorica* and his criticisms on the Greek orators—are of great value. His chief work is his *Archæologia*, or Roman history, in twenty books, of which only the first nine have reached us complete. This work contained the history of Rome from the earliest times to the year B.C. 264, and discussed fully all that relates to the Roman constitution, religion, history, and antiquities.

Dionysius Thrax, or the Thracian, was a celebrated Greek grammarian, who taught at Rome about 80 B.C. He is remembered for the merit of his grammatical works, and for his explanations and criticism of Homer. His grammatical treatise was used in schools for many centuries.

Dionysius, surnamed **Periege'tes,** from his being the author of a *periēgēsis* (Gr. 'geographical description of the earth') in Greek hexameters, was a native of Africa, and lived probably in the latter part of the 3rd or beginning of the 4th c. His work, which is still extant, is written tersely, and was translated into Latin by Rufus Festus Avienus, and also by the grammarian Priscian. There still exist a commentary upon it by Eustathius, and a Greek paraphrase and Scholia. The *editio princeps* appeared at Ferrara in 1512, with a Latin translation. It was also printed at Venice by A. Manutius in 1513, but the best edition is that of G. Bernhardy (Leipz. 1828).

Diony'sos. See BACCHUS.

Diophan'tine Anal'ysis, a branch of algebra which treats of the solution of undeterminate questions, such as: to find three commensurable numbers whose squares are in arithmetical progression. The name is derived from Diophantus (q.v.), who solved a great many questions of this kind.

Diophan'tus, a Greek algebraist, who flourished at Alexandria probably about the 4th or 5th c. of the Christian era. Montucla, after Abulpharagius, places him at A.D. 365; but the date is of little consequence except with reference to the question whether he obtained his algebra from the Hindus, or is to be regarded as the sole inventor of his methods. From an epitaph in Greek verse, discovered by Bachet, we gather that he married when thirty-three years old, that his son, born five years after the marriage, died at the age of forty-two, four years before himself, and that D. therefore lived eighty-four years. The information is given in the form of an algebraic problem. Of the thirteen books of his *Arithmetica*, only six are extant. There is also one other book, *De Multangulis Numeris.* The first printed edition was in Latin, by Xylander (Basel, 1575); Bachet de Meziriac published the original Greek, with Latin version and valuable notes (Paris 1621); but the best is by Fermat (Toulouse, 1670). Miss Abigail Baruch Lousada left a complete English translation, which has unfortunately never been published.

Diop'sis, or **Stalk-Eyed Fly,** a genus of Diptera (q.v.) or Flies, belonging to the family *Muscidæ*, and distinguished by the elongation of the sides of the head to form stalks for the eyes. *Diopsis thoracicus* is a familiar species of this group, the representatives of which mostly occur in warm climates.

Dioscorea'ceæ, the Yam order, a natural order of Monocotyledonous plants, belonging to Lindley's sub-class *Dictyogenæ*, chiefly tropical plants. *Tamus communis*, the Black Bryony (q.v.), is the only British representative. There are about 160 species and seven genera. *Tamus*, *Testudinaria*, and *Dioscorea* are examples. The Yams (q.v.) are among the most important plants of the order. The Elephant's Food (q.v.) is another.

Dioscor'ides, the author of thirty-nine epigrams in the Greek Anthology, is thought to have lived in Egypt in the time of Ptolemy Euergetes. His epigrams, chiefly on the ancient poets, were included in Meleager's *Garland*.

Dioscorides, the name of several physicians and medical writers of antiquity.—1. **D. Pedacius** or **Pedanius** of Anazarba, in Cilicia, flourished in the 1st or 2nd c. He wrote a treatise on *Materia Medica*, a work of immense research, and for many ages a standard authority, also a treatise on *Poisons* and another on *Venomous Animals*. Some minor works have been ascribed to him, but on insufficient grounds. His *De Materiâ Medicâ* has been translated into Italian, French, German, and Spanish, and an Arabian version of it in MS. is to be found in several European libraries. The first Greek edition was published by Aldus Manutius (Ven. 1499). The best edition is still that of Saracenus (Frankf. 1598).—2. **D. Phacas,** so called from the moles or freckles on his face, lived in the 2nd or 1st c. B.C. His medical works, of which several are mentioned by ancient writers, have perished.—3. A grammarian and probably a physician at Rome in the time of Hadrian, who devoted his attention to medical literature, and edited an edition of the works of Hippocrates.

Dip and Strike are terms used in geology. The 'dip' is the downward inclination of beds with reference to the horizontal plane, and requires for its determination two numbers—viz., the inclination of the beds to the horizontal, and the point of the compass towards which they slope. The 'strike' is the line drawn at right angles to the dip, corresponding to the outcrop when the surface is level.

Diphthe'ria (from Gr. *diphthera*, any leathery material), the name given to a contagious and epidemic disease of great severity, affecting chiefly the throat and neighbouring parts. It is essentially a blood disease, characterised by the formation of a false membrane on the back part of the mouth and throat. D. generally commences with headache, sickness, often diarrhœa and chilliness, and is soon followed by great prostration and the formation of dirty whitish patches on the back of the mouth, at first small, but soon coalescing so as to form a membrane whose appearance has been compared to that of 'damp, dirty, washed leather.' When this membrane begins to peel off there is a most offensive odour in the breath, and frequently the patient is unable to swallow. D. is a very fatal disease, and generally in a short time. The treatment consists in supporting the patient's strength, giving iron tonics internally, and applying Condy's fluid, or other disinfectant to the throat. Recovery is often followed by paralysis of some of the muscles. The patient should be kept warm in bed, and the air in the room should be hot and moist.

Diph'thong (Gr. *di*, 'twice,' and *phthongos*, 'a sound') is the blending of two vowel sounds into one syllable, *e.g.*, *ou* in 'house,' *ai* in 'aisle,' and *oi* in 'oil.' The distinction sometimes made between a D. to the eye and a D. to the ear is incorrect. There can be no D. which is not a D. to the ear.

Diph'yes, a beautiful genus of oceanic *Hydrozoa* (q.v.), or Zoophytes, belonging to the order *Calycophoridæ*, and consisting of a delicate thread-like *cænosarc* or connecting medium, bearing the various polypites, or individual animals of which this compound organism is composed. At its proximal end the cœnosarc expands to form two mitre-shaped *Nectocalyces*, or 'swimming-bells,' by means of which the organism is supported in the water. Each of the polypites is protected by a glassy 'bract,' or hydrophyllium. *D. appendiculata* is a familiar species of this genus of *Calycophoridæ*, and occurs in the Mediterranean and warm seas.

Diplacan'thus, a genus of extinct Ganoid fishes, of which *D. gracilis* is a familiar example. This genus belongs to the family *Acanthodidæ*, the members of which possessed small scales, and a spine implanted in the flesh in front of each fin. No operculum was developed. D. had two dorsal fins, and is confined solely to Devonian rocks. The tail was heterocircal.

Dip'loe, the cellular bony structure between the two plates or tables forming the flat bones of the skull. These cells are filled with a reddish pulpy substance, similar, when examined microscopically, to the marrow of bones.

Diplogloss'us, a genus of *Lacertilia*, or Lizards, found in Cuba. The colour of the best-known species (*D. sagræ*) is grey with bronze tints, whilst a black streak marks each side. The D. is an active little creature, and inhabits dry localities.

Diplograp'sus, a genus of *Graptolites* (q.v.), an extinct group of Hydrozoa (q.v.) or Zoophytes. This genus, of which *D. pristis* is a familiar species, ranges in Britain and N. America from the Upper Cambrian strata to the upper strata of the Lower Silurian rocks; but in Bohemia, D. occurs in Upper Silurian rocks also.

Diplo'ma (Gr. *diploō*, 'I double or fold') is the writing given by universities and other learned bodies in proof of the person named in it having been granted a degree or license for professional practice.

Diplom'acy is the art of managing international affairs by means of ambassadors and other officers accredited by one state to another. (See AMBASSADOR.) A diplomatist requires to be a man of great tact and good temper, ready in all social ceremonial to conform to the manners and customs of the people among whom he is resident. Infinite tact is required in matters involving questions of precedence. Precedence is conceded to crowned heads, and a head crowned is held to maintain its dignity under all reverses. In making a treaty, the usual practice is to make as many copies as there are parties to it. Each state gets a copy with precedence to its own name. In other matters the precedence of the various powers of Europe and of the United States of America, from time to time, is by what is called the *Alternat*, which is determined by lot. Maritime international ceremonial is arranged by compact. Salaries, allowances, and pensions in the Diplomatic service are paid under the authority of statute 32 and 33 Vict. c. 43. See SALUTE.

Diplomat'ics is the art of reading ancient writings, combined with scientific knowledge of their circumstances. The term has been superseded by the more descriptive one of Palæography (q.v.).

Diplop'terus, a genus of fossil Ganoid (q.v.) fishes, included in the group *Crossopterygidæ*. This form, which has representatives in the Devonian and Carboniferous rocks, had two dorsal fins, rhomboidal and smooth scales, and lobate fins. Like all *Crossopterygidæ* ('fringe-finned'), the species of D. had the paired fins each in the form of a central lobe covered with scales, and having the fin-rays attached to its sides.

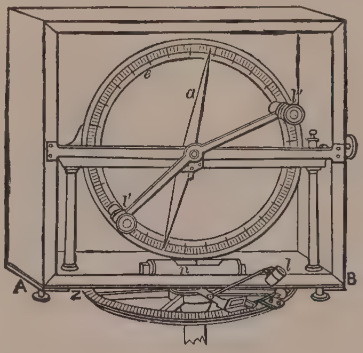
Dip'noi, an important order of the class of fishes represented by the *Lepidosirens* (q.v.), or Mud-Fishes of Africa and S. America, and by the *Ceratodus* or *Barramunda* (q.v.) of Australia rivers. Probably Günther's idea that the D. should be viewed as a subdivision of the Ganoid fishes is correct and trustworthy. As a distinct order, the D. are recognised by possessing fish-like bodies; the skull has distinct cranial bones and a lower jaw, but the spine is represented by a *Notochord* (q.v.), and no bony spinal elements exist. Small *cycloid* scales cover the body. The pectoral and ventral fins (in *Lepidosiren*) are filamentous in character, and in *Ceratodus* consist each of a central rod with lateral branches. The tail-fin is median and vertical. The heart is three-chambered. The breathing is conducted by gills and also by rudimentary lungs, formed by the modified 'Air-Bladder' (q.v.). The nostrils open posteriorly into the throat. In respect of the last three characters, these fishes differ from all others. *Lepidosiren* is said to have external gills like amphibians in its young state.

Dipp'el's Animal Oil. This is a colourless transparent liquid, obtained by repeatedly rectifying the liquid products arising from the destructive distillation of animal matter (bone, horn, &c.). It was first prepared by Dippel, an apothecary living in the 17th c., and was employed by him as a medicine. It is colourless, mobile, and highly refractive, and has a pleasant smell and taste like cinnamon. Exposed to the air, it gradually becomes brown. D.'s A. O. consists of a mixture of a great number of substances, part of which are bases containing nitrogen, part compounds of carbon and hydrogen. It is now prepared as a byproduct in the manufacture of Bone Black (q.v.). It is occasionally employed in medicine as an antispasmodic.

Dipper—Water Ousel.

Dipp'er, or **Water Ousel,** a species of Insessorial birds, belonging to the Dentirostral section of the order and to the Thrush family. The genus to which it belongs is distinguished by the bill being of moderate size, but curved slightly upwards. The opening of the nostrils is of semilunar shape. The wings are rounded, and have their third and fourth quills largest. The tail is short and even. The tarsi are large, the outer toe being longer than the inner one. The D. frequents rapid streams and rivers, and exhibits quick, jerking movements. Its average length is about 7 inches, and its colour brown on the upper parts, a rusty red below, with the throat and breast white. The food consists of insects, crustaceans, and the eggs of fishes. The D. is remarkable as differing so completely in habits from all the other members of its family. It dives with great ease, and can remain below water for some time, keeping itself underneath by the action of its wings. The nest is formed of moss, and has a dome-like shape. The eggs number five, and are coloured white. The D. may produce two or even three broods in a year.

Dipp'ing-Needle is a magnet suspended so as to have as free motion as possible round its centre of inertia in a vertical plane. It is found that such a needle, if not on the magnetic equator, *dips*, or points downwards; and if the plane in which it moves coincide in direction with the magnetic meridian, the needle gives the direction in which the terrestrial magnetic force acts. The magnet is as delicately suspended as possible, and is provided with a vertical graduated circle (marked *e* in the figure) for measuring the amount of the dip, and an azimuth circle (Z) for fixing the vertical circle in the true direction, which is found by means of a declination needle. (See DECLINATION OF THE MAGNETIC NEEDLE.) Since the magnetic axis rarely coincides exactly with the geometrical axis of the magnet, the needle must be reversed—the side which at first faced E. now facing W.—and the mean of the two readings taken as the true reading. Care must be taken not to have any iron or steel adjustments about the instrument, else the results would be rendered valueless. *l*, *l'*, *l'*, are microscopes for reading the angles; and *n* is a spirit-level for securing the horizontality of Z and the perpendicularity of *e*. From observations with such an instrument, Sir J. C. Ross, in 1831, fixed the magnetic pole in Boothia Felix, N. America, near lat. 70° N. and long. 96° W., where he found the dip to be 89° 59′—nearly perpendicular.

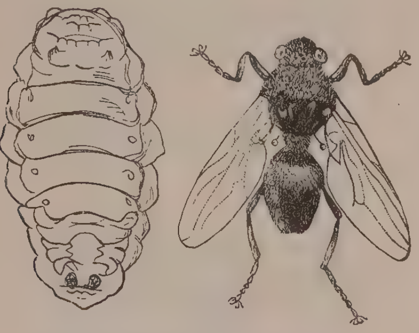


Dipping-Needle.

Dip'sas (from Gr. *dipsa*, 'thirst'), a genus of Colubrine snakes, of which the *D.* or *Eudipsas cynodon* of Asia and the Philippine Islands is an example. The neck and tail are very slender, the head being broad and of triangular shape. The colour is grey, variegated with brown. The ancients believed that this snake was constantly seeking water, hence its name.

Dipsoma'nia (from Gr. *dipsa*, 'thirst,' and *mania*, 'madness'), the name given to an intense craving for intoxicating liquors. So strong is this craving for alcoholic drink in some persons that they will sacrifice everything to obtain it. Of late years, much difference of opinion has been expressed in regard to the question whether D. is insanity or not, some physicians maintaining that it is a kind of madness, others that it is only a kind of wickedness. D. ought to be distinguished from true insanity; but though few physicians would commit dipsomaniacs to a lunatic asylum, most believe that they should be put under restraint, because of their being altogether incapable of taking care of themselves, and also on account of the misery they bring upon their families. D. most frequently occurs among members of families in which there is a hereditary tendency to insanity, and the tendency to the disease is fostered by the habitual use of alcoholic liquors from early periods of life, in many cases even from infancy. See DRUNKENNESS.

Dip'tera (Gr. 'two-winged'), an order of Insects represented by the familiar Flies (q.v.) and other two-winged forms. The D. are included in the Holometabolic group of the insect class, or in that section the members of which undergo a *complete* Metamorphosis (q.v.), and show the three characteristic stages of an active caterpillar or *larva*, a quiescent *pupa* or chrysalis, and a perfect winged and sexual *imago*. The front pair of wings are alone represented in these insects, the place of the absent hinder wings being supplied by a pair of filamentous organs, termed *halteres* or *poisers*, presumed to be serviceable to the insects in balancing them in their flight. The prothorax, or first segment of the chest, is always small, and, along with the other two thoracic segments, is generally fused into a single mass. The head is large, and the eyes are prominent. The mouth is for the most part of suctorial kind (see INSECTS), and the stomach is frequently of compound nature. The legs are usually long, and end in soft spongy bodies, by means of which these insects are enabled to obtain a firm foothold on smooth and perpendicular surfaces. In addition to the compound eyes borne by the head, several *ocelli* or simple eyes may also exist; and the antennæ or feelers are situated on the part of the head between the eyes. The wings may be wanting altogether in some D., and the skin of the larva for the most part forms a pupa case for the Chrysalis. In some flies (such as in *Pupipara*), the young larvæ reside within the body of the mother, and there become pupæ; and in *Cecidomyia* or the Hessian-fly, each larva produces within itself another larva, which latter feeds on the primitive larva and becomes the future fly. See also articles relating to the various kinds of flies, such as CRANE-FLY, HESSIAN-FLY, &c.



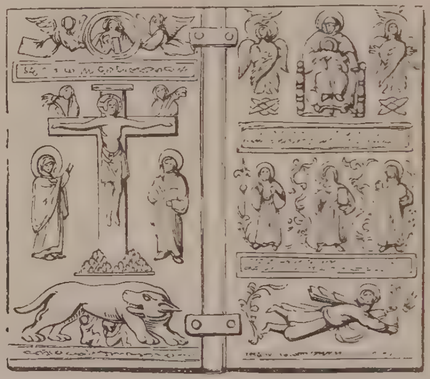
Larva and Imago of the Bot Fly of the Ox.

Diptera'ceæ, or **Dipterocarpa'ceæ,** the Sumatra Camphor order, a natural order of Dicotyledonous trees with resinous juice, natives of the forests of tropical India, with the exception of the genus *Lophira*, which is found in tropical Africa, though by some this genus is made the type of a separate order (*Lophiraceæ*). There are about fifty species and seven genera in the order, all of which owe their peculiarities to the presence of the resinous juice. Wood-oil or Gurgun balsam is yielded by the trunks of *D. lævis* or *turbinatus* of the W. Indies. The oil is used in India for painting, and is employed for much the same purposes as Copaiva (q.v.). *Dryobalanops aromatica* yields Sumatra camphor (see CAMPHOR). *Hopea odorata* of Burma yields a styptic resin. *Shorea* (*Vateria*) *robusta* is the Sal (q.v.) of India, and yields Dhoona pitch. *Vateria indica* yields the oleo-resin known as white Dammar or piny resin, used in India for making candles and as a varnish. Piny tallow or vegetable butter of Canara—a concrete oil—is obtained from the fruit of this plant, and has lately been imported into this country as a local application in rheumatism, &c. (Bentley). See ANIME, COPAL, DAMMAR, and VARNISH-TREE.

Dip'terus, a genus of extinct Ganoid (q.v.) fishes, confined exclusively in their distribution to the Devonian and Old Red Sandstone rocks. Two dorsal fins existed, and the body was covered with smooth overlapping scales. The head had a kind of helmet-covering, and the teeth were conical in form.

Dip'teryx, a genus of Leguminous plants. The seeds of the D. of Guiana, owing to the presence of Coumarine (q.v.), are very pleasantly scented, and under the name of *Tonquin*, *Tonka*, or Itonka beans, are used for perfuming snuff, &c. The nuts of the Eboe D. of the Mosquito Coast are also fragrant, and yield a fatty oil much used for anointing the hair of the natives. The timber is heavy and yellow coloured.

Dip'tych (Gr. *dis*, 'turce,' *ptussein*, 'to fold,' or 'twice-folded'), in classical and post-classical times the name given to two writing tablets fastened together at the back by means of wires, which served for hinges. They were made for the most part of wood, the inner sides of which were covered over with wax, which was written on with the stilus. There was a raised margin round each to prevent the wax of the one tablet rubbing against that of the other. Diptychs were employed especially for public registers. They were small enough to be held in the hand, rarely exceeding eight inches by four. Instead of wood, ivory and metal were sometimes used, and these were often richly carved or chased.



Diptych.

Dip'us. See JERBOA.

Di'rect and Ret'rograde, two astronomical terms, applied to the motion of a planet, according as it appears to move in the zodiac from W. to E. or from E. to W. When it is moving neither way it is said to be *stationary*.

Direc'tion-Co'sines are the cosines of the angles which a given line makes with three rectangular axes given in position. Take any point (x, y, z) upon the line through the origin, whose D.-C. are l, m, n; then if r be the distance of this point from the origin, we have at once $x = lr$, $y = mr$, $z = nr$. Squaring and adding, we obtain $(l^2 + m^2 + n^2) r^2 = x^2 + y^2 + z^2 = r^2$, or $l^2 + m^2 + n^2 = 1$. Again, if there be another line, whose D.-C. are $l'\ m'\ n'$, the angle which it makes with the first is that angle whose cosine $= ll' + mm' + nn'$. These two fundamental formulæ are of great and growing importance in physical investigations.

Direc'tor. In commercial concerns it is usual to have a body of men—commonly about ten or twelve—whose business is to meet at short fixed intervals to consult together about the affairs of the concern, and to advise and assist the manager. The members of this body are called the *Ordinary* Directors. There is commonly another body called the

Extraordinary Directors. These have no business functions, and are chosen as a rule from their social position being supposed to add to the reputation of the joint-stock undertaking. Ordinary Directors being paid officers, it may be held that they are bound to make themselves thoroughly conversant with the affairs of the undertaking; on the other hand, the remuneration is commonly insufficient to make it reasonable to suppose that they can afford time for this, when the concern is extensive and complicated. As trustees they are debarred from making any personal profit from the corporation to which they belong. On the whole, the view of the commercial community seems to be that a D. is entitled to rely on the statements of the manager, unless these be such as ought to excite the suspicion of a man of ordinary business intelligence. But where this is the case, he is not entitled to shut his eyes. He is bound to have the matter of suspicion probed to the root, and, if necessary, to consult the shareholders. Clearly the position must, in certain circumstances, be one of great danger and difficulty. As if disposing of all objection to the plenary responsibility of a D., the general truth is sometimes stated, that there can be no excuse for the neglect of a voluntarily accepted trust. But the question is as to the exact nature of the trust. A D. is not a manager. His function is to advise, not in ordinary circumstances to investigate.

Law Regarding Directors.—The powers of a D. are determined by the special act, if his company has been incorporated by statute, and by certain sections (90-100) in the Companies Clauses Act of 1845; but his powers depend upon section 14 and table A of the Act of 1862, if his company has been incorporated under that statute. A director must vacate his office by the acceptance of any other office of profit in the company, by being concerned in any contract with it, or by bankruptcy; that at the first ordinary meeting after incorporation all the directors must retire from office, and that at the first ordinary meeting in each subsequent year one-third, or the number nearest one-third, must retire; those retiring who have been longest in office. They are reeligible. Directors may delegate their powers to committees. Minutes of business transacted at directors' meetings are to be carefully made, and signed by the chairman. Dividends are only to be paid from profit, and if a dividend is declared when the company is known by the directors to be insolvent, or when payment of the dividend will make it insolvent, they shall be jointly and severally (see JOINT AND SEVERAL) liable for the debts then existing of the company, or which shall be contracted while they remain, respectively, in office. A D. who issues a prospectus calling for subscriptions to his company, becomes liable (under statute 53 and 54 Vict. c. 64) to compensate subscribers for loss, should the prospectus contain an untrue statement, should the loss have arisen therefrom, and should the D. have had no reasonable ground to believe the truth of the statement. Each of his fellow directors in that case becomes also liable to contribute to the damages awarded to the plaintiff subscriber.

By 24 and 25 Vict. c. 96, directors, members, or officers of any body corporate or public company fraudulently appropriating property, or keeping fraudulent accounts, or wilfully destroying or vitiating books, or other writings, or publishing any false statement with intent to deceive, are guilty of a misdemeanour, punishable with penal servitude or imprisonment, according to degree of guilt. See JOINT-STOCK COMPANIES.

Direc′tory was the executive power in the new constitution of the *Thermidoriens* introduced in 1795. It was a council of five persons, who had the conduct of peace and war, the execution of the laws, and the general administration without legislative functions. The D. along with the formation of the Double Council (viz., the Ancients and the Five Hundred) distinguish this Constitution of year 3 from the Girondist Constitution of 1791, the Democratic monarchy of 1792, and the Jacobin Constitution of 1793. The 'decrees of the two-thirds,' by which the Old Convention insisted on modifying the proposal of the eleven Girondist commissioners, led to the 'Day of the Sections' (4th October, 1795), in which Bonaparte destroyed the National Guards in the Rue St. Honoré. Barras and Carnot (who replaced Sieyès) were the most prominent Directors, all of whom were elected by the two Councils. The D. soon became unpopular in spite of Bonaparte's brilliant campaigns. They crushed the Babœuf Conspiracy (1797), and Pichegru and the Royalist party on the 18th Fructidor; but their policy of *bascule*, or seesaw between the Moderates and the Manéze Club in home affairs, their cruel Law of Hostages, and their misunderstandings with Bonaparte, who was the idol of the army, paved the way for the negotiations of Sieyès, which resulted in the Revolution of 18th Brumaire and the Consulate.

Directory for Public Worship of God, one of the works of the Westminster Assembly, drawn up in 1644. George Gillespie, the Scottish commissioner, had a chief hand in framing it. The order of worship prescribed begins with an invocation; a chapter from each Testament is read; and the Lord's Prayer and other set forms are used. Baptism, marriage, and rebuke are to be public; and burial, without ceremony. The General Assembly of the Church of Scotland adopted the D., 3rd February, and the Scottish Parliament ratified it, 6th February, 1645. The D., however, was not recognised at the Revolution Settlement, nor at the Union. The book was the expression of a fond illusion that uniformity of worship could be established, so as to secure the happy unity of the kirks of the three kingdoms. See *A Directory for the Public Worship of God* (Edinb. 1645); Principal Lee's *Hist. of Church of Scotland* (Edinb. 1860); Dr. R. Lee's *Reform of the Church of Scotland* (Edinb. 1864); and *Minutes of Westminster Assembly* (Edinb. 1874).

Direc′trix, in geometry, is a straight or curved line on which depends the description of a curve or surface. A point, whose distances from a given point and straight line bear a constant ratio to each other, describes one of the Conic Sections (q.v.). This straight line is the D. of the curve in question. If a surface be generated by the motion of a line which always rests on other fixed lines, these latter are sometimes called *directrices*, but more frequently *directors*; the moving line is called a *generator*.

Dirk, a Scottish dagger or poniard formerly carried by Highland chieftains; also the name for the short sword worn as a side-arm by midshipmen in the British royal navy.

Dirk Hartog Island is one of several islands forming a breakwater for the extensive inlet of Shark Bay, on the W. coast of Australia. D. H. I. is high, and about 40 miles long by 10 broad. It lies in S. lat. 25° 28′-26° 6′, and E. long. 113°.

Dir′schau (Pol. *Szczevo*), a town of Prussia, on the Vistula, and on the Eastern Railway, 21 miles S.S.E. of Danzig. It has iron and machine works, large mills, a cattle-market, and an active timber trade. The Vistula is here crossed by an immense iron bridge, 2844 feet long and 37 feet high, erected 1850-60.

Dirt-Beds, a name given by geologists to certain deposits embraced by the Portland or Upper Oolite rocks, and more especially in connection with the Purbeck beds of these formations. The name 'D.-B.' is applied to these formations by quarrymen, and denotes old soils in which vegetable matter is thickly interspersed. These beds are in all likelihood old land surfaces formed between strata of marine origin by the intermittent elevation of the latter. Fossil cycads (*Mantellia*) form their chief vegetable remains.

Disabil′ity, in English law, is legal incapacity. It may be absolute, as by Outlawry (q.v.), excommunication, and (formerly) attainder; or it may be partial, as from minority (see AGE) or Coverture (q.v.), or drunkenness, or lunacy. See also CAPACITY, LEGAL.

Disban′ding, in military language, is the breaking up of a battalion or regiment. It generally occurs when peace is proclaimed after war, the officers being placed on half-pay, and the men discharged. But it was resorted to in India to punish the mutiny of the native troops—the first instance being the D. of the 19th regiment of native infantry at Barrackpur on the 1st of March, 1857.

Disbar′ is to degrade a barrister-at-law, or expel him from the bar. The power to D. in England belongs to the Benchers (q.v.) of the four Inns of Court. No barrister who has been disbarred can plead before the courts of law. The person so affected may appeal to the judges.

Disc, or **Disk,** a somewhat vague term in systematic botany, generally applied to any organ 'intervening between the stamens and the ovary,' and may be in the form of a ring or scales. Frequently it consists of metamorphosed stamens forming an inner whorl. Sometimes it is glandular and secretes a honey-like fluid: in this case the older botanists called it the *nectary*.

Disc and **Discob′olus.** See QUOITS.

Discharge′. A verbal obligation may be dissolved by a verbal D., but a written obligation requires a written D.; the rule of law being that the same solemnities required to constitute an obligation are required to extinguish it. A similar expression is used of a prisoner when he is permitted to go free; or of a sheriff when the person under attachment is legally liberated; or of a jury when the court so directs, or when one of their number dies, or when they have returned their verdict or sentence has been pronounced by the court; or of a rule *nisi*, when the order of the court is against its being made absolute.

Dischar′ging, in the navy, is relieving the ship of the commission under which it is placed in active service, the officers on full pay and the crew on the wages list. The fact that officers and crew can only serve on board ship puts them on a different footing from the officers and men in a regiment. Soldiers are on permanent pay during peace and war, sailors only while the ship is in commission. D. leaves the men off the wages list, and the officers mostly on half pay.

Dis′cina, a typical genus of Brachiopodous mollusca, represented by living forms, and also by fossil species, which begin in the Silurian period. The family *Discinidæ* is recognised by the shells being attached to fixed objects by a fleshy stalk or peduncle, which passes through the ventral valve. The characteristic arms of the *Brachiopoda* (q.v.) are fleshy in *Discinidæ*, and the valves or halves of the shell are not articulated by any distinct hinge. The shell in D. is circular, its upper valve being limpet-shaped, the lower valve being flat or convex. *D. circe*, and *D. pelopæa* are well-known fossil species from Silurian rocks.

Dis′cipline, The First Book of, or **Policie,** an important landmark in the reformation of the Scottish Church. After the overthrow of Popery and the adoption of the ancient Confession, in 1560, a commission, dated 29th April of that year, was given to John Knox and five others to draw up a B. of D. According to this B. of D., the minister was to be admitted with consent of the people and the approval of the ministers; ordination by imposition of hands was disapproved of; readers were to be provided for destitute places; the country was to be divided into ten districts with superintendents for planting churches, appointing ministers, and visiting vacant places; elders and deacons were to be elected annually; every church was to have a schoolmaster; and the ancient patrimony of the Church was to be devoted to the threefold support of the ministry, education, and the poor. This book was dated 20th May, 1560; and on 27th January, 1561, it was subscribed in secret council by twenty-six noblemen and gentlemen, but it was never ratified by Parliament. It failed to become law because those who held the patrimony of the Church did not regard Knox's 'devout imagination' with favour. See *The First and Second Booke of D.* (Edinb. 1621); M'Crie's *Life of Knox* (Edinb. 1812); *Knox's Hist. Ref.* (Laing's ed., Edinb. 1848); and Cunningham's *Church Hist. Scotland* (Edinb. 1859).—**The Second B. of D.** was the result of an effort to make the Church of Scotland more strictly Presbyterian. The great reformer, Andrew Melville, and some others, were appointed, 24th April, 1576, by the General Assembly, a committee to perfect the regulations of the Church. As the fruit of their labours they presented the Second B. of D., which was sanctioned by the General Assembly, 24th April, 1578. This book set up a more elaborate form of Presbyterianism, and made a more complete distinction between civil and ecclesiastical jurisdiction. Patronage was abolished, also the titles of abbots, and the superiority of bishops; ministers were to be elected by judgment of eldership and consent of the people; ordination was to be by laying on of hands; and the various Church courts were appointed. The Second B. of D. was registered among the Acts of the Church by the Assembly, April, 1581; but it never was ratified by Parliament, and never became a binding law of the Church. See M'Crie's *Life of Melville* (Edinb. 1824), and Bryce's *Ten Years of the Church of Scotland* (Edinb. 1850).

Disclaim′er, in English law, a plea of denial or of renunciation. A D. may be made by a trustee, an executor, a devisee, and in respect of a patent.

Disclama′tion, in Scotch law, signified the disavowal by a vassal of some one who was, or claimed to be, his Superior (q.v.). The penalty of D. on frivolous grounds was forfeiture of the Fee (q.v.). But any reasonable excuse exempted the vassal from the penalty. D. is now obsolete.

Discob′oli, a term formerly applied by Cuvier to certain genera of fishes, exemplified by the Lump-Suckers (q.v.), &c., with sucking-disks formed by the united ventral fins on the lower surface of their bodies. The term is not now used, lump-suckers being included in the *Gobiidæ* or Gobies (q.v.).

Discoph′ora (Gr. 'disk-bearers'), a name given in modern zoology to a subclass of Hydrozoa (q.v.), represented by the true *Medusidæ* (q.v.), or sea-blubbers and jelly-fishes. These organisms may be defined as possessing a free, oceanic body (*hydrosoma*), consisting of a single *nectocalyx*, or swimming bell, from the roof of which a single zoöid or *polypite* hangs. A system of canals run through the swimming-bell. Many forms, at one time regarded as *Medusæ*, are now known to be merely the free-swimming reproductive bodies of zoophytes.

Dis′cord, in music, an interval producing Dissonance (q.v.). Strictly speaking, an interval is said to be *dissonant* if the notes of which it consists have any musical relation to each other, and *discordant* if they have none.

Dis′count is the deduction made from a debt paid before it is due. To discount a Bill of Exchange (q.v.), or a draft, means to exchange it under deduction of a percentage on account of its not having reached maturity. When this is done, it is the custom of money-dealers to subtract the interest accruing during the time between the date of their purchase and the date at which the bill or draft falls due. This causes the real charge to be greater than the nominal one, the interest being received by the lender before it is due. Thus, if you discount a bill of £100 due three months hence at 5 per cent., you will receive £100 less $\frac{1}{4}$ of £5—that is, £98 15s.; but if you then lend your £98 15s. for three months at 5 per cent., it is plain that the interest accruing during the period cannot be so much as the interest on £100 which has been deducted. In a true calculation of D., therefore, the question to be answered is—What sum will, at the given rate of interest, at the end of the given period, amount to the value of the deferred payment? The rule for ascertaining this is—Find the amount of £1 in the given time, and by that divide the given sum, and the quotient is the answer. Thus, What is the value of £100 to be received three months hence, interest at 5 per cent.? The interest of £1 for a year will be 1s., and for three months 3d. = £0·0125. The amount of £1, therefore, for the period is £1·0125; and the value of £100 three months hence is $= \frac{100}{1\cdot0125}$ = £98·765 = £98 15 $3\frac{1}{2}$

The interest on which for three months at 5 per cent. is . . . . . . 1 4 $8\frac{1}{2}$

£100 0 0

To find the amount of a given sum improved at compound interest at any rate, and for any number of years, the rule is —Multiply the amount of £1 for a year so often into itself as there are years proposed and the last product multiplied by the principal gives the answer. Thus—What will £10 amount to in three years at 5 per cent. compound interest? —1·05 × 1·05 × 1·05 = 1·157625 × 10 £11·57625 = £11 11s. 5d.

By D. is also understood the depreciation of any share or stock below the original value. Thus, when a bank share on which £100 has been paid will only bring £90 in the market, it is said to be at a D. of 10 per cent. The converse position is called being at a *premium*.

The rate of D. for bills of exchange in the United Kingdom, in ordinary times, ranges from 3 to 5 per cent. on bills of three or four months' currency. When it goes above 5 per cent. the fact indicates commercial disturbance. In recent times the rate has more than once risen as high as 10 per cent. The provincial banks, in their D. rates, follow the lead of the Bank of England. See INTEREST.

Discre'tion. According to English law, if an agent or trustee is instructed to act according to his D., he must act according to law and reason. The law of Scotland recognises the same rule.

Dis'cus proligerus, a small heap of granular cells found within a graafian vesicle, and on which the ovum rests.

Discus'sion is a technical term of Scotch law, signifying a demand for payment against a principal debtor, and by denouncing the debtor and registering the execution of an unexpired charge, by poinding his moveable estate, or by arrestment and furthcoming, and by adjudicating his heritage (see Erskine's *Principles, &c.*, by Rankine)—or against heirs. Formerly cautioners (see CAUTION), unless bound jointly and severally (see JOINT AND SEVERAL) with the principal debtor, could insist on the creditor enforcing his demand against the principal debtor in the first place, or to *discuss* him, as it was called. By the Mercantile Law Amendment Act, cautioners can now only have this right by stipulation.

Discussion of Heirs.—All heirs who have incurred a representation of their ancestor are liable for his debts; but they may insist on being sued in a certain order. Where a special heir is burdened with a debt, the creditor must *discuss* that heir before he can insist against the heir-at-law. But where the debtor does not charge any special heir with payment of a general obligation, the D. must be in legal order. See REPRESENTATION, TITLE, PASSIVE.

Disdi'aclasts, minute doubly-refracting molecules, which, according to Brücke, form part of the ultimate structure of muscle. See MUSCLE.

Disease' (lit. the opposite of *ease*), a medical term for that condition of the system in which there is a deviation from health. D. may or may not be accompanied with pain, but there is always a departure from the normal standard of health. D. may be local or general, structural or functional, curable or incurable, the latter always ending in death. The classification of D. is called Nosology (q.v.), and the changes in structure caused by it form the subject of Pathology (q.v.).

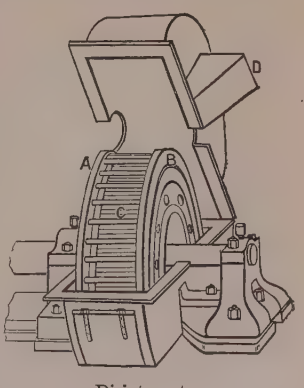
Disease, Acts Respecting. The Public Health Act of 1875, by which all the previous acts were consolidated or amended, now provides [except in London, which is dealt with in the Public Health (London) Act of 1891] for the division of England into urban sanitary and rural sanitary districts, over each of which are appointed by the acts various bodies of authority. Sewage, scavenging, water supply, infectious diseases, and hospitals, offensive trades, markets and slaughter houses, &c., are placed under the supervision and control of these bodies. The Contagious Diseases (Animals) Acts have been numerous and diversified. The chief statutes relating to the prevention of the spread of disease by killing the affected animals and by restricting the transfer of others suspected or companions of the diseased ones, and relating to other matters in connection with the (cattle, &c.) trade, &c., are the Acts of 1878, 1884, 1886, and 1890, to which the reader is referred for further information.

Diseases of Plants may be referred to four cases—(1) Parasitic fungi or other plants attacking the tubers; (2) Insects causing galls, fissures, wounds, &c.; (3) Poisonous gases in the air or soil, or any poisonous material so placed as to affect nutrition; (4) Atmospheric or other causes, 'so affecting the plants as to alter the conditions of nutrition by giving a redundancy or deficiency of air, light, moisture, warmth.' The principal D. are noticed in this work under their own names.

Dishon'our, a term of mercantile law, denoting the refusal of the drawee in a bill of exchange, promissory note, or cheque to accept or pay it. If a bill be presented and acceptance refused, or a qualified acceptance only offered, prompt notice must be given to all the parties to whom the holder intends to apply for payment. In case of a foreign bill, notice should be sent by first post or earliest opportunity. Generally, in both foreign and inland bills, notice is given next day to the immediate endorser, who is allowed a day to give notice to those who are liable to him. Delay in giving notice frees the drawer and endorsers from liability. No particular form of notice is required, but it is well to send a copy of the bill. A person having taken a cheque in payment of a debt cannot sue for the debt until the cheque has been dishonoured; but a creditor is not bound to accept a cheque. If the holder of a cheque accept payment in bank-notes, and the bank fail, the holder has no recourse against the drawer of the cheque. See BILL OF EXCHANGE, CHEQUE.

Disinfec'tants are substances which by a chemical action destroy contagious matters or effluvia from decaying animal and vegetable substances. Chlorine (q.v.) is one of the best and most powerful D. It decomposes the compounds of hydrogen, and thereby substitutes a harmless for a hurtful compound. Bleaching-powder depends for its action as a disinfectant on the chlorine it contains, as well as chlorate of soda. By adding an acid to these substances free chlorine is given off more freely. Charcoal, permanganate of potash, or Condy's fluid, chloride of zinc, or Burnett's disinfecting fluid, steel drops, sulphur dioxide, hydrate of chlorine, and carbolic acid, are all useful; but dry heat, when it can be applied, is probably the most efficient of all D.

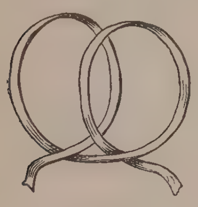
Disin'tegrator, a machine for pulverising, or disintegrating, various soft or hard materials. The patent D. of Thomas Carr, held in much favour for breaking up ores, rock, asphalt, artificial manures, peat, fireclays, oilcake, also for mixing moist sugars, the ingredients of mortar, &c., is here figured. It consists of a pair of circular metal disks, A and B, fixed to two separate shafts on one side of the machine, the shaft of the right-hand disk working through the tubular shaft of the left-hand one without touching it; an arrangement which leaves the hopper, D, by which the machine is fed with materials, unobstructed with driving-belts. The inside faces of the disks are studded with four concentric rings, or cages, of very strong projecting bars, or beaters, C; the rings of beaters in one disk occupy the opposite alternate interstices of the other, and the disks are driven in opposite directions at a high speed, varying from 350 to 500 revolutions per minute. The material to be ground being introduced through the hopper, is beaten, in its passage through the machine, with great violence by the beaters of the successive cages revolving in opposite directions, so that disintegration is thoroughly effected before the particles reach the end of their zigzag course to the cir-



Disintegrator.

cumference of the disks. A mineral D., 4½ feet in diameter, can pulverise from 5 to 15 tons of material per hour, according to the hardness of the material and the degree of fineness required. The disintegrating flourmill of the same inventor has a similar construction, and its efficiency may be judged from the fact that one, seven feet in diameter, produces as much flour, of a superior quality, as thirty pairs of millstones, and at a less cost.

Disloca'tion (Lat. 'a displacing') occurs when two bones which form a joint are displaced, and put 'out of joint.' It is often the result of violence, but sometimes of disease; and occasionally it is congenital, as in club-foot. Some joints, from their construction, especially the ball and socket joints, as the shoulders and big joints, are the most common seats of D. After these it occurs most frequently in the elbow. It is rare in children and in old age; in the latter, fracture is common. D. is liable to recur in the same joint. Surgeons divide it into partial and complete. In the latter, an external wound communicates with the joints. The symptoms are distortion of the limb, much pain, and often swelling in the neighbourhood of the joint. There is generally immobility of the limb, and always inability to use the joint. In all cases of D. there is more or less laceration of the parts around the joint. The treatment consists in returning the bones into their proper position, and maintaining them until the lacerated tissues are healed. This is effected by the surgeon in different ways, according to the joint implicated. When it is necessary to apply traction, the surgeon often does this by means of a hank of worsted applied in such a way that the traction does not cause the worsted to tighten round the limb. For this purpose the method adopted is what is termed the 'clove-hitch.' Occasionally it is necessary to use pulleys. In all cases it is good to give chloroform both to prevent pain and to relax the muscles.



Clove-hitch.

Dislocation, or **Fault,** in geology, the name given to the phenomena seen in rocks, where a crack or fissure has been formed in a series of strata, and where a displacement of the rock on either side has materially altered the original 'lie' or position of the strata. Faults vary much in nature and extent, and their effects are modified by the character of the rocks in which they occur. The dislocated strata may remain on each side of the fissure comparatively undisturbed, or may be, on the other hand, greatly bent and disturbed along the plane of the fault. Dislocations may be longitudinal ('strike faults'), or several faults may apparently proceed from one point or centre. The study of faults is of immense importance to the miner, since their occurrence in beds of coal may seriously interfere with the continuity of the seams, and cause much trouble and expense in determining the exact effects of the D. and the altered relations of the strata. The terms 'hitch,' 'slip,' 'slide,' 'heave,' and 'throw,' are applied by miners to faults.

Dis'mal Swamp, a large morass on the boundary of Virginia and N. Carolina, 30 by 10 miles, having an area of 300 sq. miles. It was formerly covered with immense trees and dense brushwood, but is now partially cleared and drained. It contains Lake Drummond, is crossed by the D. S. Canal, 23 miles long and 6½ feet deep, and is skirted by two railways on the Virginia side. There is another and smaller swamp in N. Carolina between Pamlico and Albemarle Sounds. Hither runaway slaves fled and hid themselves.

Dis'mas, St., in mediæval legend, is the name of the penitent thief.

Disorderly House. See NUISANCE.

Dis'part, in gunnery, is half the difference between the diameters of the breech and muzzle, and is of great importance to the gunner in taking aim.

Dispensa'tion is a license granted by the Pope to do some act otherwise illegal. The limits of the power having been the subject of controversy among many learned theologians, we shall not endeavour to define them. The Church, according to its own view, is empowered by God to release from vows, and to authorise marriages within degrees of relationship prohibited by the canon law. In former times, at least, it was a simple matter to apply the power to a wide department of civil affairs, by declaring that they bore upon affairs ecclesiastical. It is now, of course, only in Roman Catholic countries that D. is of any effect. In England it was abolished by Henry VIII., the power of the Pope in a very restricted form being then conferred on the Archbishop of Canterbury.

Disper'sion, of a pencil of light-rays, is the angular separation of the extreme rays of the spectrum after emergence from the prism, or, more correctly, is the difference of the indices of Refraction (q.v.) of these extreme rays. Experiment shows that the dispersive powers of different materials for light are not proportional to their refractive indices, a fact which renders possible an achromatic arrangement of lenses. See OPTICS.

Displayed', in heraldry, is a term applied to any bird of prey with its wings expanded.

Disposi'tion, in art, is the arrangement of the parts of a picture so that the form and colour of each part shall have its due effect. It differs from *composition*, in which the arrangement or design has for its aim and purpose the production of a general effect, to which all the parts contribute.

Disposition, in Scotch law, is a deed of alienation by which either heritable or moveable property is conveyed. The person to whom it is granted is called the *disponee.*

Disposition of Heritage.—The disponer or maker of the deed 'sells and dispones,' or, where the deed is gratuitous, 'gives, grants, and dispones,' the subject of the deed to the receiver, who is called the disponee.

Disposition of Moveables is a deed by which the disponer conveys his moveable estate, wholly or partially, to the disponee. This deed can only be made effectual by delivery of the subjects conveyed.

Disposition and Settlement is a deed by which a person provides for the general disposal of his property, heritable and moveable, after his death. See DESTINATION, WILL.

Disposition in Security.—This corresponds to mortgage in England, and will be explained under *Heritable Security.*

Disrae'li, Benjamin, Earl of Beaconsfield, K.G., a distinguished statesman and man of letters of the 19th c., was born in Islington, 21st December, 1804. The eldest of Isaac D'Israeli's three sons, he was privately educated at home, at Winchester, and at Walthamstow, was baptized in 1817 (the year of his father's final severance from the Portuguese Synagogue), and at an early age entered an attorney's office. The work, however, proving irksome, he abandoned it; and after extended travel, in the course of which he made the acquaintance of Lockhart, the son-in-law of Sir Walter Scott, and then editor of the *Quarterly Review*, he settled down to literary work. In 1826 he made his first successful hit in public with the brilliant and romantic novel of *Vivian Grey*, which was followed by *The Wondrous Tale of Alroy*, *The Young Duke*, *Contarini Fleming*, *Henrietta Temple*, all of which obtained for their author notoriety rather than fame. At the same time D. prepared the way for his entrance into political life by publishing *Ixion*, *A Vindication of the British Constitution*, and a poem, *The Revolutionary Epic*, which nobody is supposed to have ever read. Again D. travelled, this time in the East, and on returning plunged into the political strife that attended the great Reform agitation. He became, in 1832, a candidate for the burgh of Wycombe, and as he was recommended by Hume and O'Connell, it has been inferred that he began his active political career as a Radical, though he himself invariably affirmed that his political conduct was from first to last consistent. In 1835, when he contested Taunton, unquestionably as a Tory, and under the auspices of Lord Lyndhurst and Sir Robert Peel, he was beaten, and came into collision with O'Connell and his son, the latter of whom he challenged to fight a duel. At last, in 1837, at the age of thirty-three, he was elected a member for Maidstone. In making his maiden speech in the House of Commons, he was so disconcerted by the laughter which greeted his peculiar rhetoric and exaggerated gestures, that he sat down, saying, however, before he did so, 'I will sit down now, but the time will come when you will hear me.' D. then carefully studied both elocution and the temper of the House of Commons, and the result was soon seen in a marvellous parliamentary success. In 1841 he exchanged the constituency of Maidstone for that of Shrewsbury. Mainly by new novels, combining fiction and politics, the chief of which were *Sybil* and *Coningsby*, he became known as the chief of the 'Young England party.' His fortune as a partisan was made when, on Sir Robert Peel becoming a convert to free-trade doctrines, he attacked that great statesman with fiercely eloquent and persistent invective. Identifying himself with the Protectionists, D., who had exchanged Shrewsbury for Buckinghamshire, became, in 1848, on the death of Lord George Bentinck, their acknowledged chief. In 1852, after publishing a biography of Lord George Bentinck, he became Chancellor of the Exchequer in the cabinet of Lord Derby. Since then the history of D. may be said to be that of the Conservative party. In the three administrations of Lord Derby he held the post of Chancellor of the Exchequer, passing in the last, with the unwelcome assistance of the Liberal opposition, the Reform Act of 1867. (It may here be stated that the Reform Acts of 1832 and 1867 applied only to England and Wales, Scotland and Ireland being dealt with by other Acts; but the Representation of the People Act of 1884 provided for the whole of the United Kingdom.) When his chief resigned the Premiership in February, 1868, D. succeeded to it. In the end of the same year, however, he resigned, the general election of the time returning a majority against him on the Irish Church question. In February, 1874, another general election gave his party a great majority, and D. was again called to the post of First Lord of the Treasury; in 1876 he was raised to the Upper House as Earl of Beaconsfield and Viscount Hughenden. The Berlin Treaty (1878), the crown of his 'imperialistic' policy, was followed by the Afghan and the Zulu wars; and an appeal to the country in the spring of 1880 resulted in the unlooked-for triumph of the Liberals. The leisure of ten years earlier had yielded *Lothair*, and this now yielded *Endymion*. The name of the setting sun-god! and *Endymion's* author passed away in London, 19th April, 1881. He was buried at Hughenden, Bucks, by the side of the wife whom, as widow of Mr. Wyndham Lewis, his Maidstone colleague, he had married in 1839. She was, in 1868, raised to the peerage under the title of Viscountess Beaconsfield, and died 15th December, 1872, at the age of eighty-three, leaving no issue. No contemporary, scarce any bygone, politician was the subject of such various and conflicting criticism as D. His sincerity and sagacity were repeatedly challenged; his powers of leading often seemed misdirected, his serious eloquence excited no enthusiasm or admiration, yet his tact, audacity, ironical pleasantry, subtle humour, and unfailing courage, won him a personal popularity which his great rival could never secure, and which no modern statesman, except Lord Palmerston, has enjoyed in equal measure. It was always equally impossible both to friends and foes to discover whether, as writer or politician, he was in earnest or in jest, and very probably there were only three persons in the world who were ever permitted to become acquainted with the 'real man,' his true motives and opinions. These three persons were his secretary (Lord Rowton), his wife, and his Queen. See Lives of D., by Mill, Clarigny, Ewald, O'Connor, Hitchman, and Kebbel.

D'Israeli, Isaac, one of the best English literary anecdotists, was born at Enfield, May, 1766. His father, Benjamin D., was the descendant of a Hebrew family that had been driven from Spain to Venice by the persecutions of the Inquisition, and settled in business in England in 1747, where he made a fortune. D. was educated at Amsterdam and Leyden, and devoted himself from an early age to literature. He at first attempted satirical poetry, but found his vocation in literary and historical studies. The first volume of his *Curiosities of Literature* appeared in 1791. It is a classic in its way. It was followed by *A Dissertation on Anecdotes* (1793), *Essay on the Manners and Genius of the Literary Character* (1795), *Calamities* and *Quarrels of Authors* (1812-14), *Inquiry into the Literary and Political Character of King James I.* (1816), *Commentaries on the Life and Reign of Charles I.* (1828-31), *Eliot, Hampden, and Pym* (1832), and *Amenities of Literature* (1841). D. has a quaint, felicitous, but artificial style, on which his brilliant son's was distinctly modelled. But the elder never displayed the golden graces of the younger. D. died at Bradenham House, Bucks, 19th January, 1848. A collected edition of his works, with a Life, was published in 1858 by his son.

Diss, a market-town of Norfolk, in the vale of the Waveney, 18 miles S.S.W. of Norwich, has brush manufactories, breweries, and malting establishments. St. Mary's Church, a fine Gothic building (restored 1877), has a square tower, containing a peal of bells. Skelton, the poet-laureate in the reigns of Henry VII. and Henry VIII., was rector of D. Pop. reg. sub-dist. 7288; civ. par. and ecc. par. (each) 3763.

Dissec'tion, the method followed in anatomical schools of displaying the structure of the body in the dissecting-room, so as to enable each student to obtain as much information as possible without interference with neighbouring dissectors. The body is usually divided into ten parts, five on each side of the body, which are left in connection with one another until the D. is far enough advanced to admit of their being separated. See Quain's *Anatomy*, vol. ii. p. 1047.

Dissection Wounds are poisoned wounds received during dissection, or in making a post-mortem examination of a dead body. The virus or poison may be that of the disease from which the person died, or simply the virus of putrefaction. The former is the more dangerous. A body is more apt to produce serious results immediately after death than at a later stage. D. W. are generally caused by a puncture, and the more freely they bleed the less is the danger to the person wounded, because the blood flowing from the wound has a tendency to wash out the poison. When D. W. do not bleed freely, the wound should be enlarged with a clean knife, and in all cases washed, sucked, and afterwards cauterised with nitrate of silver, or by actual cautery. Frequently D. W. cause great constitutional disturbance. Sometimes they are followed by abscesses in the armpit, and gangrene of the diseased limb, necessitating amputation, and even causing death. In the robust, however, they seldom prove dangerous.

Dissen'ters, the name applied in Great Britain to those religious communions which, differing in either doctrine or discipline, or both, from the Episcopal and Presbyterian Churches established by law in England and Scotland, do not participate in the public support of these churches. During the 16th c. in England, Catholics and Puritans were persecuted with extreme rigour. The first instance of actual punishment inflicted on Protestant D. was in June, 1567, when a company of 100 were seized at worship in Plummer's Hall, and several sent to prison. The idea of toleration, which France had proclaimed in the Edict of Nantes (1598), was unknown. Whitgift controlled the policy of the Church towards D., and in the earlier part of the 17th c. Archbishop Laud, by the aid of the High Commission (which the royal prerogative had armed with illegal powers to fine, imprison, pillory, and mutilate), had almost succeeded in stamping out all visible signs of Nonconformity. Under Cromwell the Puritans were as intolerant and meddling as Laud; they prohibited the use of the Book of Common Prayer; they defaced churches and burnt pictures. On the Restoration it was made a crime to attend a dissenting place of worship, the penalty being transportation on a third offence, and death on return; and a further test was imposed on such divines as had been deprived of their benefices for Nonconformity, *i.e.*, for not accepting the English Book of Common Prayer. (The Act of Uniformity is 13 and 14 Car. II. c. 4, amended by 34 and 35 Vict. c. 37.) This persecution increased under James II. In 1687, however, James thought of banding all Nonconformists against the Established Church, and granted a partial measure of toleration for Scotland, Catholics and Quakers getting the right of public worship, Presbyterians only that of private worship. This was followed by the unconstitutional Declaration of Indulgence, which repealed not only the penal laws against Catholics and Puritans, but even the tests for civil and military office. The 'Five Mile Act' and the 'Conventicle Act' had previously been modified in operation by a similar declaration of Charles, which was immediately cancelled as illegal. The D. now separated into the Court party, led by Lobb (Independent), Care, Alsop, and Rosewell (Presbyterians), and Penn (Quaker), and the Church party, to which Baxter, Howe, and Bunyan belonged. The latter were in a great majority; and in spite of the efforts of the Board of Regulators of Corporations (who dismissed Tory and appointed Puritan magistrates and officers by hundreds), the D. supported the cause of the constitution, and even sympathised with the Bishops in the Tower. From what is called the Revolution Settlement—a toleration without equality of civil rights—the Unitarians were excepted, and the celebration of the Catholic mass continued to be for long prohibited. In 1779 the ministers of dissenting congregations and schoolmasters were relieved from the necessity of subscribing the Doctrinal Articles of the Church (19 Geo. III. c. 44). As in the case of Dr. Calamy, however, this subscription had frequently been dispensed with, and the Occasional Conformity Act of 1711 freed non-subscribers from the penalties. After the French Revolution a tide of liberal legislation set in. In 1813 an Act repealed the excepting clause of the Toleration Act against Unitarians, and also the Act of William which made it blasphemy to deny the divinity of Christ. The same statute led to the passing of the Act 57 Geo. III. c. 70 for Ireland, which extended complete toleration even to Unitarians. The Irish Relief Act did not pass till 1819, and required no declaration of belief in the Trinity. The Test and Corporation Acts followed in 1828, and the universities have since been thrown open to D. No measure, with regard to their legal position, has excited greater interest than the Dissenters' Chapels Act, 7 and 8 Vict. c. 45 [9 and 10 Vict. c. 59 protected the dissenters from molestation; 13 and 14 Vict. c. 28 and 15 and 16 Vict. c. 49 enabled them easily to acquire the title to land bought for religious or educational purposes; and 18 and 19 Vict. c. 81 dealt with the certificate and register of dissenters' places of worship], which was carried through by Lord Lyndhurst, Sir Robert Peel, Sir W. Follett, and Gladstone. The question was whether chapels, burial-grounds, schools, and ministers' houses, in the possession of Unitarian congregations, should be forfeited, because, at the time of the original endowment, the congregations held different opinions in theology. The Court of Chancery, in the case of Lady Hewley's trust, &c., had decided that new trustees must be appointed, and an Act then became necessary to secure other trusts in a similar position. In the proceedings it appeared that when in 1719 the 'Bill for strengthening the Protestant interest' (5 Geo. I. c. 4) was brought forward to repeal the restrictive portions of the Schism Act (12 Anne, c. 7), and the 'Occasional Conformity Act,' an attempt was made, and failed, to add to the Oath of Abjuration a declaration of belief in the ever-blessed Trinity, and that in the celebrated Salters' Hall Controversy (1719) a general meeting of all the English D. declined to say that the doctrine of the Trinity should be a term of communion. The three great bodies of English D.—the Presbyterians, Baptists, and Independents—have a joint organisation called the 'Three Denominations,' with the right of addressing the sovereign in presence. This right has been exercised. D. from the National Established Church in Scotland can hardly be said to have existed prior to Erskine's secession of 1733; as the Cameronians, or Hill Men, the descendants of the Remonstrants of the Sanquhar Declaration, were rather the growth of the wars of the persecution, and their principles put them out of relation with all other classes. In 1747 the Associate Synod split into the Burghers, and Anti-Burghers, and those again into the New Light Burghers, the New Light Anti-Burghers, the Old Light Burghers, and the Old Light Anti-Burghers. At the present time the bulk of these secessions from the Established Church are reunited in the United Presbyterian Church. The Episcopal Church was tolerated under the Act 5 Geo. I. c. 28, only qualified persons being allowed to hold divine service. They had themselves a fierce dispute between the College party under Lockhart and the Usagers under Gadderer. The Church was so much identified with the Rebellion of 1745, that statutes were passed narrowing the definition of a congregation (so as to encroach on private worship), and requiring letters of orders from English or Irish bishops in every case. There was, of course, a good deal of secret Catholicism, the principal stations of Jesuitism being Munches, Edinburgh, Aberdeen, Braemar, and Strathglass. In 1773 there were only seven Jesuit missionaries in Scotland. In the N. of Ireland the Presbyterian D. lived in harmony till the beginning of the 19th c., when the Trinitarian and Unitarian parties, under Drs. Cook and Montgomery respectively, separated, each retaining its share of the *Regium Donum* down to the Irish Church Act of 1869. In 1854 some excitement was created by Lord John Russell's Ecclesiastical Titles Act, prohibiting the use of British geographical names in the titles of the Catholic clergy. The Act was never put in force. The right of Dissenters to burial, with an appropriate service, in the parish churchyard, was not conceded till 1880. See Herbert Skeat's *History of Free Churches*.

Dissenters, Laws Regarding. See ACT OF TOLERATION.

Dissolu'tion of Marriage. See DIVORCE, DIVORCE AND MATRIMONIAL COURT.

Dissol'ving Views are produced by employing two magic lanterns, so arranged that their respective images may be super-imposed on the screen, and that, as the one is made to fade away gradually, the other increases in brilliancy, thus producing the appearance of the one dissolving almost imperceptibly into the other.

Diss'onance, in music, a disagreeable roughness produced when certain notes are sounded together. See CONSONANCE.

Dis'taff (Old Eng. *distaef*, 'the bunch or tuft of flax on the staff'), an implement formerly used for holding flax, wool, or other fibres in the process of spinning yarn from them. It is mentioned in the Proverbs of Solomon, 'She layeth her hands to the spindle, and her hands hold the distaff;' and frequent allusion is made to it by Homer and other classical writers.

Distaff.

Distem'per (Fr. *détrempe*, from Lat. *de*, and *temperare*, 'to temper'), a method of painting and illuminating in use almost throughout the Middle Ages, with pigments ground up with size, weak glue, gum water, or other vehicle instead of oil. It is still used for scene-painting, the decoration of staircases, &c., and within recent years in house-decoration, in which the chief mass or field of colour is often laid on in D., relieved by a border in stencilling, or partly stencilled, partly hand-painted. The brilliancy of some of the older pictures in D. was obtained by using a varnish of wax dissolved in an etherous oil. One drawback of painting in D. is that it is difficult, owing to the rapidity with which the vehicle dries, to blend or graduate the tints. Yet in D. the painters of the early Cologne school developed a beautiful and glowing style of colour. The improved method of painting in oils invented by Van Eyck, about the middle of the 15th c., superseded D. for strictly pictorial arts, and since 1500 easel pictures have been painted almost exclusively in oils.

Distemper, a disease affecting young dogs, very much as infantile fevers affect children. It appears to be an inflammatory affection, often very acute in its earlier stages, and inducing in some dogs symptoms not unlike those of madness. The symptoms of D. are loss of spirits and appetite, dislike for exertion, dull eyes, and coldness of the body and limbs. Discharges appear from the nose and eyes, and vomiting may occur. In some dogs the nervous symptoms are greatly exaggerated, and exhibited in convulsive spasms; whilst as the disease progresses, the inflammatory action appears to extend down the respiratory passages, and to affect the bronchial tubes and lungs. The disease usually attacks dogs from the third to the sixth month of their age; but it also shows itself much later. D. appears to be contagious from one young dog to another, and to affect different kinds of dogs very variously. It tends to run a definite course, and the dog rarely or never suffers from a second attack. The treatment consists in giving from two to three grains of calomel daily, as a purgative, in milk; James's powders may also be given with advantage instead of the calomel. The food should be light but sufficient, and the eyes and head generally should often be bathed with lukewarm water, the animal being guarded from subsequent cold. Indeed, he must be carefully tended from first to last, and be warmly housed, else the disease may leave permanent effects in the form of suppurating ears or other painful affections.

Distilla'tion (Fr. from Lat. *de*, and *stillatio*, 'a dropping'), is one of the oldest chemical processes, and was much in vogue with the alchemists.

The object of D. is to separate volatile from fixed substances, or volatile substances from one another. The principle of the process is simple. When heat is applied to a mixture of fixed and volatile substances, ebullition eventually takes place, and the volatile substances are gradually converted into vapour. If this vapour be caught and cooled, it will return to the liquid condition, whereas the fixed substances remain in the vessel in which the mixture was originally heated. Thus if sea-water be heated till it boils, steam is given off, and the steam if cooled yields pure water, whereas the saline ingredients present in the sea-water, being fixed substances, remain unvolatilised. Most ships intended for long voyages are fitted with the proper apparatus for distilling sea-water; and thus, if there be sufficient fuel, fresh water may be obtained at any moment. In the case of the separation of volatile substances from one another, advantage is taken of the fact that the most volatile body is the first to become vapour, so that if the first portion of vapour be cooled, the resulting liquid contains the greater part of the most volatile substance, whereas the liquid obtained by cooling the last portions of vapour contains most of the least volatile substance. This process of *fractional D.* will be explained more fully further on.

The apparatus in which D. is performed is called a *still*, and assumes various forms; but it consists essentially of two parts—a vessel in which the liquid to be distilled is heated (*body of the still*), and one in which the vapour is cooled (*condenser*). The simplest form of the still is that in which the body of the still is a glass retort, and the condenser a flask immersed in cold water. The vapour arising from the liquid boiling in the retort passes into the flask, and there condenses to a liquid. But such an apparatus is inconvenient for distilling large quantities, because the water used in cooling soon grows warm (from the great amount of heat given out during the transformation of a vapour into a liquid), and must therefore be frequently changed, which disarranges the whole apparatus. To obviate this, use is made of a *worm-condenser* (Fig. 1), a coil of pipe immersed in a vessel through which a current of cold water is flowing. The cold water arrives by a tube attached to the bottom of the vessel, and escapes by a tube placed near the top. Another convenient form of condenser was invented by Liebig (Fig. 2). It consists of a narrow tube passing through a broad one, and fitted into the latter by means of corks. The broad tube is provided with two smaller branches, one at each end. Through the lower branch cold water is made to enter, and after traversing the whole length of the tube, flows out through the upper branch. Thus the narrow tube (into which the vapour from the boiling liquid enters) is kept cold by a stream of water flowing over its external surface.

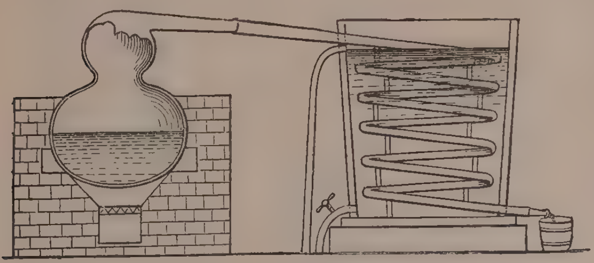


Fig. 1.—Worm-Condenser.

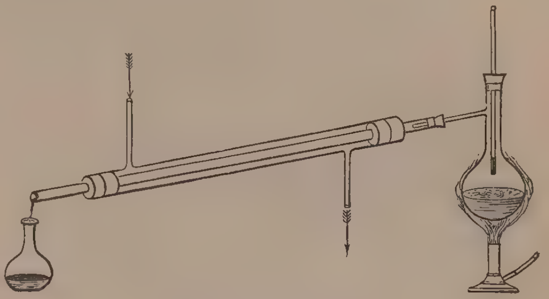


Fig. 2.—Liebig's Condenser.

Fractional Distillation.—It was stated above that when a mixture of substances of different degrees of volatility is heated, the most volatile is the first to assume the state of vapour; so that, on distilling a mixture of volatile bodies, the most volatile passes over first, leaving the less volatile to follow. But complete separation by means of a single D. can only be effected when the temperatures at which the different bodies boil are widely removed from one another, and only then if the different liquids are not chemically allied. The first portions of the distilled liquid or *distillate* always contain the largest proportion of the most volatile body, and the latter portions least. On subjecting the first distillate or *fraction* to a redistillation, and collecting the first portions that pass over separately, they will be found to contain a still larger proportion of the most volatile substance, and on repeating the process for a greater or less number of times according to circumstances, the most volatile body can, in most cases, be completely isolated. In the same manner, by repeatedly rejecting the first portions of the distillate, and collecting the last, and by repetition of the process, the least volatile body may be obtained in a pure condition. In conducting a fractional distillation, a thermometer is immersed in the vapour of the boiling liquid, and throughout the process the temperature is carefully observed. As soon as ebullition commences the temperature is noted, and the distillation allowed to proceed till the thermometer marks a certain rise in the temperature of the vapour. The vessel into which the distilled liquid is flowing is now changed, and the distillation continued during a fresh interval of temperature. The vessel is again changed, and so on till the whole of the liquid, or as much as may be required, is distilled. The first fraction (*i.e.*, the liquid which comes over during the first period of the D.) is again distilled, collecting as before in separate vessels; and this process is repeated until the boiling-point of the first fraction remains constant—constancy in the temperature of a boiling liquid being a criterion of its purity. If it be desired to separate the liquid boiling at a higher temperature, the last fractions are similarly treated, except that the more volatile portions are set aside, the less volatile alone being redistilled.

Alcohol is rectified by fractional D. Pure alcohol boils at 78° C., water at 100° C. A mixture of the two will commence boiling at a temperature below 100° C., and the nearer to 78° C. the more alcohol it contains. In rectifying alcohol, the mixture of alcohol and water is distilled till the temperature of the vapour reaches 100° C. During this rise the whole of the alcohol passes over, and the residue in the retort is pure water. In tolerably dilute solutions all the alcohol has passed over when a third of the mixture has been distilled. The alcohol thus rectified still contains a considerable proportion of water. On submitting it to a second D., and collecting, as before, only those portions which boil below 100° C., it may be further purified. And on repeating the process finally, collecting only that portion boiling within 10° C. of 78° C., a very strong alcohol may be obtained, containing only 13 per cent. of water. Owing, however, to the great attraction of alcohol for water, it can never be completely freed from the latter by rectification alone.

The process of D. is of much practical importance. All kinds of spirits are prepared by its means from dilute solutions of alcohol. Coal-tar is separated into benzine (from which the aniline colours are manufactured), into oils for lubricating machinery, into heavier oils for preserving wood, and into a variety of other products. In the manufacture of perfumes from flowers, the latter are distilled with water, and the steam carries along with it their essential oil, which condenses along with the steam, and may be readily separated from the water.

Destructive Distillation.—There are many substances which, though not volatile in themselves, are nevertheless resolved by heat either partially or wholly into volatile products. If such substances be heated in a still, the volatile products, as fast as they are formed, pass into the condenser, and there assume the liquid condition. This is the process of destructive D. Wood is a substance which cannot be volatilised intact, but when heated suffers complete decomposition, and yields various volatile products, together with charcoal, which is a fixed substance. The destructive D. of wood is carried out on the large scale on account of the valuable substances contained in *wood-tar* (the volatile products arising from the operation), as well as on account of the charcoal. From wood-tar most if not all the acetic acid of commerce is prepared. It also contains wood-spirit or naphtha, creosote, paraffine, various hydrocarbons, &c. The process of gas-making is another instance of destructive D. Coal is heated in iron or fireclay retorts; here it suffers decomposition, and is resolved into various volatile substances, and into coke (a compact form of charcoal). The coke, being a fixed substance, remains in the retort, whereas the volatile bodies pass off as vapour, and are made to traverse a considerable length of wide iron tube, cooled externally by the air. In this tube various liquid and solid bodies condense, forming a black viscid liquid called *coal-tar;* whereas the permanently gaseous products (gas) pass on unaffected, and after traversing various purifying apparatuses, at length enter the gasometer or store-chamber. The products of the destructive D. of substances are generally numerous and of a highly complex character, but this is not always the case. Thus if oxalic acid be distilled, it is resolved into carbonic acid, carbonic oxide, and water.

Distilled′ Water. Spring-water contains various impurities, among which are salts of ammonia, lime, and magnesium. When it is distilled, these impurities remain behind, and pure water passes over. It is well to reject the first portions of the D. W., as they are apt to contain a little ammonia, and the last, as they may contain traces of hydrochloric acid. Where D. W. cannot be procured, rain-water may be substituted, for it is water distilled by the sun's heat. It is insipid, without odour, and is used for making many officinal preparations in medicine.

Distilled Waters are prepared by distilling water along with the parts of plants containing volatile oils, as lavender-water, peppermint-water, &c.

Distress′, in English law, signifies the seizing of the personal effects and chattels of a debtor, and holding them as security for the debt, or selling them in payment of it; or of a wrong-doer as a pledge that a duty be performed by him or an injury redressed. D. is now chiefly enforced by landlords against tenants for non-payment of rent. Executors may distrain on behalf of the testator before or after Probate (q.v.). A husband may distrain during his wife's life for arrears of rent of her land or houses accruing before or during marriage. All chattels found on the premises, whether the property of a tenant or a stranger, may be distrained (except things in the custody of the law; wild animals; fixtures; goods under bailment in course of debtor's trade; a lodger's property; an ambassador's property; gas-meters; railway cars and trucks, not belonging to debtor; woollen, cotton, and silk loom goods; beasts of plough, sheep, tools of trade beyond £5 in value, and agisted stock (all conditionally, if there be enough of other property to satisfy debt); hired machinery; wearing apparel, bedding, tools, &c., of trade, of £5 in value; breeding stock; and articles *in use*). Nothing can be distrained which cannot be returned in as good a state as when taken. D. must be in proportion to the sum distrained for. See EJECTMENT and SALE. For Scotch law, see HYPOTHEC, SEQUESTRATION FOR RENT.

Distribu′tions, Statute of. The division of the personal property of those who die intestate and without settlement in England is regulated by the 22 and 23 Car. II., called by this name. After payment of debts and funeral expenses, if the deceased leave a widow and children, one-third goes to the widow, and the other two-thirds in equal portions to the children; or, if any of the children be dead, to their issue in equal portions. If there be no children nor lineal descendants of children, one-half goes to the widow, and the residue to the nearest of kin of the deceased in equal degree, or their representatives; but by statute 53 and 54 Vict. c. 29, the widow is entitled to receive at least £500, and if the estate be not of that value, she obtains the whole. If there be children but no widow, then the whole is divided among the children or their representatives. If a child has been portioned, the portion will be held as part of his share. An *heir-at-law* is entitled to his full share of the personal estate. If there is neither wife nor children living, nor representatives of deceased children, the whole property goes to the father of the deceased. If he has no father living, the whole goes to the mother, brethren, and sisters of the deceased in equal portions. If there are neither brothers nor sisters, the whole goes to the mother. If the mother be dead, the whole goes to the brothers and sisters and their children, failing all these, the whole goes to the grandfather or grandmother. After these, uncles, aunts, and nieces share equally. Failing all the above-mentioned relatives, the whole goes to the nearest of kin; and failing kin, to the Crown.

Dis′tricts, Mil′itary, certain divisions into which the country is marked off for purposes of efficiency in recruiting and organising the army. Prior to the passing of Cardwell's Act, in 1872, for localising the forces, England was divided into four districts, Scotland was one, and Ireland had five. Now there are in England ten general districts, or District Commands as they are called, each of which has headquarters as follows:—The north-western, with Chester as its headquarters; the eastern, with Colchester; the north-eastern, York; the western, Devonport; the southern, Portsmouth; the Thames, Chatham; the south-eastern, Dover; the home, Horse Guards, London; the Woolwich; the Aldershot. Scotland is one general district, with headquarters at Edinburgh. Jersey is a military district; Guernsey and Alderney another. In Ireland, there are the Belfast, the Dublin, the Cork, and the Curragh districts.

Ditch, in agriculture, a deep trench excavated along the sides of a field to serve as a main channel for the drain-water. In modern farming, ditches are frequently converted by the use of drain-tiling into covered sluices.

Ditch, in fortification, is the excavation in front of a parapet or rampart, and one of the chief defence-works. The earth taken from it supplies a parapet in field fortification, and the greater body of the material for a rampart in permanent works. It is kept dry, unless when actual danger is apprehended from without. The inner slope of the D. is the scarp; the outer, the counterscarp.

Dithyram′bus, a name of Bacchus, the origin of which is unknown, was a species of poetry invented by Arion, and cultivated by the Doric lyric writers, and afterwards at Athens. It was first used in honour of Bacchus, but afterwards also of other gods. It was elevated, but often bombastic in style, was accompanied by flutes, and gradually lost its regular choral or antistrophic character.

Dit′marsh, or **Dithmarch′en** (*i.e.*, the Deutsch or German marsh-lands), a fertile coast district in the W. of Holstein, between the estuaries of the Elbe and the Eider. It has a flat coast, indented by a great bay, and its chief towns are Meldorf, Brunsbüttel, and Heide. In the time of Karl the Great, D. was ruled by Abbio, or Albion, the companion in arms of Wittekind, and became a province or *Gau* (*Thiatmaresgaho*) of the Frankish empire in 804. It formed part of the Markgrafdom of Stade, and later (1474) of the Duchy of Holstein, which had been granted in feoffment to Christian I. of Denmark in 1460. In 1500 D. revolted, and after a vigorous struggle under Wolf Isebrand, threw off the Danish yoke, and remained an independent state till Frederik II. again subdued it in 1559. The famous *Dithmarsisches Landbuch*, or legal Code of D., was drawn up by forty-eight judges in 1321, printed in 1497, revised in 1567, and imposed anew in 1711.

Ditt′any (*Dictamnus*), a small genus of Rutaceous plants, natives of Southern Europe, Asia Minor, &c. The Fraxinella D. and the White D. (common or bastard D.) have been long cultivated in gardens for the fragrance of their leaves and their handsome flowers. The inflorescence and the outer parts of the flowers themselves are covered with glands secreting a resinous or oily volatile matter, which ignites with a flash in hot weather when the flowers are fading, if a light is applied to it. The white, thick bitter root was at one time much used in medicine as a tonic, aromatic, stimulant, diuretic, antispasmodic, and otherwise. The D. of Crete is *Origanum Dictamnus*, a plant of another order. (See MARJORAM.) The name is also applied to *Cunila maranaia*.

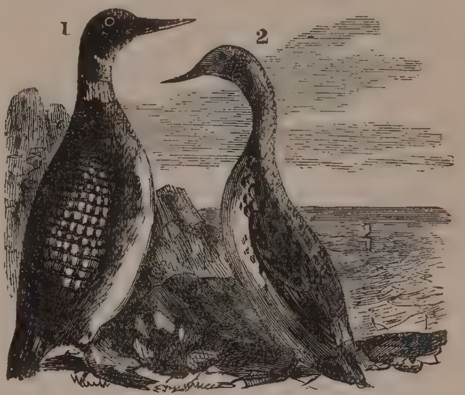
Dittelas′ma, a genus of *Sapindaceæ*. The berries of *D. Rarak* of the Malay Peninsula and S. China have marked saponaceous properties, 'making a lather even with salt water; used as a lotion, they are useful in skin-diseases, and when eaten produce giddiness.'

Diu′ (Sansk. *Dvipa*, 'an island'), a Portuguese island in the S. of the peninsula of Guzerat, Hindustan, at a short distance from the coast, has an area of two sq. miles, and a pop. of 13,016. It was famous in early times on account of the splendid temples of Mahadeva, destroyed by Mahmud of Ghizni in 1024. Seized by the Portuguese in 1515, it soon after became one of the most flourishing places of trade in India. The fortified town of D. lies at the E. end of the island, and is the seat of the Portuguese governor, who is subordinate to the Governor-general of Goa. Nothing of startling importance has happened here since 1670, when the place was sacked by Arabs. The harbour is small but safe. The coco-nut tree flourishes here, but agriculture is much neglected. The inhabitants chiefly support themselves by fishing. Besides D. town, there are three large villages—Nagwa, Bachawara, and Monakbara.

Diuret′ics are medicines which stimulate the kidneys. They are mostly given in dropsies. D. diminish the watery portion of the blood, and hence cause absorption of fluid from serous cavities and from the meshes of areolar tissues. Examples are the salts of potash, broom, foxglove, and juniper.

Divan′, a word of very various signification. In Persian, *diwân* means 'a book of many leaves,' 'an account-book,' 'a collection of books,' 'a senate or council.' In European languages it signifies a register, a muster-roll, a collection of poems, any administrative Turkish court, but especially a privy council or cabinet of the Sultan of Turkey. It also is applied to the room in which such a council sits—and hence to any room for the reception of distinguished guests—and to the low seats or cushions for their accommodation; for which reason the name D. is applied to a sort of sofa by the Western nations of Europe. The Turkish D. or State Chancellorship includes the greater number of the officials known under the name of *qualemié* or secretaries, and consists of five grades of officials, of which the highest grade corresponds with that of a general of division.

Di′ver, or **Loon,** a genus of Natatores (q.v.), or Swimming birds, belonging to the family Colymbidæ, and distinguished by the long, compressed bill with curved tip, by the short tail, the short tarsi, the three front toes being webbed, and the first and second quills being the longest in the wings. Of these birds, the Great Northern D. is the best known. It attains a length of $2\frac{1}{2}$ or 3 feet, and is green, black, and purple above, with a white breast and abdomen. The neck and upper breast are banded with two black collars, and the black of the back is variegated with short white streaks. This bird is common on the N. coasts of Britain. The eggs number two, and are dark-brown; the nest is little more than a bare patch on the ground. The black-throated D. and the red-throated D. are two other British species. The former is marked boldly with black and white on the back; the latter is of smaller size, and has a reddish throat. The red-throated D. is sometimes known as the Sprat loon; and the Great Northern D. as the loon and ember goose.



1, The Great Northern Diver; 2, The Red-throated Diver.

Diver′gent. See CONVERGENT.

Div′idend, in bankruptcy, is the share which a creditor ranked on the estate has in any fund falling to be divided. When a creditor has not been ranked in time to share in any declared D., if he prove his debt in time to share in a subsequent one, he is entitled to the arrear (called an *equalising D.*) out of any money for the time being in the hands of the trustee; but he is not entitled to disturb the distribution of any dividend, declared before his debt was proved, by reason that he has not participated therein. The term is also applied to the periodical (usually half-yearly) interest or profit arising from the public funds or from joint-stock undertakings.

Divi-Divi, the pods of *Cæsalpinia coriaria*, a great leguminous tree, a native of S. America. It is very rich in tannin, and is extensively imported for the use of tanners and dyers. D. is a strong astringent substance.

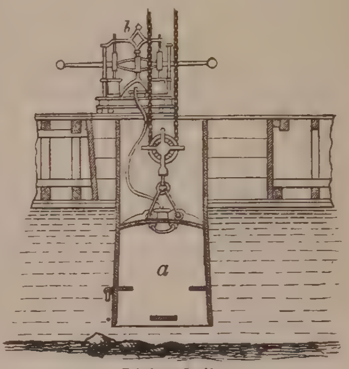
Divina′tion (Lat. *divinatio*), the presension or discovery of things future or hidden, by rites, omens, or other supernatural agency. The Latin term was used in a more restricted sense than the Greek (*mantikē*), which latter signifies the ascertaining of the will of heaven by any means whatever, whether through the mouth of the inspired seer or by the skill of the diviner. In all ages, and under all religious systems, the desire to penetrate the unrevealed and to know the future has prevailed in a greater or less degree. This yearning is rooted deeply in the human heart, and doubtless had its rise in the almost universal belief that gods and men had, at one time, met face to face. The belief that the gods care for man gave birth to another—that they sent indications of their will; hence it became the aim of mankind to interpret these manifestations. The Chaldeans had recourse to astrology, and tried to read the future by the aid of the stars. The Greeks, and after them the Romans—through Apollo, god of prophecy, and his inspired priesthood; through sacred books; by dreams and lots; by the flight, feeding, and chattering of birds; by the entrails of beasts; by placing straws on red-hot iron; by appearances in the heavens, such as comets, meteors, lightning, eclipses; and in countless other ways—strove to know the will of heaven. In the Middle Ages the same beliefs prevailed, and the already extensive catalogue of objects big with fate was increased. Even yet, D. flourishes in phases varying from the fortune-telling of the gipsy to that strange delusion spiritualism. The seeds of D. have become so rooted in our everyday life and conversation that they almost escape our notice, but reference to a few of them will suffice to prove not only their universality, but also their abiding influence. Such are the evil-eye, the sight of magpies, the number thirteen at table, the first-foot, the fact of stumbling, meeting a hare (the witch's steed), the fixing of the wedding-day, grouts in the tea-cup, the burning of nuts at Hallowe'en, spilling of salt, &c. Both in ancient and modern times omens have been drawn from sneezing, and nurses still exclaim when a child sneezes, 'Bless the child,' 'God bless it,' just as the ancient Greek cried *Zeu sōson!* 'Zeus save thee!' Many of the above-named modes of taking omens or reading the future were comparatively harmless, as they concerned the deluded inquirer only; but matters were much more serious when the diviner sought to ascertain the guilt or innocence of persons accused. Recourse was then had to an *ordeal*, and the individual was condemned or acquitted according as he stood the test imposed. The principal modes of D., which will be found under their proper heads, were Axinomancy, Belomancy, Bibliomancy, Botanomancy, Capnomancy, Cheiromancy, Coscinomancy, Crystallomancy, Geomancy, Hydromancy, Lithomancy, Oneiromancy, Pyromancy, Rabdomancy, Teraphim.

Divine Right. In former times the monarch was by a party regarded as the representative of the deity, and consequently as having no moral responsibility. Much learning has been shown in seeking to maintain or refute this view. That the king rules *jure divino* forms the groundwork of the learned and very abusive *Defensio Regia pro Carolo I.* of the learned Claudius Salmasius. He had for his opponent in the controversy the hardly less learned John Milton. The two great scholars abuse each other freely in classical Latin—*asinus* (ass), *pecus* (beast), and such-like terms being freely dealt with between them. See the *Convocation Book* of 1603; Archbishop Leslie's *Power of the Prince;* Sherlock's *Case of Resistance to Supreme Powers* (1684); Mackenzie's *Jus Regium* (1683); for the modern High Church view, Dr. Pusey's *Sermon on the 5th of November* (1837), and also Allen's *Royal Prerogative* (1849).

Divine Service, a tenure by which the tenant was bound to perform some special D. S. for the lord of the manor—as to sing so many masses. The tenure is obsolete.

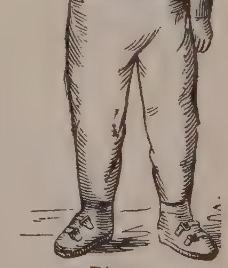
Div'ing. See Diving-Dress, Pearl and Sponge Diving.

Diving-Bell, a vessel open at one end only, and of various shapes, which can be lowered into water with the open end downwards, and replenished with fresh air, so that men within it can breathe freely and work beneath the water. The earliest reliable account of anything resembling the modern D.-B. is a quotation by Gaspar Schott, a Jesuit priest, in 1664, from a book by John Taisnier. The passage describes how the latter, in 1538, saw two Greeks descend into the water in a large inverted 'kettle' suspended by ropes. After this time the D.-B. often engaged the attention of ingenious mechanicians, but it was Dr. Halley, F.R.S., who, in 1720, proposed the changes which first rendered it really useful. The great difficulty in the way of its use was the want of adequate means of replenishing the air in it, so as to make it possible for men to remain in it for any considerable length of time. Dr. Halley's principal invention was an arrangement by which barrels of air could be lowered to the men in the bell, and their contents allowed to pass into it, while the foul air could at the same time be discharged. In spite of the practicability of this plan, Halley's D.-B. does not seem to have been introduced into engineering operations. Smeaton (q.v.) was the first to employ the D.-B. for this purpose, and to him seems also to be due the first use of a force-pump to supply the bell with air. The first engineering work of any magnitude in which the D.-B. was employed was Ramsgate harbour (1788), for which Smeaton was the engineer. Since that time it has come into general use among engineers, and has been constantly employed in the preparation of submerged foundations, the laying of masonry under water, &c.



Diving-Bell.

The illustration shows the form of D.-B. commonly used, which differs very little from that of Smeaton. It is made of cast-iron, and is suspended by tackle from a boat or scaffolding. The upper part of it contains small panes of thick glass, which are sufficient in bright weather to give light to the men inside. The pipe from the air-pumps is connected with the top of the bell, and is fitted to a valve opening inwards. As the bell is gradually lowered, air is pumped into it to prevent the water rising to an inconvenient height as the air already in it becomes compressed. By continually adding air, the water is kept out of the bell. As soon as the bell has reached the required position, the workmen signal to stop lowering. Signals for various purposes can be given, according to a preconcerted code. Air-pumps are constantly at work while the bell is under water, the used-up air continually escaping under its lower edge, and coming to the surface in bubbles. The pressure of the air in the bell depends upon the depth to which it is immersed. It seldom exceeds double the atmospheric pressure, which corresponds to a depth of between 30 and 40 feet. Breathing in such a dense atmosphere causes considerable discomfort to those unaccustomed to it, but no permanent ill effects to the workmen. The greatest depth under water at which work has been done is about 120 feet. This was reached in the foundation of the East River bridge, New York, for making which an air-tight caisson (similar in principle to a D.-B.) was employed. The pressure here was more than four times as great as that of the atmosphere, and the men could remain in the caisson only about twenty minutes at a time. See Caisson.



Diver.

Diving-Dress, a watertight dress, including a helmet, so arranged that its wearer can move freely under water. Some kind of dress which answers this purpose more or less imperfectly has been long known, but only within the last few years has it been brought into a really practicable form. The dress is of india-rubber cloth, and the helmet of metal, the latter having plates of glass opposite the eyes, and a nozzle for the attachment of the air-pipe. The diver has lead weights on his chest and back, and descends into the water by a rope ladder from a boat or wharf. He can give signals by means of a cord, and can remain submerged for five or six hours. The employment of divers in a dress instead of a diving-bell is now very common. Not only would it often be very inconvenient to fit up the necessary apparatus for the heavy bell, but often also the work can be done more satisfactorily by divers than by workmen who cannot get beyond a very confined space.

Divin'ing Rod, a forked branch, usually of hazel, formerly believed to have the power of indicating a treasure, mineral vein, a spring of water, &c., by bending towards the thing sought. In modern practice the diviner is placed in contact with a metallic or other magnetic substance. The art is still practised in Italy and the S. of France, under the names of *metalloscopy* or *hydroscopy*, according as the object sought is a metallic vein or a spring of water. Men of science have professed their belief in the D. R., though some of these are not clear as to the cause of its influence. Bayle's *Dictionary*, in the notes to the article 'Abaris,' contains some interesting facts bearing on the subject. See also De Quincey on *Sortilege*.

Divir'igi, a town in the vilayet of Sivas, Asia Minor, on the Tshalta, a tributary of the W. branch of the Euphrates, 23 miles W. of Egin. It is situated in a hilly region, is elevated about 1000 feet above the sea, and has some trade in fruits. Pop. 7800. D. was the ancient *Tephrene*.

Divisibil'ity, the property which all matter possesses of being separated into parts. To what extent the process may be carried on is a matter of speculation, the general belief being at the present time, however, that matter is ultimately composed of indivisible particles called atoms. (See ATOM.) There are some very striking examples in physics of this general property. Goldleaf has been obtained of a transparent thinness; and a film of the same metal can be formed not exceeding the ten-millionth of an inch. A single grain of blue vitriol tints five gallons of water. A musk grain that has perfumed a room for years shows no diminution in its weight. The animal kingdom gives many examples of extreme attenuation of matter.

Divi'sion, a fundamental rule of arithmetic, which gives the method of finding the number of times one figure contains another. The number to be divided is the *dividend*, that which divides is the *divisor*, and the result of the operation is the *quotient*. When the dividend contains the divisor an exact number of times, the former is said to be *divisible* by the latter. The distinctive symbol of D. is $\div$; thus $a \div b$ means the operation of dividing a by b. The same thing is far more frequently expressed, especially in algebra, by the fractional form, namely, $\frac{a}{b}$. The usual methods of D. are to be found in any treatise on arithmetic or algebra.

Division, Military, a section of an army, commanded by a general, usually consisting of two, and sometimes of three, brigades (see BRIGADE), and embracing infantry, cavalry, and artillery. The number of divisions in an army varies according to the number of men in the field or the scale of a war.

Division, Naval, was a secondary section of a fleet, forming a third part of a squadron, of which there were usually three in the most complete English fleets. The term is now practically abolished since the adoption of iron-clad and heavily-armed steamers.

Division of Labour is of two kinds: 1st, simple co-operation, which may be illustrated by the case of two greyhounds running together and killing more hares than four greyhounds running separately; or by the case of sawing timber, rowing a large boat, &c.; 2nd, complex co-operation, where 'one body of men having combined their labour to raise more food than they require, another body of men are induced to combine their labour for the purpose of producing more clothes than they require,' to be exchanged against the surplus food (Wakefield's Notes to Adam Smith). Such is the geometrical definition of political economy, but in reality the growth of D. of L. is much more natural, more complex, and less conscious, and is modified at every stage by the positive institutions of society, such as slavery, castes, craft guilds, trades' unions, &c. The production of a coat nowadays requires the following trades:—Sheep-breeder, sheep-feeder, wool-dresser, wool-spinner, weaver, dyer, and tailor, without counting the carriers, wholesale merchants, factors, &c., who act as middlemen between different classes of manufacturers. All these persons require to be provided with food, lodging, fuel, and clothing; hence, within limits, it may be said that the existence of one important branch of industry requires the existence of all others. Hence, not only does D. of L. increase the *quantity* of production, it renders *possible* a great many *kinds* of production. It has been said that no country has a productive agriculture unless it has a large town population or an export trade to supply. The increase of skill, the saving of time, and the saving of material sufficiently explain how D. of L. increases the quantity of production. Say mentions that there are 70 operations in cardmaking; Baggage that there are 102 in watchmaking; and yet the products of these numerous operations are sold very cheaply. Many great mechanical improvements have also been suggested by the attention of individual workmen being concentrated on single processes. The D. of L. is at all times necessarily limited by the market for the article, and by the nature of the employment. Whether production can be carried on most efficiently on a large scale is, therefore, a question depending not merely on theoretical advantages of D. of L., but also on such circumstances as the extent of population, the means of communication, the realised wealth of the community, &c.

Divorce'. Previous to the Matrimonial Causes Act of 1857, a marriage could only be dissolved in England 'after tedious and costly repetitions of the same inquiry before separate and distinct tribunals, the last of which was the House of Lords.' At that time, an apparent marriage might be declared null on the ground of Degree of Kindred (q.v.), or Bigamy (q.v.), and on some other grounds; but the effect of the legal declaration was to establish the fact that marriage had never existed. D. of course presumes the existence of marriage. Under the Act referred to, a husband may obtain D. on the ground of his wife's adultery. A wife may D. her husband on the ground of adultery and cruelty or two years' desertion, or on the ground of incestuous or bigamous adultery by itself, or on the ground of certain gross offences. Condonation (q.v.) or Collusion (q.v.) bars D. Desertion, however long, is not sufficient ground for D. unless accompanied with adultery. (See DESERTION OF SPOUSE, JUDICIAL SEPARATION.) After D. husband or wife may marry again, even with the co-respondent. The Judicature Acts have dealt with the practice and procedure of the Divorce Court established in 1857, and transferred its jurisdiction to the Probate, Divorce, and Admiralty Division of the High Court of Justice.

By the law of Scotland, D. may be had on the ground of adultery, or of wilful desertion for four continuous years. But neither of these grounds dissolves the marriage *ipso jure*. The offender forfeits all pecuniary benefit which might otherwise accrue to him or her from the marriage. Condonation or collusion also bars D. in Scotland. Recrimination does not; but as common guilt may affect the pecuniary interests of parties, it may be alleged in a counter-action. The guilty party, as well as the innocent, may contract a second marriage after D., but by special statute two guilty parties, declared so in the decree of D., are prohibited from intermarrying. After mutual decrees of D. each party takes his or her property as nearly as possible in the same condition as it was before the marriage, but when D. is obtained by one spouse, the decree binds the property of the guilty party for the entire benefit of the other, just as if the guilty party had died at that date.

Dix'on's Entrance, off the Pacific coast of N. America, is the strait between Prince of Wales and Queen Charlotte Islands, and an inlet receiving the Simpson River. It is about 100 miles long from W. to E., and partly separates British Columbia from Alaska.

Dixon, William Hepworth, an English author, descended from an old Puritan family, was born at Newton Heath, in the West Riding of Yorkshire, 30th June, 1821. After being for a short time in a Manchester mercantile house he took to literature, and settled in London in 1846, where he was called to the bar in 1854. He first attracted attention by his *John Howard and the Prison World of Europe* (1849), and two series of essays *On the Literature of the Lower Orders* and *On London Prisons*, originally published in the *Daily News*. D. now devoted himself almost entirely to historical and biographical works, publishing a biography of William Penn (1851), which obtained notoriety from its answer to the charges made against the great Quaker by Macaulay, a *Life of Robert Blake* (1852), *The Personal History of Lord Bacon* (1860), *Her Majesty's Tower* (1871), the *History of Two Queens* (1873-74), and *Royal Windsor* (1878-79); besides *New America* (1867), *Spiritual Wives* (1868), *Free Russia* (1870), *The Switzers* (1872), *White Conquest* (1875), and two novels, *Diana, Lady Lyle* (1877), and *Ruby Gray* (1878). Editor of the *Athenæum* from 1853 to 1869, and a Middlesex magistrate from 1869, D. died in London, 27th December, 1879. His style is picturesque, epigrammatic, and racy, and it is evident that he never used a word derived from the Latin when Saxon English happened to be as expressive. D. was made K.R.C. of Germany.

A warm-hearted man, of a genial and lively temperament, yet possessed of a somewhat bitter sharpness in retort, he made many friends and boasted of having a few enemies.

Dizful', the chief trading town of Khuzistan, Persia, on a river of the same name, at a foot of a range of hills, 36 miles N.W. of Shustar. It has an inferior bazaar, but it furnishes good supplies of victuals, and has a fine climate. To the N.W. of D. the river is crossed by an old stone bridge of twenty arches. Pop. 23,600.

Diz'ier, St., a flourishing town in the department Haute-Marne, France, on the river Marne, 30 miles S.E. by N. of Châlons-sur-Marne by railway. It has a theological school, a chamber of commerce, a fine townhall, and the ruins of an old castle. Its main industries are iron-smelting, cotton-spinning, and barge-building, and it has also an active trade in cabinet woods, grain, millstones, &c. Population 13,372. In the Middle Ages D. was called *St. Desiderii*, from being the last resting-place of Bishop Desiderius of Langres. It was long an important fortress, and in 1544 resisted for six weeks the army of Charles V. of Spain, its capitulation only being brought about eventually by the governor's treachery. On 25th January, 1814, the Russian general, Prince Tscherbatov, fought the French at D., and drove them back on Vitry, but two days later Milhaud recovered the town from Prince Lanskoi. The Prussians on the 30th January displaced Lagrange's division, and held D. till the 26th March following, when the French under Marshal Oudinot stormed and recovered it once more.

Djez'zar ('the Butcher'), the surname of an adventurer named Achmed, born in Bosnia about 1735, came into the hands of a slave-dealer in Constantinople, was bought at Cairo by Ali Bey, and earned his surname and the affectionate regard of his master by the facility with which he got rid of all persons obnoxious at court. In 1775 he was appointed Pacha of Acre. He exercised a commercial monopoly here, and extorted arbitrary impositions from a community of French merchants who had settled at Acre. Eventually he expelled the French consul and merchants, and sacked the consulate. This insult to the French flag was one of the considerations which determined Napoleon's expedition into Syria. On the 20th March, 1799, Napoleon opened the siege of Acre, but so obstinate was D.'s defence, that after attempting for two months to reduce the town, the French were obliged to retire. D., though a monster of cruelty, was possessed of great military and administrative capacity. He died in 1804.

Dmitrov' ('the town of St. Demetrius'), a town in the government of Moscow, Russia, on the Jakhrama, 40 miles N. of Moscow, with silk and woollen manufactures, tanneries, and a trade in linen, wax, and tallow. Pop. 10,026.

Dnie'per (Gr. *Borysthenes Banapris*, Turk. *Ohu*, Tartar, *Exi*), after the Volga and Danube the largest river of Europe, rises among forest marshes in the government of Smolensk. Its general direction is S., but in its lower course it sweeps first to the S.E. and then to the S.W. and W., and after a course of more than 1000 miles falls into the Black Sea below Kherson, its embouchure (*Liman*) forming a gulf on the W. side of which lies Odessa. In its mouth there is an archipelago of forty islands, on several of which there are forts. It is navigable nearly its whole length, the impediments produced by the numerous sandbanks and rapids in its lower course below Ekaterinoslav having been partly removed by blasting, and partly overcome by hydraulic works constructed at the expense of the state. Annually it is frozen for from 80 to 97 days. Its affluents from the E. are the Soj and the Desna, from the W. the Pripet and the Beresina. The D. traverses some of the finest governments of the empire—and Moghilev, Minsk, Kiev, Poltava, Ekaterinoslav, and Taurida—and conveys their products to the Black Sea. There is also some trade with the Baltic by canal communication between the D. and the Beresina and Dwina. At the mouth of the D. are valuable fisheries of sturgeon, herring, carp, &c.

Dnie'ster (anc. *Tyras*, *Taras*, *Danasterrus*, Turk. *Tur*), a river of Europe, rises on the N. of the Carpathians in Austrian Galicia, but is mostly in Russia. It enters the Black Sea 30 miles S. of Odessa, after receiving thirty-seven affluents, and after a course of upwards of 500 miles. The navigation, which is almost wholly downwards, is chiefly occupied with the transport of wood, grain, salt, &c. Mud flats and sandbanks obstruct the mouth of the river.

Do'ab (Sansk. 'two rivers'; comp. Lat. *duæ aquæ*) is the name given to the long, narrow strip of country in India, N.W. Provinces, lying between the Jumna and the Ganges, and stretching from Allahabad to the Himalayas. It includes the British districts of Meerut, Agra, Bulandshahr, Aligrarh, Muzaffarnagar, Saharanpur, Etah, Mainpuri; part of Muttra and Ettawah; and Cawnpur, Fatehpur, and Farukhabad, with part of Allahabad. The population is very dense, and mainly engaged in agriculture. The soil is fertile and productive. Easy communication is carried on both by land and water, and the region is connected with all the principal railroads in the peninsula. But the name is also applied generally in Northern India to any similar region. The Punjab, for instance, is subdivided into a number of Doabs.

Dobell', Sydney, an English poet, was born 5th April, 1824, at Cranbrook, in Kent. His youth was painfully precocious. Married in 1844 to one of the sweetest and truest women in England, he first came before the public in 1850 with the *Roman*, an impassioned dramatic poem, warmly espousing the cause of Italian freedom. After travelling in Switzerland he resided in Edinburgh until 1857, when he removed to Cheltenham and the Isle of Wight. He published *Balder*, a fervid, gloomy, and pathetic poem in 1854; *Sonnets on the War*, written along with Alexander Smith, in 1855; and *England in Time of War*, a collection of exquisitely musical, touching lyrics, in 1856. In 1865 he produced a pamphlet on *Parliamentary Reform*, in which, like Hare and Mill, he advocated a 'graduated suffrage.' Bad health hindered his literary activity during his later years. His *England's Day* (1871) is a defiant lyric against Grant, Bismarck, and Gortschakoff. D. died 14th November, 1874. In analytic subtlety he at times rivals Browning; his melody of verse is almost equal to Shelley's. His notes and memoranda were published as *Thoughts on Art, Philosophy, and Religion* in 1876, with a prefatory note by Nichol. See also Nichol, *Poetical Works of D.*, and *The Life and Letters of S. D. Edited by E. J.*

Dö'beln, a town of Saxony, on an island formed by the Mulde and Mühlgraben, 36 miles S.E. of Leipzig by the Mulde and Chemnitz Railway. It has manufactures of linens, woollens, brassware, &c., also bleachfields and worsted mills, a trade in butter, and important cattle and horse fairs. Pop. 12,087.

Dobrow'ski, Joseph, a Bohemian philologist, born at Gyermet, Hungary, 17th August, 1753, studied at Deutschbrot, where he acquired the Bohemian language, that of his childhood having been German. He afterwards studied at Klattau and Prague. In 1774, on the dissolution of the Order of Jesuits, to which he had attached himself, he withdrew to Prague, where he published his first work, *Fragmentum Pragense Evangelii S. Marci, vulgo autographi* (1778). From 1780 to 1787 he edited at Prague a journal of Bohemian and Moravian literature. From 1792 to 1795 he visited Denmark, Sweden, Russia, Italy, Germany, and Switzerland in search of MSS. illustrative of Bohemian history. After his return he exhibited symptoms of mental derangement, which, in 1801, necessitated his removal to an asylum. Recovering his reason in 1803, he lived sometimes at Prague, and sometimes in the country. He died at Brunn, 6th January, 1829. D.'s principal work is *Scriptores Rerum Bohemicarum* (Prag. 1783-84), in which he had Pelzel for a collaborateur.

Dobrud'scha, or **Dobru'ja,** the ancient Scythia Minor, since 1878 part of Roumania, is bounded, N. and W. by the Danube, E. by the Black Sea, and S. by a line drawn from Mangalia to near Silistria. It was the scene of numerous important operations during the Turko-Russian wars of 1854 and 1877.

Doce'tæ, heretics in the early Christian Church who held that the body of Jesus Christ was nothing but a phantom or appearance (Gr. *dokēsis*, hence the name), or that, if substantial, it was of a celestial substance. The heresy, which is supposed to be referred to in several passages of the New Testament, and the foundation of which is ascribed to Simon Magus, to Cassian, and to Tatian, was founded on the dualistic notion of the essentially evil nature of matter, so that the divine nature could not be supposed to unite itself with a material body and thereby expose itself to the pollution from which it was the object of Christ to free mankind, combined with the other favourite Oriental notion that a higher spirit has the faculty of presenting itself to the eye in various sensible but unsubstantial forms. See Neander's *Kirchengeschichte* and Blunt's *Dictionary of Sects*, &c.

Dock, an excavated enclosure, usually provided with gates, formed in connection with a river or harbour for the reception of ships. Docks are of two kinds, *wet* and *dry*. A wet D. is a basin in which the water is maintained at a uniform level by shutting the gates before the ebb of the tide, for facilitating the loading or unloading of vessels lying at the quays or jetties. A dry D. or *graving D.*, for repairing the exteriors of ships, is a long and narrow excavated basin with curved ends, lined with masonry, and left dry by the ebbing of the tide, or rendered so by pumping. A ship is floated in at high water, and is steadied in a vertical position by means of 'shores' and wedges. At low water the entrance is closed, and the remaining water pumped out. When the repairs are completed, the water is again admitted, and the vessel floated out. The walls of a dry D. slope inwards towards the bottom, and all round steps or 'altars' are constructed to allow of ready access to all parts, and also to serve as supports for the shores which hold the vessel upright. An inverted arch of masonry is usually constructed as a foundation for D. walls, which are thickest at their base, and are puddled with clay behind the granite or concrete facing, so as to be perfectly watertight. Cast iron has been used for the walls at the entrance to the Victoria (London) Docks, the iron plates being backed with concrete and coped with granite. As a protection from abrasion, fenders of timber are often secured to the faces of D. walls.

Gates or *caissons* are fitted at the entrance to docks, to shut out or keep in the tide. Small gates are formed of wood, large ones of wrought iron. The gates of the South Docks at the Isle of Dogs, in the Thames, are of the latter material, and are cellular, having two skins separated by horizontal and vertical ribs. Gates are usually in two parts, and the inner and outer upright posts, called the heel and mitre-posts, are generally of green-heart timber. Each leaf swings on pivots, working in sockets of gun-metal or chilled cast-iron, and is supported at the mitre-post on a roller which runs on a curved iron pathway. The sides of the gates are curved outwards, so as to resist better the pressure of the water. Caissons, shiplike in form, with stem and stern projections to fit into grooves in the masonry, are found convenient for closing D. entrances. They are built of wrought iron, and are divided into compartments, with apertures for the admission of water. To close a D. entrance, the caisson is floated into its proper position, and water being admitted to some of the compartments, it sinks down into the stone recesses; by pumping the water out, the caisson is readily removed. A shutting sill of timber is embedded in the masonry at the bottom of a D. entrance, and against it the base of the gates or keel of the caisson presses closely, preventing the passage of water.

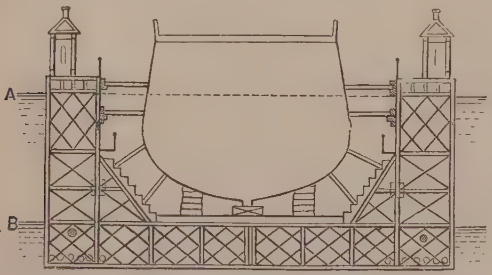
In recent docks, gates are opened and shut by hydraulic machinery, a power which is now used for emptying graving docks, and working the swing-bridges, capstans, cranes, and other D. conveniences. To further the performance of business, every facility is provided in docks. There are all kinds of hoisting apparatus and mooring-posts; and rails are laid along the quays having connection with the great railway systems; extensive warehouses and cellarage for the storage of goods, jetties to accommodate vessels of considerable draught, &c.

Sluicing is frequently resorted to to clean wet docks of the mud that is constantly being deposited. The docks being allowed to run dry, the mud is thrown into deep channels, and carried away by the scouring water that has meanwhile been admitted into them from sluices.

The docks of Great Britain surpass in extent those of any other country. The most remarkable examples are to be found on the Thames and the Mersey. The docks on the East of London, having an area of over 1100 acres, comprise the Surrey Commercial, East India, West India, St. Katharine's, London, Victoria, Millwall, and Tilbury Docks (the latter cost £3,000,000; opened 1886). The total area of the Liverpool and Birkenhead docks and basins, irrespective of graving docks, amounts to 440 acres, with a wall quay-face 28 miles long. The graving docks number eighteen, having an aggregate length of floor of upwards of two miles; the Herculaneum graving docks are the largest, the floor of each being 750 feet long. There are also important docks of both kinds at Bristol, Hull, Cardiff, Swansea, Pembroke, Southampton (where a new dock was opened in 1895 to accommodate the vastly increasing traffic), Sunderland, Shields, Leith, Dundee, Great Grimsby, &c.

Other Arrangements for affording Access to Ships' Exteriors.—In past times *beaching* and *careening* were resorted to. In the former operation the vessel was run on to the beach, so that it was left high and dry by the ebb of the tide; in the latter, it was heaved over first on one side and afterwards on the other, so that the keel was raised out of the water by means of power applied to the masts, which were properly strengthened for the great strain. In some situations a *slip* or inclined plane, with vertical wheels and hydraulic machinery for dragging a vessel out of the water is adopted. (See SLIP.) In America vessels are raised out of the water by means of a *screw D.*, or timber frame raised or lowered by means of screws and other machinery.

Floating Docks.—In localities where the construction of graving docks would be enormously expensive, a most convenient substitute is found in a floating D., which has the advantages of being independent of the tide. In the United States timber structures of this nature have been in use for many years. In Great Britain iron has been employed in their construction. The Spanish port of Ferrol, on the Atlantic, possesses a floating D., made after the designs of G. B. Rennie, wholly constructed of plate, angle, and T-iron riveted together. It resembles an oblong rectangular box without top or ends, and measures 350 feet long, 105 broad, and 37½ high from the floor of the D. The base or pontoon and side walls are hollow, and divided into watertight compartments, strengthened by open lattice girders and diagonal bracing, which give the structure great rigidity. The upper chambers in the side walls are airtight, and keep the D. from sinking too low when water is admitted by sluices and distributed by pipes through the lower chambers. When the D. is sufficiently submerged, the sluices are closed, and the vessel to be docked is drawn in between the side walls. The water in the chambers being then pumped out, the D. rises gradually, lifting the vessel, which is steadied with the usual appliances, completely out of the water, as shown in the following figure. The displacement of water by the base equals 13,000 tons, and deducting the weight of the D. itself, 5000 tons, a sustaining or lifting power of 8000 tons remains. An iron floating D. of different construction was launched at North Woolwich in 1868, and towed in the following year to Bermuda, where it has successfully docked first-class men-of-war. It is U-shaped in section; the double sides and bottom, 20 feet apart, are divided into compartments, and a caisson is fitted at each end. To dock a vessel, some of the compartments are filled with water to sink the D. sufficiently, and then water is admitted into the inside by valves in the caissons, till the sea outside and inside has the same level. The caissons are next taken out, and the ship led in over the central line of blocks. The D. is afterwards raised about 10 feet by partly emptying the chambers, the caissons are placed in position, and the water remaining inside the D. is run into the side balance-chambers, leaving the vessel dry. To undock the vessel, the side chambers are filled up, and water let into the inside of the D. by the openings in the caissons, which are then removed and the ship led out. Pontoons capable of supporting small vessels may be used in connection with this D. The Bermuda floating D. affords facility for the examination of its own base, by filling the upper chambers of one side with water.



Transverse Section of Rennie's Floating Dock.

A, Level of water preparing to receive first-class ship.
B, Level of water with first-class ship docked.

Hydraulic Lift Dock.—This is another ingenious contrivance for the dry-docking of vessels. One of them was supplied to the Victoria Docks, London. On two parallel sides of a channel 300 feet long and 60 feet broad, sixteen upright cast-iron columns, in a row, are sunk into the ground. At the base of each column there is an hydraulic press, and the top of each piston or ram carries a cross-head, from the ends of which two iron girders are suspended by iron bars. These girders extend across the excavation to the cross-head of the corresponding column on the opposite side. There are thus thirty-two girders forming a kind of platform capable of being raised or lowered. On this platform rests a wrought-iron pontoon, open at the top, having sufficient buoyancy to support a vessel. To apply the apparatus, the girders and pontoon, weighted with water, are sunk to the bottom of the lift, and the vessel to be raised is drawn in directly over the centre of the pontoon. The rams are then slowly raised by hydraulic power, the vessel being at the same time secured by wedges and blocks. When out of the water, the pontoon is emptied by valves which are afterwards closed. The girders being again lowered, the pontoon, with the vessel upon it, remains afloat, and may be towed to a convenient spot. As many vessels as there are pontoons can be docked in a similar manner.

Dock, a sub-genus of *Rumex* (see SORREL), containing those plants which are not acid, and the flowers of which are almost invariably hermaphrodite. Most of them are troublesome weeds, though they may grow in watery places. The roots of the great water-D. are administered as an antiscorbutic, and were looked upon by the Druids with superstition. The roots of other species are also astringent, and can be employed medicinally in rheumatism as styptics, as astringent gargles, or as a dentifrice. Monk's rhubarb has been employed in place of true rhubarb, but is not so powerful. The roots of D. have also been employed in dyeing. In all, there are eleven British species of D.

Dock'et, in English law, is a record in the courts containing an entry of judgment. *Striking a D.* was when a creditor gave a bond to the Lord Chancellor to prove his debtor to be a bankrupt. See DOQUET.

Dock'ing Horses. When young work-horses are sent to grass, they are docked, *i.e.*, six joints of their tails are amputated, the object being to keep the naturally long tails from being incommoded in the trams of a cart. The cutting is accomplished by aid of a machine similar in form to a pair of nutcrackers. It is a cruel custom and is now held to be illegal.

Dock Warrant. When goods are consigned in a Bonded Warehouse (q.v.), a certificate is granted called a D. W. When a transfer is made, the warrant is endorsed with an order to deliver to the purchaser. An entry in the warehouse books completes the transference. When a D. W. is lost, a new one will only be granted on security of indemnification to the company should loss arise in consequence.

Dock'yard, a naval arsenal for the construction, repairs, and equipment of ships. A D. usually embraces building slips, repairing docks and basins, workshops, and all the machinery and tools necessary for the manufacture of anchors, cables, and other adjuncts of a ship and storehouses. The royal dockyards in Great Britain are at Portsmouth, Devonport (Plymouth), Chatham, Sheerness, and Pembroke. Woolwich and Deptford dockyards were closed in 1869. Early in this century the English dockyards were in a very backward condition; now they are unequalled for completeness.

Dockyard and Naval Stations.—Statutes 46 Geo. III. c. 153; 10 Vict. c. 27; 16 and 17 Vict. c. 107; 24 and 25 Vict. cc. 45, 47, 80; 25 and 26 Vict. cc. 16, 69; 26 and 27 Vict. cc. 30, 31; and 28 and 29 Vict. c. 100—provide for the security of the ports, wharves, embankments, harbours, piers, and navigable rivers of the United Kingdom. They regulate the mooring and placing of private ships, restrict the keeping of gunpowder on board ship, &c.

Doc'tor (from Lat. *doceo*, 'I teach'), a title at first bestowed on one who could teach a special art or science, but now applied to one who has taken the highest degree in law, divinity, physic, or music. The title was probably first sanctioned at Bologna University about the middle of the 12th c., where Inerius or Werner, Professor of Roman law, is said to have induced the Emperor Lothar II. to introduce the dignity. The title then passed into the faculty of divinity—Peter Lombard, Bishop of Paris, being made D. of divinity by the Paris University in the middle of the 12th c. The first D. of medicine was Gulielmo Gordenio, of Asti College, elected *D. artium ex medicinâ* in 1329. The title was not introduced into the English universities until the reign of John or of Henry III. See DEGREE.

Doctors' Commons was the college in London founded by Dr. Harvey, the Dean of Arches, in 1568, for the professors of the civil law. In it were situated, prior to the transfer of the ecclesiastical jurisdiction and the opening of the Probate and Divorce Courts, the residences of the judges of the spiritual and admiralty courts. It was also the abode of the doctors of the civil law practising in London, who for diet and lodging commoned together; hence the name of D. C. To the college belonged a certain number of advocates and proctors. The Courts of Arches (chief ecclesiastical court of the province of Canterbury) and Faculties, and the Vicar-General's office for granting marriage licenses, were in the renowned D. C. The statute 20 and 21 Vict. c. 77, dealt with this college, and under its provisions the property of the college was sold, the charter was surrendered, and the collegiate body was dissolved.

Doc'trinaire means, in the first place, a secular priest or clerk of the Christian doctrine. In this sense it has been displaced in the French language by *religionnaire*. Under the Bourbon Restoration it was applied to a set of political men, who professed to deduce their ideas, half liberal half conservative, from a coherent body of political theory. This fraction of the Chamber existed in 1816, when the name was first applied to Royer-Collard by the *Nain Jaune Réfugié*, a French newspaper published at Brussels. Cousin and Broglie were also leading Doctrinaires. But their representative man was Guizot, who in 1822, by an *Essay on the Origin and Development of the English Constitution*, revived that excessive admiration of *de facto* legitimacy which Montesquieu and De Lolme had already evinced for the English Constitution. He endeavoured to construct a political eclecticism on the ruins of Boulainvilliers the feudalist, Dubos the monarchist, De Mably the democrat, and Demaistre the theocrat. Practically the Doctrinaires were for extension of the *Charte* of Louis XVIII., and, therefore, opposed the absolutism of Charles X. Under Louis Philippe, however, most of them, then beyond middle age, were unable to move with the times; and it has been said that the Doctrinairism of Guizot, when in power, was sufficient to excuse the Revolution of 1848. Hence D. is sometimes used to denote an unpractical pedant—in vulgar language, a political prig. In England the term was applied to Bentham and other writers in the *Westminster Review*.

Dodd, Charles, the assumed name of Hugh Tootel, an English Roman Catholic historian, who was born near Preston, 1672, studied at Douay and at St. Gregory's, Paris, entered the priesthood, and settled (1697) as a preacher in Lancashire. He wrote a *Church History of England from* 1500 to 1688, which contains much curious and valuable information drawn from original papers, letters, &c. This work was published in Brussels (1737-39-42), and a new and corrected edition was begun by the late A. Tierney, but only five vols. appeared (1839-43). D. wrote many other works. He died 27th February, 1743.

Dodd, William, LL.D., a popular divine, was born at Bourne, in Lincolnshire, June, 1729, graduated as B.A. at Clare Hall, Cambridge, and then went to London, where he soon gained a wide reputation for effective preaching. After holding a prebend in the collegiate church of Brecknock, he was, through the influence of his former pupil, Lord Chesterfield, made a chaplain to the King, but lost the office for trying to acquire the living of St. George's, Hanover Square, by bribery. In return for the many favours he had received from his generous pupil and patron, he forged a bond for £2000 in the name of that nobleman, for which act he was condemned at the Old Bailey, 24th February, 1777, and executed on the 27th June following. D. was meanly ambitious, and nourished habits of luxurious wastefulness. Of his many works, the chief are a *Commentary on the Bible*, *The Beauties of Shakespeare*, *Reflections on Death*, and *Sermons on the Miracles and Parables*. See D.'s *Memoirs*, prefixed to his *Thoughts in Prison*.

Dodd′ed Cat′tle are animals without horns. The name is also given to cattle which, naturally having horns, have had them cut off to prevent them goring their neighbours in the field or fold—a method which should also be adopted in the foreign live cattle traffic. The details, as given by persons who have witnessed the horrors of the ocean passage, are hideous and revolting, and would lead us to believe that in no previous age has so much cruelty been inflicted upon this portion of the brute creation as in ours. Cock-fights and bull-baiting may be considered harmless amusements when compared to the ordinary every-day transit of cattle, some of which are suffocated, trampled, or gored to death by their neighbours. The public are ever ready to rush to the rescue of the victim of man's cruelty, and to punish the culprit when the former is a horse, dog, cat, or even donkey, but the tragedies on board of the ocean cattle steamer do not seem to appeal to anybody's sense of humanity. The veneer of the so-called civilisation of the 19th c. must indeed be extremely thin when a traffic so conducted is allowed to continue without check or remonstrance.

Dodd′er, a genus of annual leafless plants, of the natural order *Cuscutaceæ* (q.v.), which originally take root in the ground, but afterwards become parasitic, and sever their connection with the soil. There are two British species, *C. Europæa*, which chiefly attaches itself to thistles, oats, &c., and *C. Epithymum*, a smaller plant, which grows on thyme, &c. In addition, there are now naturalised in the English flora two other species or varieties, probably originally introduced with foreign seed, viz., *C. Epilinum* (the flax D.), and *C. Trifolii* (the clover D.). They are all very troublesome to cultivated crops, and the only remedy is to sift out the seed of the D. which has got mixed with that of the cultivated crop.

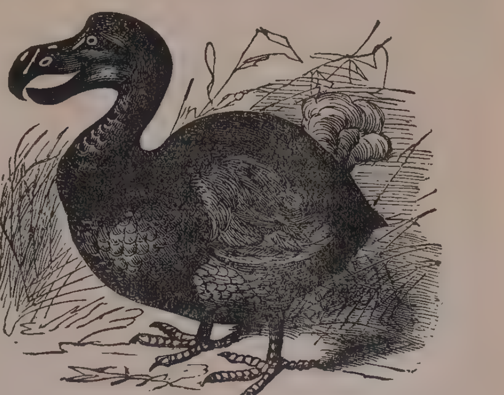
Dodd′ridge, Philip, a Nonconformist preacher and theologian, born at London, 26th June, 1702. He was educated at Kibworth, Leicestershire, of which place he became a minister in 1722, and whence in 1725 he removed to Market Harborough, where he opened a school. About 1730 he settled as a dissenting minister in Northampton. Bad health induced him to visit Lisbon, where he died, 26th October, 1751. His chief prose works are *Four Sermons on the Education of Children* (1732); *The Absurdity and Iniquity of Persecution for Conscience' Sake* (1736); *The Family Expositor* (1738); *Rise and Progress of Religion in the Soul* (1744); *Course of Lectures* (1763). D. is, however, best known by his hymns, which glow with impassioned devotion, and justly rank among the finest products of the evangelical muse.

Dodec′agon (from Gr. *dōdeka*, 'twelve'), an equilateral and equiangular plane figure of twelve sides. If a be the length of the side, the area is approximately 11·196 a^2.

Dodecahed′ron (from Gr. *dōdeka*, 'twelve,' and *hedra*, a 'seat' or 'basis'), one of the five regular solids, being bounded by twelve equal pentagons and thirty equal edges, and having twenty equal solid angles. If a be the length of each edge, the superficial area is approximately 20·6457 a^2, and the solid contents 7·66312 a^3.

Död′erlein, Ludwig, an eminent German philologist, was born at Jena, 19th December, 1791, studied at Munich under Thiersch, at Heidelberg under Creuzer and Voss, and at Berlin, where he graduated, under Wolf, Böckh, and Buttermann. In 1815 he was appointed Professor of Philology at Berlin, removed to Erlangen in 1819, where in 1827 he became Director of the Philological Seminary. He died 9th November, 1863. D. edited the works of Tacitus and the *Epistles* and *Satires* of Horace.

Do′do, a singular wingless bird, which has become extinct, through human interference, within the last 300 years. It inhabited the island of Mauritius. Most naturalists relegate it to the Rasorial birds, as possessing its nearest living ally in the *Didunculus strigirostris*, or tooth-billed pigeon of the Navigator Islands. It was a clumsy bird, larger than a swan,



The Dodo.

and weighing about 40 or 50 lbs. The Dutch navigators named it *dod-aer*, of which word the English D. is a corruption. Various writers describe the D., but it appears certain that the bird, being unable to fly, offered an easy prey to the sailors who visited Mauritius. A specimen was deposited in the Ashmolean Museum at Oxford, but unfortunately was allowed to go to waste, the head and feet being alone preserved. A good representation is contained in the British Museum. The legs were short and stout, the feet had each four toes; the tail was also short, and, like the rudimentary wings, carried a tuft of plumes. The bill was large, and prominently curved and hooked; the plumage a greyish brown, that of the females being paler. The D. was said to lay but one large egg. It is curious to note that the wingless Solitaire (q.v.) or Pezohaps disappeared, like the D., from the adjacent island of Rodriguez.

Dodo'na, a town in Epirus, was the seat of the oracle of Zeus, which was the most ancient in Greece. Homer attests its antiquity, and describes the Selli or Helli, who were the interpreters of Zeus. The god was believed to dwell in the stem of an oak, and the priests interpreted his will, as instructed by the branches of the tree. In later times, the oracles were interpreted by three old women. D. waned in influence with the growing importance of Delphi, and though it long continued to be consulted, and to enjoy wide celebrity, its advice was chiefly sought by the neighbouring tribes. In 219 B.C. the temple was destroyed by Dorimachus, general of the Ætolians. The site of D. has not yet been clearly established.

Dods'ley, Robert, an English author and publisher, was born at Mansfield, Nottingham, in 1703. The son of a poor schoolmaster, he was forced by bad health to serve as a footman, and in 1732 published *The Muse in Livery, or the Footman's Miscellany*, a volume of poems, which was followed by *Kitty, a Pastoral*, and *The Devil is a Dunce*. In 1775 his drama, *The Toyshop*, was, through Pope's influence, acted at Drury Lane, with such success that D. was enabled to open a bookseller's shop. He became a prosperous publisher, and wrote various plays, of which the most popular were *The King and the Miller of Mansfield* (1737), *Sir John Cockle at Court*, *The Blind Beggar of Bethnal Green*, and above all *Cleone*, which met with boundless applause. He published several of the works of Johnson and Pope, and started various periodicals, such as *The Public Register*, *The Museum*, *The Annual Register*. D. died at Durham, 25th September, 1764. He is best known now for his *Select Collection of Old Plays* (1780).

Dog, a genus and the type of a family (*Canidæ*) of Carnivorous mammalia. The family includes not only the dogs, but their near allies the foxes, wolves, and jackals. As a family, these animals are distinguished by their pointed muzzles, smooth tongues, and by possessing claws incapable of being retracted, as in the *Felidæ* or cats. The front feet each possess five toes, and the hinder feet four digits. They are Digitigrade (q.v.), in that they walk, like lions, &c., on the tips of their toes. The molar teeth in this family number either twelve in the upper jaw and fourteen in the lower jaw, or fourteen in either jaw. Two or three of the molars on each side are provided with tubercles or blunt processes. In the genus *Canis* itself—to which the wolf and jackal also belong—the incisor teeth number six, the canines two, the præmolars eight, and the molars four in each jaw. The pupil of the eye is round. The tail is of moderate size, and is covered with short hair. The subject of the relations of the many varieties or kinds of dogs assumes the same difficult aspect in treatment as that of determining the exact nature of the breeds of other animals, such as the ox and sheep, which have been extensively cultivated and reared by man; and the question becomes still more difficult when we attempt to determine the relationship of the so-called *wild* breeds of dogs to their more domesticated neighbours. Some naturalists incline to the belief that in the present day the D. is only known to us as a domesticated animal; and these authorities regard the wild races as having sprung from domesticated breeds. Others again maintain the distinct and primitive nature of certain wild dogs—such as the hunting D. of S. Africa, and the Dhole of British India—and believe that these or similar forms may represent the progenitors of the many existing breeds of dogs. Darwin inclines to the belief that the breeds of the domestic D. 'are descended from several wild species,' and he says, 'it cannot be doubted that there has been an immense amount of inherited variation; for who will believe,' he continues, 'that animals closely resembling the Indian greyhound, the bloodhound, the bulldog, pug-dog, or Blenheim spaniel, &c.—so unlike all wild *canidæ*—ever existed in a state of nature?' Another equally important subject is the question of the fertility or sterility of the progeny of the wolf and D. when interbred. We know with certainty that all our existing breeds of dogs can interbreed; and also that the D. will interbreed with the wolf and the jackal, although the exact extent of the fertility of the wolf and D. breed has not been determined. Probably the fertility is not affected by time, and in this view the common parentage or descent of the D., wolf, and jackal might be assumed by evolutionists. Le Roy instances a D. whose great-grandfather was a wolf, and which showed its wild origin particularly 'by not coming in a straight line to his master when called' (Darwin). The entire subject of the origin of the breeds or races of dogs becomes further complicated when we reflect that naturalists are by no means clear among themselves as to the characters which are to be deemed purely *specific* in their nature, and those which, on the contrary, are only of *varietal* value. Until, therefore, decisive information be obtained as to what characters constitute a true *species*, and what are those of a mere *variety*, the exact relationships of the dogs must remain a matter of conjecture and dispute.

The characters of dogs naturally vary with the particular breed or race to which they belong, and information on this head may be sought for in the separate articles devoted to the various kinds of dogs. The period of gestation in the D. is the same as that of the wolf—63 days—and this fact, together with the close similarity in the skeleton, has by some naturalists been cited as evidence in support of their similarity of origin and close relationship. An argument against this identity is derived from the observation that dogs when left to themselves, and when existing as nearly as possible in a state of natural freedom, do not tend to become savage or exhibit wolfish characters. From the most ancient times the D. has been the companion, and, without exaggeration, one may say the 'friend,' of man. The ancient records, both sacred and secular, attest the close companionship of the human and canine races, and in ancient Egypt the D. assumed a high place in the phases of animal-worship. The average life of the D. varies according to its race, but in general is about twelve years. The intelligence of these animals also depends much upon the breed and training. The shepherd's D., Scotch terrier, and Newfoundland D., probably possess, of all the breeds, the greatest natural intelligence. See also SPECIES.

Laws Regarding Dogs.—To allow any *mischievous* dog to go loose or unmuzzled is an indictable offence; and if the dog injure any one, he will have ground for a claim of damage against the owner, but not unless the owner has had notice of the dog having bitten someone before—in fact, the dog is entitled to the first bite. By 28 and 29 Vict. c. 60, the owner of a dog is liable in damage for any injury done by it to cattle or sheep; and in England it is not necessary for the party claiming damage to prove that the owner previously knew of the dog's mischievous propensity. In Scotland this knowledge must be proved, it having been so decided by the House of Lords, reversing the judgment of the Court of Session, in the case of Fleming *v.* Orr, 3rd April, 1853 (1 Macqueen). (See DAMAGES.) By 24 and 25 Vict. c. 96, any person convicted of stealing a dog before two or more justices may be imprisoned for six months with hard labour, or forfeit £20 more than the value of the dog. A second offence is a misdemeanour, punishable by fine or by eighteen months' imprisonment, with or without hard labour. To receive money for restoring a stolen dog, or corruptly under the pretence of restoring one, is punishable with eighteen months' imprisonment with hard labour. The duty on a dog is 7s. 6d.; dogs under six months old and those used for blind persons, sheep, and cattle are exempt; this duty is regulated by 42 and 43 Vict. c. 21, and two previous statutes which it amends. No dog can be used as a draught animal (2 and 3 Vict. c. 47), and under the Dogs Act of 1871, the Contagious Diseases Act (Animals) of 1886, and the Metropolitan Street Act of 1867, stray masterless dogs may be destroyed, and dogs not under proper control may be restrained wandering or approaching the public.

Dog'bane, a genus of plants belonging to the natural order *Apocynaceæ* (q.v.). The fly-trap of N. America is cultivated in this country. 'The five scales in the throat of the corolla of this plant secrete a sweet liquid, which attracts flies and other insects to settle on them; the scales are endowed with a peculiar irritability, the cause of which has not been accurately determined, but which causes them to bend inwards towards the centre of the flower when touched, and to retain the unlucky flies as prisoners. Numbers of dead flies may be seen in the several flowers of this plant. The movement of the scales probably serves to scatter the pollen on the stigma' (Masters). The bark of the root is emetic, diaphoretic, and tonic, but in large doses more or less poisonous and acrid. From the fibrous bark of the Canadian or Indian hemp the Indians prepare the twine of their fishing-nets, linen, &c. Its roots have the same medicinal properties as the preceding species. The milky juice of all the genus when dry exhibits the properties of India-rubber.

Dog'days. See CANICULAR DAYS.

Doge (Lat. *dux*, Eng. *duke*), the title of the principal executive magistrate in the Venetian and Genoese republics. The Venetian dogate goes back to 697, when Anafesto Paoluccio was elected. At that period the doges were actual sovereigns, but their supremacy soon began to arouse popular jealousy. The D. Orso was killed in 737, and for some years an annual magistracy ruled the republic. But the life-dogate recommenced in 742, and from that year till 1172, forty doges held the power, upon which limitations were imposed in 1032. Of these, only half were allowed to die a natural death. In 1172 the constitution underwent a change. The Great Council of 480 obtained the right to choose the D. Sebastiano Ziani was the first ruler under the new order, and in his dogate began the ceremony of the wedding of the Adriatic. (See BUCENTAUR.) Six members of the Great Council were delegated to advise the D., and the sixty *Pregadi*, or Venetian senate, performed a similar function. Thus the power of the D. was greatly circumscribed, but he still remained Captain-General of the Forces. After 1310 the appointment of the Council of Ten reduced the D. to a political nonentity, his office to a mere state show, with a few unimportant privileges, and several heavy drawbacks. The last D. of Venice, Lodovico Manin, was elected in 1788, the dogate lapsing with the fall of the republic in 1797. See VENICE.

The republic of Genoa was also governed by doges, of whom the first was Simon Boccanegra, elected in 1339. The Genoese dogate was held at first for life, like the Venetian, but under the new constitution of 1528 (see DORIA) was restricted to two years. The power of the D. was solely executive, legislative functions being discharged by councils. In 1804 the republic and the dogate ceased to exist. See GENOA, and Hallam's *Middle Ages*, chap. iii.

Dog'fish, a name applied generally to certain genera of fishes, closely allied to the sharks, and included with the latter forms in the order *Elasmobranchii* (q.v.). The D. belongs to the group *Plagiostomi* (q.v.), in which the mouth is transverse, and on the under surface of the head. The gills exist in the form of pouches or sacs, and open externally on the sides of the neck by distinct apertures. The pectoral fins exist on the breast, the ventral fins being abdominal in position. The dogfishes constitute the family *Squalidæ*, which includes numerous genera. Thus the genus *Scyllium* embraces the little D., the rock D. and other forms. The genus *Pristidurus* is exemplified by the black-mouthed D. The tope or miller's dog is the *Galeus canis* of the naturalist, the smooth hound or D. being the *Mustelus vulgaris*. Another common species is the picked D. These fishes are all common in British waters, and are bold and voracious in habits. See articles on the separate species of Dogfishes.

Dogfish.

Dog-Fox, a term applied to the male fox, and also to certain genera of dog-like animals belonging to the family *Canidæ* (see DOG), and represented by the *Corsac* (q.v.) and other species included in the genus *Cynalopex*.

Dogg'er, a kind of sea-going fishing-boat used by the Dutch.

Dogger-Bank, a great sandbank in the N. Sea, extending from 36 miles E. of Flamborough Head to 60 miles off Jutland. In some places it is 60 miles broad, and 9 fathoms in the shallowest part near England. It has valuable cod-fisheries. The Dutch and English fleets fought a drawn battle here in 1781.

Dog-Grass. See COUCH-GRASS.

Dog'ma (Gr. 'a decree') means primarily a decree, edict, or statute, as in Luke ii. 1, Acts xvi. 4, &c. In theology it means properly a positive statement of doctrine derived from divine revelation and enunciated by the Church; or, in a looser sense, the peculiar doctrine of a particular section of the Church, in which sense it is synonymous with an article of a creed. In the early Church, D. was sometimes used in the sense of the Christian religion or the faith of Christ, as the expositors generally supposed St. Paul used it in Eph. ii. 15; and it has a similar meaning yet; so that D. is Christian doctrine generally, as distinguished from *a* D. or doctrine.

The history of D., or of the gradual development of the doctrines of the Christian Church, formerly treated only in connection with ecclesiastical history or dogmatic theology, has, on account of its extent and importance, been recently advanced into a special part of Church history. In this position it forms the transition from Church history to dogmatic theology, its basis being biblical theology, while dogmatic theology continually supplies it with materials. Dogmatic theology proper is the rationale of the whole D. of the Catholic Church at a particular time, and the subject of the history of D. is the D. as it presents itself in the various stages of its development. (See DEVELOPMENT OF DOCTRINE.) Comparative dogmatic theology (Ger. *sumbolik*) has for its object a survey of the distinguishing principles of the different sections of the Church as embodied in their confessions of faith: and stands in the same relation to the history of D. as the Church statistics of any particular period stand to ecclesiastical history. The first attempt at compiling a system of dogmatic theology was made by Origen (q.v.). Augustine also wrote a work on Christian doctrine. But the founder of systematic theology was John Damascenus (q.v.), and the structure was completed in the Scholastic period, from the 8th to the 16th c. Since the Reformation, the Roman Catholic Church, regarding Protestants in the same light as the early Church regarded heretics, has found it necessary to exhibit her doctrine definitely in new confessions of faith. Protestants have also set forth their distinguishing principles in confessions which had reference to the Church of Rome, to the controversies within the Protestant Church itself (*e.g.*, between Lutherans and Calvinists), and to the tenets of heterodox sects (*e.g.*, Baptists, &c.).

Dogs, Isle of (*Poplar Marshes*), a projection or peninsula of the northern bank of the Thames, 3½ miles E.S.E. of St. Paul's, is insulated by the canal of the West India Docks. There is an old legend of doubtful authenticity to the effect that a king of England kept his dogs here; hence the name. It has an area of about a mile square, and though in the midst of a district of great activity, its appearance is squalid and uninviting.

Dogshores, pieces of wood so placed as to prevent motion in a ship about to be launched when all other supports are taken away. See LAUNCHING.

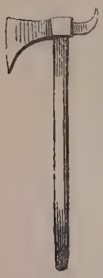
Dogs'tail Grass, a very numerous genus of grasses, natives of Europe and Asia. The crested D. G. is the only one of the two species found in Britain of any value as a pasture grass. From its shining yellow seeds it is sometimes known as the *goldseed*.

Doi'ley, or **Doi'ly** (perhaps from Dutch *dwaal*, 'a towel'), a napkin or small towel, sometimes coloured and embroidered, on which glasses were laid when the table was spread for dessert. D. is still used between finger-glasses and plates, and on dressing-tables.

Doit (Dut. *duit, duyt;* Ger. *deut*, from Venet, *daota*, a piece of eight soldi, *da oto soldi;* compare Fr. *dhuit, de huit*, of eight), an old Dutch copper coin, of which eight went to the *stiver* or halfpenny. It was also a division of the English grain Troy. It is used by the Old English writers to mean a coin of most trifling value, or a matter of no consideration. See Shakespeare's *Coriolanus*, act i. sc. 5.

Dokk'um, a town in the province of Friesland, Holland, on the Ee, 11½ miles N.E. of Leeuwarden, with a haven accessible to the largest sea-going ships. It has shipbuilding yards, breweries, distilleries, potteries, and wool-carding establishments, and a trade in wool, cattle, butter, and cheese. St. Boniface (q.v.) was slain here in 755. Pop. 4025.

Dolab'ra, in Latin, a hatchet or splitter (from *dolare*, 'to split,' allied to the Old Eng. *daelan* and the Ger. *theilen*, 'to divide'). In Latin it means a military, an agricultural, and a butcher's implement. Specimens are represented on the columns of Trajan and Antoninus.


Dolabra.

Dol'ce (Ital. from the Lat. *dulce*), sweet or sweetly, used as an expression mark in music.

Dol'ci, Carlo, or **Carlino,** a famous Florentine painter, was born in 1616. He came of a family of artists, his father, grandfather, and uncle being all painters of repute in Florence. His life was passed in the pursuit of his art, and he produced many fine works. He died at Florence, 17th January, 1686. D.'s style is marked by extreme delicacy and purity of colouring, and by elaborate finish. His range of subject was limited to madonnas, saints, holy families, and kindred themes. The most noted are his 'St. Cecilia,' 'St. Anthony,' 'Conception of the Virgin,' and 'Christ Blessing the Bread and Wine.' See Baldinucci's *Life of C. D.*

Dole, in English law, is a boundary mark, consisting of a post of wood or iron, or of a heap of earth; also a portion or lot in a distribution of money, &c.

Dole, in Scotch law, is defined as the evil intention essential to guilt. Simple negligence does not constitute a crime, but gross carelessness, however, is in certain cases criminal, without evil intention. This the law construes into D. See CULPA.

Dôle, a town in the department of Jura, France, in the beautiful Val d'Amour, on the Doubs, and on the Rhône and Rhine Canal, 28 miles S.E. of Dijon by railway. It has a tribunal of the first instance, a Jesuits' college, a public library of 40,000 volumes and 617 MSS., an art gallery, a museum of antiquities, &c., and is the centre of large iron industries and of an active trade in corn, timber, and marble. Its chief buildings are the large cathedral of Notre Dame, dating from the 16th c., the Hôtel-Dieu, of the 17th c., the Palais de Justice, formerly a Franciscan convent, and the ruins of a Roman bridge. Near D. are a mineral spring and marble and millstone quarries. The town existed before the invasion of the Romans, from whom it received the name *Dola Sequanorum*. It stood on the Roman road from the Rhine to Lyon, and has still many remains of this period, as the ruins of two aqueducts, an amphitheatre, and a temple. Later it became capital of Franche-Comté, the seat of the parliament, and of a university (1423-81), and was strongly fortified, but was taken by Charles of Amboise for Louis XI. in 1479. In 1636 it was attacked in vain by the Prince de Condé, and in 1668 eagerly espoused the cause of Louis XIV., who now made himself master of Franche-Comté, and who razed the fortifications of D. in 1674. The Austrians under Bubna here forced the passage of the Doubs, 6th January, 1814. D. was the headquarters of Garibaldi during the war of 1870. Pop. commune 14,253; arrond. 69,278.

Dol'erite, a term given by geologists to a group of igneous rocks of a dark green or grey colour, and composed of felspar (triclinic) with magnetic iron and olivine. The typical D. is a 'crystalline-granular mixture of labradorite and augite with magnetic iron.' It often contains small quantities of the carbonates of iron and lime.

Doles, at funerals (from *to deal*, 'giving money or bread in charity'; hence *to dole*, 'giving grudgingly'). This is a custom of the Early and Middle Ages, probably founded upon the Catholic doctrine of prayers for the dead. D. were given to procure rest for the departed spirit; and the usage at one time prevailed throughout Great Britain of giving something to all classes of the community at a funeral. A slight resemblance to this Christian custom may be traced in the funerals of Mohammedan princes, when a crowd of the poor follows to gather the small coins thrown to them on such occasions.

Dolgell'y ('dale of hazels'), the county town of Merioneth, N. Wales, on the Wnion, 3 miles above its estuary, and 46 W. of Shrewsbury. It is prettily situated near the base of Cader Idris, and its industries are chiefly woollen (Welsh tweed) and flannel weaving, tanning, bleaching, &c. The Wnion is here crossed by a stone bridge of seven arches. In 1404 Owen Glendwr held a parliament at C., and there allied himself with Charles VI. of France. Pop., in summer much increased by visitors, reg. dist. 14,492; civ. par. 3785.

Dolichoceph'alic, a term first introduced by Retzius to denote human skulls which are much elongated from before backwards, as distinguished from those termed *brachycephalic*, which have nearly as great breadth as they have length. See SKULL.

Dol'ichos, a genus of Leguminous plants including several shrubby annual and perennial herbaceous species cultivated for their flowers, seeds, or young pods, which are boiled for the table. About sixty or seventy rather dubious 'species' have been described, from the tropical and temperate regions of Asia, Africa, and America. Among the best-known species is the D. of the W. Indies and tropical S. America. In France it is much cultivated for the succulent young green pods, which are boiled for table. The tuberous root as well as the pulse of the D. of Martinique are eaten. The horse-gram of the E. Indies is single-flower D. The tubers of *Pachyrhizus*, an allied genus, are also used for food.

Do'lis, or **Sa'ta,** a town of Hungary, in the county of Komorn, about 40 miles W.N.W. of Buda-Pesth, consists of the Lake Town (Tóváros) on a small lake, and the Upper Town. The Esterhazy castle and gardens, and an old castle now in ruins, said to have been for some time a residence of Mathias Corvinus, are interesting. There are warm baths. Pop. 7029, engaged in the manufacture of woollen goods and faïence marble.

Doll, a toy in imitation of the human figure, made of all varieties of material, from the article of shreds to the elaborately dressed miniature of French fashions, costing from

2000 to 3000 francs. In the neighbourhood of Sonneberg in Thuringia not less than 32,000 individuals find employment in the manufacture of toys, and of dolls alone there are exported from that locality annually 24,000,000. The materials used in D.-making are *papier-mâché*, vulcanised india-rubber, &c. As a proof of the magnitude of the D. trade there exists a fellow-trade which is devoted entirely to the manufacture of dolls' eyes.

Doll'ar, a form of the Ger. *thaler* (Low Ger. *dahler*; Dutch, *daler*), from *thal*, 'a valley,' because first coined in Bohemia about the close of the 15th c. From the German empire the coin passed into Spain and the Low Countries, and thence to the New World. The D. is best known as the United States unit of money. The United States silver D., probably adopted from the Spanish, weighs 412½ grains of standard silver, one-tenth alloy. The cent, answering to the English halfpenny, is the hundredth part, the nominal value of the D. being 4s. 2d., but New York exchange on London is about $4·87 for £1. During the war, paper money was made legal tender. The D., or 1-peso, is also used in Mexico, and is imported in great quantity into China, the Straits Settlements, and the adjacent countries, where the exchange value has, within the last four years, varied from 3s. 11¾d. to 2s. 2d. on London.

Mexican Dollar (Silver).

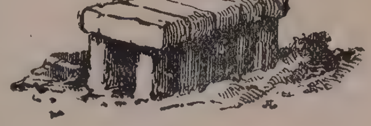
Dollar (*dol* or *dal*, 'a vale,' and *ar*, *aird*, 'a height,' 'the vale among the hills'), a village in Clackmannanshire, on the right bank of the Devon, at the foot of the Ochils, 10 miles E.N.E. of Stirling, is chiefly noted for a flourishing academy, founded and endowed by Captain John M'Nab, a native of the parish, in 1818, at a cost of £80,000. Classics, modern languages, English, and the arts, are taught by a principal and assistant teachers. The noble ruins of Castle Campbell, an ancient seat of the Argyll family, lie a mile N. of D. On the banks of the Devon there are numerous bleachworks. Pop. 1807, as against 2014 in 1881.

Doll'art, The, a gulf of the N. Sea, at the mouth of the Ems, between the provinces of Groningen and E. Friesland, about 10 miles long by 7 broad. It was formed by irruptions of the sea in 1277 and 1530. Much of it has been reclaimed.

Döll'inger, John Joseph Ignatius, born at Bamberg, 28th February, 1779, was at first a Catholic curate in Franconia, then Professor of Ecclesiastical History at Aschaffenberg (Church Training School), and latterly at the University of Munich, a chair which he subsequently resigned to Möhler, taking himself that of dogmatic theology. In 1826 his *Die Lehre von der Eucharistie in den ersten drei Jahrhunderten*, and in 1838 his *Lehrbuch der Kirchengeschichte* (which superseded a standard work by Hortig), gave promise of his later independence. As editor of the *Historisch-politische Blätter*, he wrote on semi-political subjects, as the mixed-marriage question, debated between the Archbishop of Cologne and the Prussian Government, Tractarianism, &c. In 1845 he entered the Bavarian Parliament as an Ultramontane, but lost his chair there and in the university through the influence of Lola Montez. In the National Parliament of Frankfurt he elaborated the definition of the relations of Church and State, which amounted almost to complete separation. In 1853 he protested against the proposed coronation of Napoleon III. by Pope Pius; and also produced his famous *Hippolytus und Kallistus*, a work on the Roman Church in the 3rd c., written against the views of Baur, Bunsen, Lenormant, &c., in the controversy raised by Miller's *Philosophumena* (Eng. transl. 1877). In 1857 appeared his *Heidenthum und Judenthum* (translated into English by Darnell in 1862), an attempt to appreciate the social forces which favoured or retarded the spread of Christianity. His work, *Kirche und Kirchen* (1861), in which he definitely argues against the temporal power of the Pope, has also been translated into English by M'Cabe. In spite of his formal excommunication on 18th April, 1871, for having resisted the doctrines of the Encyclical of 1864 and the Definition of 1870, D. received many honours, *e.g.*, in 1871, the degree of D.C.L. from Oxford, the rectorship of his own university, the Order of Merit from the Bavarian king, the Presidency (on Liebig's death) of the Royal Academy of Science at Munich, and in 1874 the Order of the Red Eagle from the Emperor of Germany. In September, 1874, he presided at the Bonn Alt-Catholik Conference, where he declared that the Eucharist was not a perpetual renewal of the propitiation of Christ, and that he was not bound by the Tridentine Decrees. Among D.'s other works may be mentioned *Mohammed's Religion* (1838), and *Die Reformation, ihre innere Entwickelung und ihre Wirkungen* (1846-48), and a work on prophecy, translated into English by Plummer (1873). The bill for transferring ecclesiastical property to a committee of the ratepayers and communicants in each parish of the empire greatly strengthened the Old Catholic party, of whom D. was the head until his death in 1890, but he was too old to undertake the task of reconciling the ideas of Catholic and Teutonic unity.

Doll'ond, John, F.R.S., was born in Spitalfields, London, 10th June, 1706. He began business as a silk-weaver, occupying his leisure hours with the study of mathematics, anatomy, theology, and physical science, till 1752, when he set up with his son Peter as an optician. In 1753 he communicated to the Royal Society his improvement on the telescope, and soon after he entered into a controversy with Euler, who denied the conclusiveness of Newton's experiments on the possibility of obtaining refraction without colour. This led him to repeat Newton's experiments, and to solve the problem which Newton had deemed insoluble—viz., an *achromatic combination of lenses*. For this great discovery D. received the Copley medal from the Royal Society. He died 30th November, 1761. See Kelly's *Life of D.*

Dol'men (Cym. 'stone table'), the name, chiefly used in France, of an interesting class of prehistoric monuments, similar to those known as Cromlechs (q.v.) in this country. They are found in great numbers in Bretagne, but are also to be met with along the shores of the Baltic, in Friesland, the Netherlands, in the British Islands, in Spain and Portugal (where they are called *antas*), and even in Algeria and other parts of N. Africa. The principal dolmens in France are the famous Pierre Couverte near Saumur, the Table de César, not far from Lakmariaker, in Bretagne, the Pierre du Mesnik at Morvilliers, the Pierre de Gargantua in Eure-et-Loire, and the vast stone catacomb on the small island of Gavrinis, in Morbihan. The Pierre Couverte is a rude structure, covering an area of 65 feet by 17. Its walls consist of ten unhewn blocks, about six feet high, and it is roofed over with four immense slabs. The D. was long looked upon as a sort of altar, and identified with Druidical sacrifices, but antiquaries are now agreed in regarding it as a place of sepulture.



Dolmen.

Dol'omite, or **Bitter Spar,** a mineral composed of the carbonates of lime and magnesia, and represented by large masses of magnesian or dolomitic limestones, which occur in the *Oolitic* formations. All dolomitic rocks contain a proportion of carbonate of iron, which sometimes exceeds that of the magnesian carbonate. In such cases they are named *Ankerite*. D. is usually brown or yellow, is very friable, and appears to result from the gradual metamorphosis of common limestone, the carbonate of magnesia taking the place of the original carbonate of lime. From its susceptibility to the action of the weather, it does not make a good building-stone,—a fact well shown by the weathered and wasted appearance of the Houses of Parliament.

Dol'phin, a genus of *Cetacean* mammalia, forming the type of the family *Delphinidæ*, which also includes the Narwhals (q.v.) and Porpoises (q.v.). The dolphins are distinguished from the whales by their smaller size of body, by possessing numerous teeth of conical shape in both jaws, and by the nostrils being united and placed far back on the upper aspect of the head. This single nostril, or *blowhole*, as it is termed, is crescentic in shape, and placed transversely. The head forms about one-seventh of the entire length of the body. The dolphins are recognised by the elongated snout, and by the head being separated from the snout by a depression. A somewhat hook-shaped dorsal fin exists in the centre of the back. The common D. possesses about 190 teeth. Its average length is about seven feet, but specimens measuring ten feet are not unknown. The back is black in colour, the sides greyish white, and the abdomen silvery. The eyes are small, and the aperture of the ears very minute. The female D. produces but one young at a birth. These animals tend their young with great care and fidelity. The D. is found in the European seas, and also in the Atlantic. It is a lively, playful animal, often accompanying ships in shoals, and for long distances. The bottle-nosed D. is a second species, which, however, possesses fewer teeth than its better-known neighbour. The French name the D. *Bec d'Oie* (goose-beak) and *Oie de Mer* (sea-goose), from its prominent beak.

Bottle-nosed Dolphin.

Dolphin, Black, a name given to the *Aphis fabæ*, a species of *Aphis* (q.v.) or plant-louse, found often in immense numbers on the bean. It derives its name from its black colour. These aphides cause great devastation in crops and gardens, and gardeners remove the top of the plants, for the reason that these pests first appear in that situation.

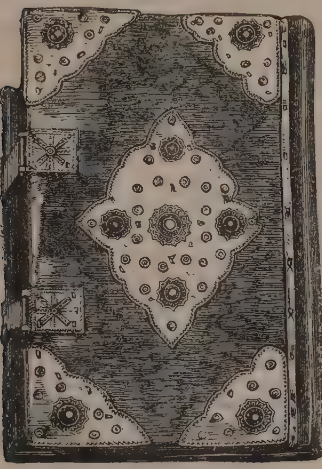
Dom-Boc, or **Doom-Book** ('book of dooms or sentences'), the code which Ælfred the Great compiled from the code of Ine of Wessex, the earliest extant collection of West Saxon law, and the code of Offa of Mercia. Ælfred was satisfied with expunging, modifying, and arranging preceding enactments, and added few original laws. Corporal punishment was assigned for many offences formerly punished by a fine or *blood-wite*, severe penalties were imposed on perjury and sacrilege, labour on Sundays and holy days was strictly forbidden, and the right of private revenge was restricted. Throughout there is visible a tendency to aggrandise the kingly power, alien to the early spirit of Teutonic government. The Ten Commandments and part of the Mosaic law were prefixed to Ælfred's code, of which Dr. Pauli says, 'So strong an infusion of biblical principles is scarcely to be met with in any other collection of laws belonging to the Middle Ages. Nowhere do we find the idea of combining the old Teutonic with the Judaic Christian law into a uniform whole carried into such perfect practical application.' See Pauli's *Life of Alfred*, sect. v., and Thorpe's *Ancient Laws of England*, fol. i.

Dombrow'ski, Jan Henryk, a famous Polish general, born at Pierzowice, Cracow, 29th August, 1755. He joined a regiment of Uhlans in 1770, became aide-de-camp in the Saxon service, and distinguished himself in the campaign of the Poles against the Russians in 1792. In the Polish struggle of 1794 he defeated the Prussians at Labiszyn and Bydgoszcz, and after Kosciusco's defeat at Maciéiowice, nobly declined a high post in the Prussian army. In 1796 he was empowered by the French Directory to raise the *Polish Legion*—a body of Poles who fought under the French flag with the ultimate hope of freeing their country. These Poles signalised themselves at the battles of the Trebia, Novi, and others; but the Polish interests being ignored at the Peace of Luneville (1801) and of Amiens (1802), D. quitted the French service for that of the short-lived Italian Republic, and afterwards of the kingdom of Naples. When the French entered Poland in 1806 he rejoined Napoleon, and called on all Poles to win back their freedom. His countrymen responded eagerly, and until the Peace of Vienna (1809) were ably and bravely led by D., who also covered the French retreat at the Beresina in 1812, and, on Poniatowski's death, became commander-in-chief of the Poles. After 1815 he retired to his estate in Posen, which had been given him as a national reward. Here he busied himself with arranging his memoirs until his death on 26th June, 1818. See Chodzko's *Histoire des Légions Polonaises en Italie* (Paris 1829).

Dome (Lat. *domus*, Low Lat. *doma*, Ital. *duomo*, Fr. *dôme*, Span. *dombo*), in architecture, the spherical or concave ceiling of a building. Early in the Middle Ages D. was applied to a church ('God's house,' *Domus Dei*), and from such structures being often surmounted by a cupola, the word acquired its present meaning. Of modern domes the most celebrated is probably that of St. Peter's in Rome. The external diameter is 195½ feet, being 2 feet more than that of the Pantheon; the diameter of the interior is 139 feet, being 3 feet less than that of the Pantheon. The traveller will hardly see any greater architectural wonder than St. Peter's from the Campagna. The D. of the Pantheon (*La Rotonda*) is the most magnificent ancient D. in existence. It is supported by a rotunda 143 feet in diameter, exclusive of the walls, which are said to be 20 feet thick. Of St. Paul's in London the D. is the most magnificent feature. While the general effect is powerful and grand, the outline is varied and graceful. Unquestionably an invention of the Romans, it was at Constantinople that the D. was first employed in ecclesiastical buildings.

Domenichi'no, properly **Domeni'co Zampie'ri,** one of the first painters of the Bolognese school, born in Bologna, 1581, studied first under Calvaert, and afterwards entered the school of the Caracci. His first important work was the decoration of the Nolfi Chapel at Fano. After studying in Lombardy, he went in 1604 to Rome, where he painted, among other great works, a Madonna of marvellous beauty for Cardinal Aquechi. His magnificent 'Communion of St. Jerome' (1614), now one of the chief treasures of the Vatican, his 'Martyrdom of St. Agnes,' in the Museum of Bologna, and 'Diana Hunting' (Borghese Gallery), are among the greatest of his pictures. He studied architecture, and on the accession of Gregory XV. (1621), was appointed architect of the Vatican. The Aldobrandini Palace at Frascati was built after his drawings. In design and in truth of expression, D. ranks the first of his school, while his colour is at once brilliant and delicate. He was persecuted by the jealousy of contemporaries, and his death, 15th April, 1641, at Naples, is supposed to have been caused by poison.

Domes'day Book, the name of the great statistical survey of England, drawn up by order of William the Conqueror during the years 1081-86. The name is the 12th c. form of the Old English *domesdaeg*, the 'day' on which a local court gave its 'dooms' or decisions; the D. B. thus meant the book compiled from inquiries made on local court days, and, perhaps, from the prevalent fears of the conquered English, had an additional reference to the 'day of judgment.' Its technical name was *Liber de Wintonid*, as it was at one time preserved in the treasury at Winchester. Camden calls it the 'tax-book of kinge William.' The object of the survey was to show the king to whom and in what proportions the country was allotted, to guard small landholders against the encroachments of the great proprietors, and, in general, to facilitate administrative, legislative, and fiscal measures. 'Domesday,' says Freeman, 'is the first known statistical document of modern Europe; it was the first survey of the kind which had been made since the days of the elder Roman Empire.' It was compiled by commissioners from information rendered on oath by the chief laymen and churchmen of each district. The survey gives the name of each estate, the name of its owner in the reign of Eadward and in the reign of William—for the reign of Harold is studiously ignored—its extent and the number and size of its woods, pastures, ponds, &c., the number of freemen and villeins upon it, its total value in William's and in Eadward's time, and the wealth of every freeman. It is of great historical value as a minute and thoroughly faithful picture of England before and immediately after the Norman conquest. It is not a mere colourless inventory, but is rich in details, which throw light on the manner of the confiscation of English estates, on the division of the country into shires, &c., on the different condition of various districts, and likewise on the character of William. It is marked by an air of consistent impartiality in its statements of the rival claims of Englishmen and Normans, King William himself being in one place included among those wrongfully holding the lands of others. The lawfulness of William's succession to Eadward, and of the transfer of lands from Englishmen to Normans, is throughout assumed, and the nature of the great confiscation is carefully veiled under legal euphemisms. 'Domesday teaches us better than any other witness of these times can teach us, that the England of the 11th c. and the England of the 19th are one and the same thing. Never was there a dry legal record so full of human interest of every kind as the great survey of England' *(Freeman)*. The taxes were raised according to the divisions of the country given in the D. B. until 1552, when a new survey, called popularly the *New D. B.*, was made. See *General Introduction to D. B.*, by Sir Henry Ellis (1833), Stubbs' *Select Charters*, and especially Freeman's *Norman Conquest* (vol. v. 1876).



Domesday Book.

Domes'tic An'imals are those which man, for various purposes, as for food or as beasts of burden, has trained and bred in near proximity to himself. This subject has already been partly noted under the head of Acclimatisation of Animals (q.v.). It will be found that, as civilisation advances, man's inroads upon both the animal and plant worlds grow more and more extensive; and his demands for articles of food, dress, and luxury, year by year open up new sources of supply, by the enlistment into his catalogue of resources of hitherto unknown kind; while he may also take advantage of natural qualities and phenomena, by interbreeding animals, and by thus forming those combinations of their features which present the qualities or substances most in demand. (See Breed and Species.) The circumstances that favour the domestication of animals are those that present to animals the qualities and conditions to which they have been accustomed in their natural state, although in many cases they may *adapt* themselves more or less completely to other environments and unwonted surroundings. We should perhaps distinguish between *acclimatisation* and *cultivation* of animals on the one hand, and their complete *domestication* on the other. The silk-moth, cochineal insect, ox, and horse, &c., may, strictly speaking, be described as 'cultivated' by man, whilst in the same sense we may talk of the dog and cat as 'domesticated.' But apart from strict etymological reasons, the term 'domesticated' is used to include all animals of use to man, to the breeding of which he gives his attention. It is not necessary to specify the various and diverse animals which are of use to man, or to indicate the many different sources which are being at the present time opened up for fresh experiments in the cultivation of commercial zoology. Pisciculture (q.v.), for example, is beginning to give important results even in its early stages of cultivation, and other departments of biology cannot fail in the future to afford as gratifying evidence of the rich stores that await our attention.

Domestic Ar'chitecture. The first consideration in building a house ought to be to make it healthful, the second should be to make it convenient, and the third to make it pleasing to the eye. These ends being in no way antagonistic, it ought to be possible to attain them all. Efficient drainage, with the means for efficient ventilation, are the chief requisites for a healthful house. Of course, the means existing, it must be seen that they are properly exercised. The inattention of some persons to airing their rooms, by opening their windows, is most blamable, and the evil effects of it ought to be pointed out forcibly, and due ventilation insisted on by those in a position to do so. Sleeping in kitchens, or in little rooms or alcoves off kitchens, should be avoided; hence in D. A., where means are sufficient, it should be made impossible to do so. In the houses of the middle and professional classes, servants' sleeping-rooms should be above-ground—at all events, quite apart from the kitchen. As regards convenience, arrangement of staircases, cupboards, closets, &c., the two latter are the important points. Scotch houses have generally more than English houses; but it is to be feared that this sometimes leads to the abuse of their being kept in dusty confusion. An airy, well-ventilated larder is a point of great consequence. It also should be well apart from the hot kitchen. In our country, to keep out the cold must, of course, always be a main object of D. A.; in Southern climes it is to keep out the heat. With us the problem of the day is from a minimum consumption of fuel to extract a maximum of heat.

Domestic Man'agement. A considerable and, perhaps, increasing number of people are forced to lament over the insoluble nature of the problem how to make one banknote do the work of two. Seeing that this is impossible, the only plan, with a narrow income, to make 'ends meet,' is to lessen the work to be done by self-denial and thrift, and out of expenditure so regulated to extract as much rational pleasure as possible. To attain thrift, careful account-keeping is a necessity. With all housekeepers who do not attend to this it is a subject of constant wonder where money goes to. You have exceeded your income one year; keeping careful accounts for the next will not bring back that which is gone, but by so doing you will discover where the leak is, or where the many leaks are. On one side enter all sums received; on the other side there should be various columns of £ *s. d.*, headed according to the various branches of your expenditure; thus, *rent and taxes, coal and gas, butcher, baker, education, furniture,* &c. Each item of expenditure should be entered under its appropriate head, and the book periodically balanced. If this system be carefully carried out, the mystery cannot fail to be solved. It will probably be found to consist largely in a wholly incredible consumption of various articles. In regulating expenditure, the first consideration should be given to matters affecting health. When income allows, let every one have an airy, cleanly, and cheerful home. (See DOMESTIC ARCHITECTURE.) Let there be fitting decoration. In and about the cottages of the poorer classes there is no decoration so pretty as flowers, and they cost almost nothing. Perfect cleanliness, it is to be feared, requires a certain income; yet much may be done by means of two inexpensive articles—a tub and water.

The art of cookery should be carefully studied by all women of the lower and middle classes, and even by those of the higher. It would be well that they should acquire a certain amount of gastronomical acumen; because there is often a very unhappy discrepancy in this respect between a man and his wife. Women are often unable themselves to see the difference between a good article of food and a bad one, and they think their husbands unreasonable, who see a very great difference. Then, by means of science, a good dinner may be had for less cost than a bad one, unscientifically prepared. Besides, good cookery is essential to health. So also, especially in our climate, a woman ought to have an economical and hygienic knowledge of clothing. Many young children die annually from being insufficiently clothed; purposely, sometimes, under the mistaken notion of 'hardening' them. With regard to the furniture of a house—we speak here rather of the houses of the middle classes—harmony is especially to be studied. Showy articles should be avoided. In themselves they are probably not highly tasteful, and in combination with other articles, perhaps somewhat faded, the effect is unhappy. A drawing-room ought to *look* what it ought to *be*, a room for use, and not for show. It ought not to look as if it was only used on special occasions. We should study to produce a tasteful, cheerful effect in selecting and arranging the furniture. Let signs of rational, pleasant occupation be habitually seen in it, books—books for reading, that is, not for show—music, and needlework of a rational kind.

With respect to the difficult question of *servants*, it would be well if women of the middle, or even somewhat higher classes, would learn to do much for themselves which, from false notions of dignity, they depend on servants doing. But, as the relationship will probably always be necessary in some measure, the responsibility of improving the terms of it must obviously rest with the mistresses, for the plain reason that they have, as a rule, received a better education and culture.

Dom'icile, in law, is the place of residence of any one, the home or fixed and chief establishment to which, whenever he happens to be absent, he intends to return. The D. of a minor is that of the father, unless the child be illegitimate, when, having no father in the eye of the law, the D. is that of the mother. A married woman has the D. of her husband, which she retains on his death till she acquires another. The place where a man lives is presumed to be his D.; but the presumption may be overcome by proof of an intention of going back to a former residence. Mere temporary absence from home does not change D. But in many cases, after legal residence has been determined, there arise questions of the utmost nicety in the application of international law.

There are three sorts of D., although only one can be said to be the D. of a person at one and the same time. Birth confers a D. upon a person, so also do the law and the choice of the person. A wanderer may, therefore, still retain his D. by birth, which, however, he may cast off, when he fixes his home permanently elsewhere, or when, by law, his D. has become changed. See FOREIGN LAW, APPLICATION OF.

Dom'inant, in music, the note a fifth above the key-tone. In connection with the chord of the D. and of the 'D. seventh,' see CADENCE and CHORD.

Dom'inant Ten'ement, in Scotch law, is the name of a tenement in favour of which a servitude exists. The tenement, over which the servitude is, is called the *servient tenement.*

Domin'go, Santo, the capital of the republic of Santo Domingo, or República Dominicana (q.v.), lies at the mouth of the Ozama, in a deep bay on the S. side of the island. It is quadrilateral in shape, and is surrounded by ramparts. Its principal buildings are a cathedral (1540), large barracks, an arsenal, a palace, and several convents and churches. Only small vessels can enter the harbour, and there is, therefore, but little trade. Pop. 14,150. D. was founded by Bartolommeo Columbus in 1494, and may be regarded as the first European settlement in the Western World. It was sacked by Francis Drake about 1586. The name of the city has superseded Hispaniola as applying to the whole island, which is also generally known as Haiti (q.v.), the eastern part forming the republic of S. D., while the republic of Haiti holds the western. D. is, besides, the name of several small rivers, settlements, and villages of S. America.

Dom'inic, De Guzman, St. (in Span. **Domingo de Guzman**), was born in 1170 at Calahorra, Old Castille. According to some, he belonged to the old family of Guzman, which had made alliances with royalty, but this statement is somewhat dubious. He was early distinguished as a learned theologian and a fervent missionary. After studying from his fourteenth to his twenty-third year at Valentia University, he became canon, and in 1198 archdeacon of Osma, in Castille. Being unsuccessful as a preacher, in his efforts to convert the Albigenses, he gained permission from Innocent III. to call in military force against the heretics of Southern France, whom he persecuted with relentless fanaticism. (See ALBIGENSES.) His admirers, however, declare that he strove to mitigate the horrors of the war which he had mainly provoked. This crusade gave rise to the Inquisition (q.v.), of which D. is the reputed founder, but which, in his time, was not definitely organised. He established the order of the Dominicans (q.v.), and is said to have invented the rosary. D. died at Bologna in 1221, having won the title of 'burner and slayer of heretics.' Many grotesque miracles were ascribed to him, and he was said to have converted 100,000 souls. He was canonised in 1234. D. was a man of sincere but implacable and misapplied religious zeal, and though he seems to have been visited by occasional gleams of tenderness, his fiery, persistent intolerance stands in marked contrast to the angelic mildness of St. Francis. He is mentioned in Dante's *Paradiso* (c. xii.) as a fellow-labourer with the Saviour. See Theodoric du Pay's *Vita S. Dominici*, Lacordaire's *Vie de Saint D.*, and Principal Tulloch's *St. D. and St. Francis.*

Domini'ca, or **Dominique,** the largest British island in the Lesser Antilles, W. Indies, lies between Guadeloupe and Martinique, and has an area of 291 sq. miles, and a pop. of 26,841, of whom 335 are white, 6806 are coloured, and 19,700 are black. It is traversed by rugged mountains, of volcanic origin, which rise in one peak to a height of 5314 feet. There are many streams, and in various parts hot and sulphurous springs. The climate is moist and unhealthy, the soil singularly fertile; nevertheless only 8651 acres are under cultivation. In the valleys, besides coffee, sugar, and cacao, are grown indigo, cotton, bananas, batates, and fruits. The hillsides are clad with forests of rosewood and other valuable timber, and the arable parts are very fertile. Sugar, molasses, rum, coffee, cacao, and copper ore are exported. The great majority of the inhabitants are liberated slaves; a number of the whites are descendants of the old Spanish settlers. Roseau or Charlotteville (pop. 5186), on the S. coast, is the capital; and the only other considerable place is the haven of Portsmouth. D. was discovered by Columbus on the 3rd November, 1493 (a Sunday, hence its name, 'The Lord's Day'), but remained unoccupied till 1759, when its possession was assumed by the English. It was captured by the French, under Bouillé, 7th September, 1778, but was restored to England in 1783. In 1802 England surrendered it to France, eventually to receive it again on the peace of 1814. Between D. and the islet, Île des Saintes, Rodney gained his famous victory over the French fleet, under Grasse, 12th April, 1782.

Domin'ical Letter, or **Sunday Letter,** one of the seven letters A, B, C, D, E, F, G, used to mark the days of the year, A marking the 1st of January, B the 2nd, and so on; A marking the 8th, 15th, 22nd, &c., and all days which have the same letters falling on the same day of the week. Consequently all the Sundays of the year are marked by the same letter, which is hence called the D. L. (from *Dies Dominica*, 'the Lord's Day,' or Sunday). The 1st of January, 1895, falling on Tuesday, Sunday is the 6th, and the D. L. for the year is F. Common years consisting of fifty-two weeks and one day, the D. L. for the next year is one earlier; but leap-years having two days more than fifty-two weeks, and the 29th of February having no letter attached to it, have necessarily two Dominical letters, the first for January and February, and the second, which is the letter immediately preceding, for the Sundays of the rest of the year.

Dominica'na, República, or **Republic of Santo Domingo, The,** forms the eastern part of the island of Haiti (q.v.). It was early colonised by Spain; but in 1795 it became French, as the west part of the island had already been. In 1814 France relinquished its authority in favour of Spain. The colony threw off the yoke of Spain in 1822, and united with the negro republic of Western Haiti, but again asserted its independence in 1843. In 1861 it once more placed itself under the government of Spain. A revolt, however, broke out in 1863, the Spanish troops were expelled, and on 14th November, 1865, a republican constitution was proclaimed which was further amended in 1879, 1880, 1881, and 1887. By the terms of the constitution, as it now stands, the executive is in the hands of a President, chosen by universal suffrage every four years, and the legislative power belongs to a National Congress, consisting of 22 deputies who are elected every two years by the voters who are entitled to the suffrage. Each province sends two deputies, and each district is similarly represented. The R. D. has an area of 18,045 sq. miles, and an estimated pop. of 610,000. Its chief productions are sugar, hides, mahogany wood, logwood, honey, coffee, cocoa, cattle, and tobacco; the last-named is on the decline, but sugar plantations and factories are rapidly increasing in commercial importance. The railway system is developing and already nearly 100 miles are open to traffic between La Vega, Samana, and Santiago. The clearances at the ports represent over 100,000 tons per annum. The Roman Catholic religion is that of the State, but others are allowed in the republic conditionally. There are over 300 elementary schools; instruction is free and attendance compulsory. The capital is Santo Domingo (q.v.), and the chief port is Puerto Plata with a pop. of 15,000.

Domin'icans, a religious order organised by St. Dominic (q.v.), who established the order of Dominican Nuns in 1206, and of Dominican monks at Toulouse in 1215, the last foundation being confirmed by Honorius III. in 1223. A third section, the military order of Christ, composed at first of nobles and knights, and intended to war against heretics, was known, after Dominic's death, as the Tertiarians, and included members of both sexes. The D. were also known as Predicants—Chaucer's 'frères prechours'—or preaching friars, in England as Black Friars, and in France as Jacobins, from their convent in the Rue St. Jacques, Paris. They rapidly grew in power and numbers, and were distinguished by their bitter hatred of heretics. (See ALBIGENSES.) They preached in the streets, administering the communion from portable altars, and wandered as missionaries into Asia. The Popes, of whom they were staunch allies, granted them many privileges, freed them from episcopal authority, and in 1272 recognised them as a mendicant order. They received the entire control of the Inquisition in Spain, Portugal, and Italy; and ceasing to be mendicants in 1425, held wealthier benefices than any other order possessed. Along with their rivals the Franciscans, with whom they had fierce controversies (see SCHOOLMEN), they were all-powerful in the Church, and very influential in politics, until the rise of the Jesuits (q.v.). The D. were opposed at times by the regular clergy, and by the University of Paris. Guillaume St. Amour, Doctor of the Sorbonne, wrote a treatise against them, which was answered by the great Dominican Thomas Aquinas (q.v.), and condemned by Pope Alexander IV. They devoted themselves to polemic theology and to foreign missionary work. To their order belonged Albertus Magnus (q.v.) and Las Casas (q.v.). They were at first governed by the rule of St. Augustine, with some additional regulations, and wore a robe, a black cloak, and a black pointed cap. In the 18th c. the D. possessed 1000 monasteries.

Dom'inis, Marcus Antonius de, a theologian and mathematician, born in 1566, at Arba, an island on the coast of Dalmatia, educated by the Jesuits at Loretto, and afterwards taught philosophy and mathematics at Padua and other Italian towns. He was successively Bishop of Segni and Archbishop of Spalatro, but having offended the Inquisition by some writings tinctured with Protestantism, he passed over into England in 1616, where James I. appointed him Dean of Windsor. In 1617 he published the first volume of his *De Republicâ Ecclesiasticâ*, in which he disputed the supremacy of the Pope. He afterwards returned to the Church of Rome, but his orthodoxy was always suspected, and Urban VIII. imprisoned him in the Castle of St. Angelo, where he died in September, 1624. The Inquisition caused his body to be disinterred and burned with his writings. In his *De Radiis Visus et Lucis in Vitris Perspectivis et Iride* (Ven. 1611, 4to), he first satisfactorily explained the phenomenon of the rainbow. His other works, in Italian, were translated, some of them into French and some into Latin.

Domin'ium, a Roman law-term denoting ownership.

Dominium Directum and *Dominium Utile*.—The former term in feudal law denotes the right vested in the Superior (q.v.) of a heritable (real) subject. The latter term denotes the right of use and profit vested in the vassal.

Dom'ino (Lat. *dominus*, 'lord'), originally a hood worn by the canons of a cathedral, later came to mean a woman's mourning veil, and eventually a loose silk cloak with a hood, worn by persons of either sex at a Masquerade (q.v.).

Dom'inos, a game usually played with twenty-eight oblong pieces of ivory or bone, which, with the exception of the blanks, are marked with dots ranging in number up to double six. There are various forms of the game, which is one of some antiquity.

Dom'inus Li'tis, a term of Scotch law, denoting the person having the real interest in a lawsuit, though nominally neither pursuer or defender, also the advocate, who continues a suit on behalf of the executor of his deceased client.

Domitia'nus, T. Flavius, son of Vespasian, and younger brother of Titus, was born at Rome, A.D. 52. After his father had been established as emperor, D. took part in the administration of Italy, but his career was marred by gross licentiousness and savage cruelty. He was jealous of the fame both of his father and of his brother, and the early death of the latter has been attributed to him. D. succeeded Titus, A.D. 81, and in the opening years of his reign displayed much energy and liberality. The external affairs of Rome under D. were of little moment, being confined to an expedition against the Chatti, A.D. 84, in which D. was successful, and an attack on Decebalus, king of the Dacians, who defeated the Romans, A.D. 87. In A.D. 84, D. withdrew Agricola from his great career in Britain, and from mean jealousy condemned him to private life. During the latter part of his reign he gave free vent to his wild and cruel passions. He sought the favour of the soldiers by increased pay, and of the common people by lavish gifts and public shows; while he shed with appalling frequency and freedom the noblest blood of Rome, and obtained a fresh supply of treasure by confiscating the property of the wealthiest citizens. He was assassinated by conspirators belonging to his own household, and with the knowledge, if not indeed at the instigation, of his wife Domitia, A.D. 96.

Do′mo d' Oss′ola, a town in the province of Novara, N. Italy, on the Tosa or Toccia, here crossed by a long bridge. It lies in the beautiful Val d' Oscella, at the S.E. base of the Simplon, and is the chief key to the South Alpine tours. The Simplon can be scaled hence in seven hours. Pop. 3628.

Don, an Italian and Spanish contraction of the Lat. *dominus*, 'lord' or 'master.' The Portuguese form is *dom*, the Old Eng. *dan* or *daun*. In Spain and Portugal the word is applied as a title to all persons of noble birth, including kings and princes, but it is also bestowed in courtesy on those who are not grandees. The Latin form was originally assumed by the popes, and descended from them to all ecclesiastics and scholars. Hence the 'dons' of English colleges, and the 'dans' of old English poetry—*Dan* Chaucer, *Dan* Lydgate, &c. Tennyson has restored the word to modern English in his *Dream of Fair Women*.

Don (anc. *Tanais*, connected with the Celtic *afon*, 'water' or 'river'), a river of Russia, issuing from Lake Ivan Ozera, government of Tula, and after a S.E. and then a S.W. course, falling into the Sea of Azov by three mouths, its entire length being about 900 miles. The navigation, on account of the shallowness of the channel from sandbanks, is conducted principally by flat-bottomed boats. The traffic on the lower waters is important, owing to the fisheries of the D., and the conveyance of produce to the S.

Don, a river in Aberdeenshire, rising in an elevated marshy district between the counties of Aberdeen and Banff, and falling, after a course of 78 miles, into the sea a mile N.E. of Old Aberdeen. Its principal tributary is the Ury, from the N.W. It has valuable salmon-fisheries. The 'Brig of Balgownie,' the youthful dread of Lord Byron, from an old prophecy which threatened its fall with a wife's one son, crosses the D. about a mile from the sea.

Don, or **Dun,** a river in the West Riding of Yorkshire, rises near the borders of Cheshire, and after a course of 55 miles falls into the Aire, which soon after joins the Ouse. By means of canals and cuttings it is navigable to Sheffield, a distance of about 40 miles.

Donaghadee′, a seaport of Ireland, county Down, on the Irish Channel, opposite the Copeland Islands, and 18 miles E. of Belfast by railway. It has considerable flax-mills, some industry in embroidering muslin for the Glasgow market, and an export trade in cattle, grain, timber, and potatoes. The harbour is commodious, and there are productive line and trawling fisheries. A conical mound, 140 feet high, to the N. of the town, commands a splendid view of the Irish and Scottish coasts. Pop. of town 1886; of parish 5050.

Don′aldson, Rev. John William, D.D., a distinguished philologer, was born in London in 1811, and educated at London University, and Trinity College, Cambridge, where he was second in the Classical Tripos and won a Fellowship. His first work was *The Theatre of the Greeks*, which was followed (1838) by the *New Cratylus; or, Contributions towards a more Accurate Knowledge of the Greek Language*, an important work, which reached a fourth edition in 1868. His *Varronianus*, a critical and historical introduction to the ethnography of ancient Italy, and to the philological study of the Latin language, appeared in 1844, at which time he held the head-mastership of the grammar-school of Bury St. Edmunds. He subsequently resigned this post, and returned to Cambridge, where he passed the remainder of his life in strenuous literary labours and tuition. Among his other works may be mentioned *Jashar*, an endeavour to identify in the Pentateuch fragments of the lost Book of Jashar; a Greek and a Latin Grammar; and an essay on *Classical Scholarship*. In 1856 D. was appointed classical examiner in the University of London. He died 10th February, 1861.—**James D.,** a Scottish schoolmaster and scholar, was born in Aberdeen in 1831. He studied at the universities of Aberdeen and of Berlin. In 1856 he was appointed a classical master in the High School of Edinburgh, of which he became rector in 1866. D. published several classical text-books, but is best known by his valuable *Critical History of Christian Literature and Doctrine, from the Death of the Apostles to the Nicene Council*, in three vols., the first of which has been reissued under the title of *The Apostolical Fathers*, and by his edition (in conjunction with Professor Roberts of St. Andrews) of a translation of the entire *Ante-Nicene Fathers* (Edinb. 1866-72). D. took an active part in the agitation that preceded the passing of the Scotch Education Act (1872); and in 1874 published *Lectures on the History of Education in Prussia and England, and on Kindred Topics*.—**James D.,** an Edinburgh printer, bequeathed in 1830 £215,000 to build and endow a hospital for the maintenance and education of poor children. A magnificent building, in the Tudor style, was erected at the west end of Edinburgh, from a design by W. H. Playfair, and was opened in 1851 for 300 children, who were to be clothed, kept, and educated; the boys for trade, and the girls for domestic service.

Donatell′o (properly **Donato di Betto Bardi),** one of the greatest of Italian sculptors, born at Florence, 1383, was taken early under the protection of a liberal Florentine named Martelli, and received lessons in sculpture from Lorenzo Bicci. His first work was an 'Annunciation,' still preserved at Florence, and of which the draperies in basso-relievo are treated in the spirit of the antique. This work won for the sculptor applause, commissions, and the friendship of Lorenzo and Cosmo de' Medici, for whose family he afterwards executed a noble monument. A great work, nicknamed by the Florentines *Lo Zuccone* (the Baldhead), is the finest of his six statues decorating the exterior of the campanile of Florence Cathedral. His marble statue of St. Mark (St. Michael's Church, Florence) drew from Michael Angelo the exclamation, 'Why do you not speak to me?' and the great bronze group, 'Judith and Holofernes,' is pronounced by Vasari a work of 'great excellence and mastery.' D. died 13th December, 1466.

Dona′tion. A D. in expectation of death, or *mortis causâ*, implies the reversion of the property to the donor should he recover. To be a valid gift, in a question with an heir or executor, the donor must have died before recovery from the particular illness, and he must have actually or symbolically delivered to the donee the thing meant to be given. Accordingly, a receipt for stock will not give the stock, because stock does not pass by receipt, but by transfer. But right to a bank note will pass by delivery of the note. A D. is often revocable, but no deed is presumed in law to be a D. if it admit of another construction, and when there is doubt, the law holds a transaction to have been for Consideration (q.v.). Donations between husband and wife are revocable; but if the donor die without revoking, his or her representative cannot revoke. A reasonable post-nuptial contract is not revocable.

Don′atists, a sect of the early Christian Church, founded by Donatus, who, being defeated in his candidature for the bishopric of Numidia in 311, and refusing to admit that the *traditors*, or such of the clergy as had yielded up the Scriptures to the magistrates during times of persecution, were eligible for ecclesiastical offices, withdrew with numerous followers from the Catholic community. The D. soon became powerful in Africa, and in 330 possessed 172 bishops. They asserted that the *traditors* had broken the line of apostolical succession, that the integrity of the Church depended not on the succession of bishops, but on the holiness of each of its members. They professed to hold a doctrine of perfect purity, and carefully rebaptized each convert they made from the Catholic Church. In 348, when efforts were made to suppress them, they ravaged N. Africa as bands of fanatical marauders, under the name *Circumcelliones*, and were frequently seized with a frenzied desire for martyrdom. The D. were extinguished when the Saracens invaded Africa.

Dona′tus, Ælius, a grammarian and rhetorician at Rome in the middle of the 4th c., and tutor of St. Jerome. His treatises, embracing a pretty comprehensive system of Latin grammar, were for many centuries the standard work on the subject, and formed the basis of most of the elementary books of the kind. In such repute were they during the Middle

Ages, that the word *Donat* or *Donet* came to signify lesson or rudimentary treatise. D. was also the author of an interesting and valuable commentary on five of Terence's plays. The work entitled *Scholia in Æneida*, which bears the name of D., is generally considered to be by *Tiberius Claudius D.*, a grammarian of later date and inferior calibre, who wrote a worthless and slipshod *Life of Virgil*.

Don'auwörth, a town of Bavaria, 25 miles N.N.W. of Augsburg, at the confluence of the Wernitz and Danube. It has manufactures of linen and leather, and a trade in cattle, flax, linen, and wool. D. is memorable as the place where the Protestant League originated in 1607, whose formation was the immediate cause of the Thirty Years' War. Pop. 3725.

Do'nax, a genus of mollusca belonging to the class *Lamellibranchiata*, and to the section *Siphonida* of that class. This genus belongs to the family *Tellinidæ*. The shell is wedge-shaped, with the point rounded. Fossil species of D. occur in the Eocene rocks.

Don Beni'to, a town in the province of Badajoz, Spain, lies on the left bank of the Guadiana, 60 miles W. of Badajoz by railway. It has some woollen manufactures, and an active trade in oil and wine. Pop. 16,287.

Don'caster (Roman *Danum*, Old Eng. *Don Ceastre*), a market-town in the West Riding of Yorkshire, on the right bank of the Don, 37 miles S.W. of York, and 156 miles N.N.W. of London by rail. It has some manufactures of cotton and woolspinning, glovemaking, and hosiery, besides manufactures of iron, brass, and agricultural machines. D. races are among the most famous in the kingdom. The St. Leger, run in September, brings out some of the finest horses in the kingdom. The race is called after Colonel St. Leger, who founded the stakes in 1776. Pop. parl. div. of county 73,032; mun. bor., reg. sub-dist., and civ. par. (each) 25,933.

Don Coss'acks. See COSSACKS.

Don'da-ndu'gu (Kisuaheli, from *donda*, 'ulcer,' and *nduga*, 'brother' = brother-ulcer), a peculiar form of ulceration, confined to the lower extremities, endemic in Zanzibar and Eastern Africa. This formidable disease is common in inter-tropical Africa, more especially after the rainy seasons, and it probably depends on the development of larvæ from eggs deposited by some species of insect. The ulcer is always situated on those parts exposed while the natives are travelling, with bare feet and legs, through mud and water, and most generally on the shin-bones, the gastrocnemius muscle or its insertion, the instep, and the toes. On the first appearance of the disease there is not, generally, very severe pain; the skin is smooth and glazed, and the sub-lying tissues have a boggy feeling, and not fluctuating as in abscess; in the centre there is a small spot, like an abraded pimple, exuding a little serous matter. An incision made at this stage reveals an extensive, deep-seated slough; but if left to itself the glazed skin soon separates as a slough. Tendons are laid bare, and the bone is denuded of periosteum; joints are opened, and the toes or foot may be separated from the limb. The disease is generally fatal, and those who recover are generally permanently lamed. Death results from purulent absorption, from extreme exhaustion, and occasionally from hæmorrhage. This disease seems to be allied to the ulcer Yemenensis, common in Arabia. The late Dr. Livingstone was confined to his hut at Bambarré, in Central Africa, for eighty days with this disease. The antiseptic is the only mode of treatment of any avail. The disease was first described by Dr. Christie (*Cholera Epidemics in E. Africa*, Macmillan, 1876).

Don'dra Head, the southern extremity of the island of Ceylon, and the site of the ancient Sinhalese capital, of which many remains still exist.

Don'egal (Celt. *Dun-na-n Gall*, 'the fortress of the foreigners,' *i.e.*, of the Danes), a market-town and seaport at the mouth of the Eske, D. Bay, D. county, 29 miles N.E. of Sligo. Near the town are the ruins of a castle once belonging to the Earls of Tyrconnel. D. exports grain and butter. The chronicle of the town is contained in the *Annals of the Four Masters*, written at D. Pop. 1323.

Donegal, a maritime county in the N.W. of Ireland, province of Ulster, 85 miles long, with an average breadth of 41 miles. D. is the most mountainous county in Ireland. Erigal in the N.W. attains an elevation of 2462 feet. The coastline of 395 miles is indented by various bays and loughs, of which Lough Swilly is 25 miles long. Many islands fringe the coast, of which the chief are the N. Aran Islands. The streams are numerous but small, the principal being the Foyle and the Swilly. Of the lakes the most noteworthy is Lough Derg (q.v.). Granite, metamorphic rocks, graywacke, trap, and carboniferous limestone compose the subsoil. The climate is moist. Much of the soil is poor, but the S.E. is fertile. The principal crops are oats, potatoes, and flax; there are manufactures of linen and worsted stockings; and fisheries of herring, cod, sole, and mackerel. Of the land area of D. (1,190,268 acres) 90,941 acres are under corn crops, beans, and pease (oats 88,557); 64,221 under green crops (potatoes 41,608); 10,363 under flax; 19,999 (for hay) under clover, sainfoin, and grasses in rotation; 42,439 (for hay) under permanent pasture and grass not broken up; and 1879 under fallow or uncropped arable land. Woods and plantations cover 5629 acres, while 131,528 represent the area under turf bog. Marsh and barren mountain occupy 342,780 acres. For live stock see separate articles CATTLE, HORSE, PIG, and SHEEP. The trade of D. is principally carried on through Londonderry. Among the minerals are marble, lead and copper ores, manganese, and pipeclay. Pop. 185,635; of these 142,893 are R. Catholics and 21,884 Protestant Episcopalians. D. is divided into four parl. divisions, each of which returns one member: E. D. 45,417; N. D. 46,248; S. D. 46,624; W. D. 47,346.

Dongarpur', or **Dungarpur,** the capital of a native state of the same name in Central India, which is under the superintendence of the Agent to the Governor-General for the states of Rajputana. It lies 139 miles S.W. of Nimach. It is fortified, and has a pop. of some 6431. A hill 700 feet high dominates the town; at its base is a small lake, and on one side are the Prince's palace and grounds. The Rajput state of D., which is an offshoot of that of Odepur, has long been governed with tact and intelligence. It is in part a wild hill-country, inhabited by feudatory tribes. Area 1447 sq. miles. Its revenue amounts to £20,931. The Maharawal received the right of adoption in 1862. Pop. of state, the wild tribes of the Bheels not being included, 98,448. Fruit and vegetables abound. Geologically speaking, the state of D. consists of trap; the rocks being composed of gneiss, mica, quartz, calcareous sandstone, clay slate. An excellent granite is quarried in the hills. The Mahi and Som are the rivers, small and stony. Wheat, Indian corn, rice, cotton, opium, ginger, and sugar-cane are the chief products. The climate is healthy, but the people suffer much from the guinea-worm. The name of the present ruler is Maharawal Udai Sing. Nothing is known of D. until the founding of the Mogul Empire in India, and to this and to the Mahrattas afterwards the state was tributary, until the British supremacy in those parts freed the inhabitants. Since then they have lived peaceably, with the exception of the Bheels, who have sometimes rebelled. The army consists of 400 horse and 1000 foot.

Don'gola (New), Kask Dongola, or **El Ordeh,** the capital of a province of the same name, Nubia, on the left bank of the Nile. Before the revolt of the Mahdi it was the seat of an Egyptian pacha, and a flourishing place of trade, with a fort, well-stocked bazaar, and a pop. of 7012. It was founded by the Mamlukes, on the loss of Old D., 75 miles S.S.E., on the opposite bank of the Nile. Near New D. is the charming islet of Argo, on which have been found many Egyptian and Nubian antiquities.

Do'nis, Statute de, is the statute of 13 Edward I. c. I. It is sometimes called the statute of 'great men,' as chiefly concerning the upper class and their interests. It created the power of entailing, by enacting 'that the will of the giver, according to the form in the deed of gift manifestly expressed, shall be henceforth observed.' See ENTAIL.

Donizett'i, Gaëtano, an Italian musician, born at Bergamo, in North Italy, 25th September, 1798, studied at Bologna, and for some time served in the Austrian army. He devoted himself at first to church-music (for writing which he was singularly unfitted), but afterwards to the opera. He operas are over sixty in number, among the best-known being *L'Elisir d'Amore*, *La Fille du Regiment*, *Lucia di Lammermoor*, and *Lucrezia Borgia*. D.'s music is more trivial, and his talent less than that of Rossini, of whom in many respects he was a follower. The flowing melody of his music has caught the popular ear, but the greater portion of it hardly deserves serious attention. D. died at his birthplace, 8th April, 1848.

Don'jon (from the Low Lat. *dominio*, 'a lordship,' contracted *domnio*, *domgio*, *dongeo*), or **Dun'geon,** originally the principal building of a district, or the strong tower of a fortress. The form *donjon* is now applied, in fortification, to a large tower or redoubt, to which a garrison may retreat in case of need; *dungeon*, to an underground prison, such as used to be a portion of the strong tower of a fortress.

Donjon.

Don Ju'an, an imaginary personage, whose story symbolises the same idea as the old German legend of the Tannhauser—the idea of a soul in which regard for the spiritual has been burned out by ungovernable desire. According to the popular version of the legend, D. J. is a young nobleman of Seville, whose rare intellect and courage enable him for a time to pursue with impunity a career of eclectic profligacy. Having slain the father of one of his victims, in impious bravado he challenges the Supreme Power to animate the murdered man's statue, which he mockingly invites to a feast. The statue arrives as he requested, and carries the blasphemous libertine down to hell. This legend has been frequently embodied in literature. It was acted, as a *spiritual* play entitled *Atheista Fulminato*, in the Spanish churches and monasteries, but was first cast into regular dramatic form in *El Burlador de Sevilla*, by Gabriel Tellez, an imitator and contemporary of Calderon. In this play D. J. appears as the sombre but impressive incarnation of godless, sensual sin. Translated into Italian by Cicognini, the drama passed from Italy to Paris, and gave rise to Molière's *Festin de Pierre*, where D. J. is represented as an unscrupulous, plausible scoffer and voluptuary, but fallen from the grandeur of the Spanish poet's creation. The legend has served also as a groundwork for Shadwell's *Libertine*, for Mérimée's *Les Ames du Purgatoire*, and for the plot of Mozart's *Don Giovanni*. Byron's D. J. has only the name in common with the legendary character; he is merely a youth who, being detected in an intrigue, leaves Spain to pursue a course of adventures in Greece, Turkey, Russia, and England.

Donk'ey Engine, a small auxiliary engine used on board ship for filling up the boilers and doing other work when the main engines are not in motion.

Donn, Robert, or **Robert Mackay,** born in the county of Sutherland in 1714, died 1778, probably the only one of the Gaelic bards who has received more attention and praise than his productions deserve. His poems were published in 1829, with a highly laudatory preface, and his clansmen raised a monument to him with inscriptions in Latin, Greek, Gaelic, and English. He is frequently spoken of as a poet of the highest order; but in truth, while one or two of his songs possess considerable merit, the great majority are commonplace, often interlarded with English words, and frequently disfigured by such coarseness as ought to have prevented their having ever been published.

Donne, John, an English poet and divine, was born in 1573. He was educated at Oxford and Cambridge, and studied law at Lincoln's Inn. Becoming master, at the death of his father, a London merchant, of property worth £3000, he went abroad, and accompanied the expeditions of Essex to Cadiz and the Azores in 1596-97. Returning to England, he became secretary to Lord Chancellor Ellesmere, whose niece he secretly married. For this he was imprisoned, and on being liberated had to recover his wife by a lawsuit. He remained a poor dependent on his friends, until James VI., pleased with his book *The Pseudo-Martyr*, induced him to take orders, and made him his chaplain. He became famous as a preacher and a poet, was made Dean of St. Paul's in 1623, and, after receiving further preferment, died 31st March, 1631. His poems, consisting of elegies, satires, epistles, and erotics, display a strange union of pathos and affectation, delicacy and coarseness. They abound in fantastic and jarring conceits; their verse is often harsh, and their thought crude; but amid their tangled intricacies runs an undercurrent of melody, and verses of the purest poetry occur. His *Sermons* (1640) are full of deep thought and far-fetched illustrations. Ben Jonson called D. 'the first poet in the world in some things.' See Isaac Walton's *Life of Dr. J. D.*, prefixed to the first edition of his *Sermons*.

Doo, George Thomas, an eminent engraver, born in Surrey, 6th January, 1800, well known for his prints after leading English artists and the old masters, such as Wilkie's 'Knox preaching before the Lords of the Covenant,' Etty's 'Combat,' Correggio's 'Ecce Homo,' and Raffaelle's 'Infant Christ.' D. was appointed Historical Engraver in Ordinary to the Queen in 1842, and R.A. in 1856, and was Chairman of the London International Exhibition of 1862. His engraving of Piombo's 'Raising of Lazarus' was the result of eight years' labour. Died 13th November, 1886.

Doom, or **Doum Palm,** a palm of Upper Egypt, Central Africa, Nubia, Abyssinia, and Arabia, remarkable for its repeated forkings in a dichotomous manner. It will grow in the sandiest soil, and in some of the most desert parts it is the prevailing or sole tree. The fruit tastes somewhat like gingerbread, hence it is sometimes called the *gingerbread tree*. From the fibres of its leaf-stalks ropes are made. An infusion of the fruit is gently aperient, and accounted salutary in fevers. The hard albumen of the seed is turned into beads and other little ornaments. The hard, tough wood is useful for making various domestic articles. There are a few other species of the genus, which extends as far S. as Natal.

Doom'ster. See DEEMSTER.

Doon (Celt. 'the dark water'), rendered by the muse of Burns the most classic of Scottish streams, rises in Loch Enoch, in the S.E. of Ayrshire, and flows through Loch D. Emerging from the loch, it rushes through the magnificent wooded ravine of Glen Ness, and after a course of 30 miles, falls into Ayr Bay, about 2 miles S. of the town of Ayr. Not far from its mouth are the cottage in which the poet was born, the monument erected to his memory, Allowa Kirk, the Auld Brigg, and all the magic associations of 'Tam o' Shanter.'

Doorn'boom (Dutch, 'thorn-tree'), the name given by the Dutch Boers, and now generally adopted in S. Africa, for *Acacia horrida*, the most common tree in the wastes of the Cape of Good Hope, &c. Its hard, tough timber is used for house carpentry. See ACACIA.

Doors, Doorways, have in all civilised ages formed an important detail of architectural composition, and in the successive well-defined styles of the art, they are invariably designed in harmony with the features of the special style, and their form and decoration supply data for determining the order and character of the building, of which they make part, and the period of its construction. In the ancient Egyptian tombs, and in all primitive stone structures, the character of the architecture has been borrowed from a wooden original, and the doorways, as might be expected, seem reproductions in stone of the entrances of wooden cabins. The lintels are generally rounded, and the walls are, *in idea*, mere square posts, grooved and jointed together. The famous 'Pelasgic' tomb at Mycenæ is of the shape of a regular equilateral pointed arch, a form which their mode of building—with horizontal layers of stone projecting the one above the other, and with one small stone covering the apex of the vault—naturally and necessarily suggested. Familiarised with the curved line of the pointed arch, they made use of it in their doorways, which were often curved pointed arches. In some, however, the sides of the triangular opening were straight for the whole height; but though this form of entrance was very stable, it must have been exceedingly difficult to fit with a door or to close by any known contrivance. The difficulty was obviated at a later period by inserting a lintel half way up the opening. Below this lintel the jambs were nearly perpendicular, while above it they sloped so as to form a pediment, which was sometimes filled with sculpture. In the architecture of the ancients the doorways were usually rectangular; though sometimes the jambs had a slight inward slope. In later Roman architecture they were sometimes arched; and when rectangular, an architrave or suit of mouldings ran round them, and around the top; these mouldings were often heavier and more numerous than round the sides, and were supported at each end by a truss or bracket. The doors of the ancients were made of wood, metal, and, rarely, of marble, and were swung upon pivots working in sockets. In the doorway of the Old English church of Monkwearmouth in Durham, the arch is round and rests upon pillars, 'evidently copied,' says Fergusson, 'from turned posts in wood.' The Norman doorways were heavily enriched with ornaments, and show surprising variety of design. The arch was commonly semicircular, but was also segmental or horseshoe in form. The mouldings round the arch were sometimes so numerous that their breadth nearly equalled that of the doorway itself. Shafts, sometimes circular, sometimes octagonal, and occasionally ornamented with zigzags or spiral mouldings, and with capitals enriched with figures and foliage, were used in the jambs. The original Norman doors present little ornamentation with the exception of the iron of the hinges, which often extended more than half across the door, in fanciful scroll-work. The west door of Lichfield (1275), in the Decorated Style (q.v.), is an example of the architecture of the period in its highest perfection. The chapter-house door at Rochester is excessively rich in ornament, and is satisfactory in design; but there is little freehand carving in its decoration, the greater number of the forms being produced by instruments. In this great work the tendency towards the more mechanical arrangement of the Perpendicular Style (q.v.) is already observable. In the doorways of this style the outer mouldings over the arch were usually formed into a square—the spandrels being filled with tracery, foliage, or sculpture; and the doors were usually panelled, and enriched with tracery. Of modern ornamental buildings, the doors and doorways are most commonly designed in the Early English or Decorated spirit.

Doq'uet, or **Dock'et,** an old English word denoting a summary of a voluminous writing. Attestations or declarations annexed to written instruments are called doquets. The notarial D. is a curious example of ancient style.

Do'ra d'Istria, the pseudonym of Helena Ghika, Princess Koltzoff-Massalsky, a Wallachian authoress, born of a noble family at Bucharest, 22nd January, 1829. Her early studies and travels made her an accomplished linguist, and at the age of fifteen she undertook to translate the *Iliad* into German. She composed several dramas when very young; became famous for her beauty and acquirements; and in 1849 married Prince Koltzoff-Massalsky, whom she accompanied to the Russian court. After further travels she published *La Vie Monastique dans l' Église Orientale* (Paris, 1855), under the pseudonym D. d'I., in allusion to the Ister or Danube. Among her other works are *La Suisse Allemande* (Geneva, 1856) and *Les Femmes en Orient* (Zurich, 1860). Her works are pervaded by ardent love of freedom and Christianity. She produced numerous articles in French, Italian, and German journals, attempted painting with success, and was chosen a member of learned societies which had never before admitted a woman.

Dorak', a town of Persia, province of Khuzistan, on the left bank of the Jarahi, about 44 miles from the Persian Gulf. It stands in a marshy plain, its houses are mostly of reeds, and it is partly circled by a thick mud wall. It is the chief seat of the Chāb Arabs. The climate is unhealthy, and fever is prevalent. D. has a trade in rice, wool, and Arab cloaks, for the manufacture of which it is famous. Pop. 9020.

Dor'cas Soci'ety. Charitable societies of ladies are sometimes so called, from the verse Acts ix. 39—'And all the widows stood by him weeping, and showing the coats and garments which Dorcas made while she was with them.' The object of the D. S. is the clothing of the poor and the employment of poor needlewomen.

Dor'chester (Old Eng. *Dorce-ceaster*), the county town of Dorsetshire, situated on the Frome, 140 miles S.W. of London by rail. D. is a pleasant town, consisting mainly of three streets, the chief buildings being the shire-hall, guildhall, St. Peter's Church, the exchange, and the gaol. D. has considerable trade in agricultural produce, and brewing is carried on, the ale of D. being famous. The town, which was nearly ruined by a fire in 1613, was the scene of several battles in the civil war. Near it are the remains of a Roman camp and amphitheatre. Roman urns, coins, &c., have been found in the neighbourhood. Pop. mun. bor. 7946; and reg. sub-dist. 9133.

Dordogne', a south-western department of France, formed out of the province of Périgord. The surface is hilly, with level uplands, narrow, fertile, well-watered valleys, and several moors and marshes. The N. is mostly woody or barren; the S. rich in corn and vines. D. is remarkable for its numerous streams and ponds. It is named from the river D., which rises in Mont Dor, and of which the chief tributaries are the Ceon, Isle, and Haute-Vezère. The climate is generally mild, though the winter in the uplands is severe. The chief products are vines, chestnuts, maize, rye, and buckwheat. There are mines of coal, iron, lead, copper, and quarries of granite and sandstone. The leading industries are mining and the manufacture of woollens, charcoal, paper, brandy, cutlery, &c., but there is also a large trade in iron, wine, leather, ham, and the truffles of Périgueux. D. is crossed by the Paris-Agen Railway, and by the *Canal-de-la-Cité* and *Canal-de-l'Isle*. The largest towns are Périgueux, the capital, Bergerac, Ribérac, and Sarlat. Area, 3546 sq. miles; pop. 478,471.

Doré, Paul Gustave, a French painter and designer of great fertility and fancy, was born at Strasbourg in January, 1832, was taken to Paris in 1845, studied at the Lycée Charlemagne, and after 1848 was engaged, along with Bertall (q.v.), to contribute sketches to the *Journal pour Rire*. From this date sketches, cartoons, and pictures came teeming from his hand in the most marvellous profusion. To attempt to enumerate more than his principal works would be undesirable. He first exhibited in the Salon in 1848, and his sketches of the Battle of Alma (1855) and Battle of Inkerman (1857) attracted considerable attention. In 1860, and subsequently, he exhibited a series of impressive cartoons illustrative of the *Divina Commedia*. Later he contributed a vast number of drawings to the *Journal pour Tous* and to many other periodicals, and also illustrated the works of Rabelais (1854); the *Wandering Jew* (1856); the *Contes Drôlatiques* of Balzac (1856); the *Contes de Perrault* (1861); Montaigne's *Essais* (1857); Taine's *Voyage aux Pyrénées* (1859), &c. The works, however, by which he has earned a European fame are illustrations of Dante's *Inferno* (1861); *Don Quixote* (fol. 1863); the Bible (1865-66); Fontaine's *Fables* (1867); Dante's *Purgatorio* and *Paradiso* (1868); Tennyson's *Idylls* (1866-68); Milton's Works (1866); a collection of drawings entitled *London* (1870); and Coleridge's *Ancient Mariner* (1875). D. was specially happy in rendering weird, unearthly subjects, to the effects of which his gloomy *technique*, consisting of engraved white lines on a black ground, greatly contributed. His grim humour found vent in occasionally grotesque exaggerations of life and nature. The main objection to his art, apart from the defects of execution, is general dulness of tone, and the consequent want of atmosphere, point, and brightness. D. died at Paris, 23rd January, 1883.

Do'ria (originally **D'Oria,** the children of Oria, wife of

Arduin of Narbonne, in the first half of the 12th c.), the name of an ancient patrician family of Genoa, which has furnished a long succession of historic names.—**Antonio D.**, elected consul in 1154, greatly advanced the trade and commerce of his native city. In the struggle between the Guelfs and Ghibellines, the Dorias, with few exceptions, took the side of the latter, and were in consequence highly favoured by the Hohenstauffens. They were also conspicuous in the conflicts of the Genoese families for political supremacy, and succeeded in obtaining for a time almost unlimited power. Their rule was the golden time of Genoa. During the 14th, 15th, and 16th centuries, their renown as commanders of the Genoese fleet was sustained by a series of brilliant victories over the fleets of the Pisan and Venetian republics. The most notable member of the family was **Andrea D.**, born at Oneglia, 30th November, 1468. He served in the papal guard, and under various Italian potentates; and, as captain-general of Genoese galleys, warred on the Moorish pirates. D. sided with François I. against the Emperor Karl V., and commanded the French fleet with signal success. Finding, however, that his native city was oppressed, he went over to the Emperor, and in 1528 drove the French out of Genoa. Karl offered to make him sovereign, but he patriotically refused, and was called 'Father and liberator of his country.' He formed a government, with a council (*signoria*) and a doge, who held office for two years. In 1535 he aided in the taking of Tunis, and in 1541 commanded the naval force in the Emperor's unfortunate expedition to Africa. Fieschi's conspiracy troubled his closing years, but this he crushed, and lived in great state at Genoa till his death, 25th November, 1560. See Lorenzo Capelloni's *Vita del Principe D.* (Venice, 1569); Carlo Sigonio's *De Vita et Gestis Andreæ Doriæ* (Geneva, 1586). The family still survives, and is represented by Alfonso Maria D.-Pamphilj-Landi, prince of Torriglia, Melfi, and Valmontone, duke of Avigliano, who was born at Rome, 25th September, 1851. His mother was a daughter of the Earl of Shrewsbury. He married, 24th June, 1882, Lady Emily Pelham Clinton of the Newcastle family.

Do'rians. The inhabitants of Doris, a small mountainous district of Greece, lying between mounts Œta and Parnassus, and embracing the valley of the river Pindus. They are said to have derived their name from Dorus, the son of Hellen, and are variously represented as inhabiting Doris, Phthiotis, and the whole country N. of the Corinthian Gulf. The last account best agrees with the historical importance of the D., who formed one of the four chief peoples of ancient Greece, and conquered the greater part of the Peloponnesus—a feat which they accomplished under the leadership of the Heraclidæ. During the historical period a great part of the Peloponnesus was subject to them. They founded numerous colonies in Asia Minor, Sicily, Southern Italy, and the islands of the Ægean. The D. are mentioned only once in Homer (Od. xix. 177), and then as a Cretan tribe: their conquest of the Peloponnesus must therefore be placed after his time. Like most mountain races, they were a stern, unpolished, earnest people. Their character is written both in their language and architecture, and stands out in striking contrast to that of their more polished neighbours.

Dor'ic Order. See COLUMN.

Do'ris, a familiar genus of Gasteropodous molluscs, including those forms familiarly named 'sea-lemons.' These molluscs belong to the order *Opisthobranchiata* of their class, and possess no shells in their adult state, but have the gills present in the form of beautiful plumes, situated towards the hinder extremity of the body, and which can be retracted or expanded at will. The head is provided with tentacles, and eyes are placed behind the tentacles. These animals are sometimes named 'sea-slugs,' from the resemblance to the more familiar land Gasteropods of that name. The sexes are united in the same individual. *D. Johnstoni* is a familiar species among the British examples of this genus.

Dor'islaus, Isaac, a Dutchman who came to England in the early part of the 17th c., and was made lecturer on history in Cambridge University by Fulke Lord Brooke in the beginning of the reign of Charles I. He lost this post for his avowed republicanism, became judge-advocate in the royal army, embraced the cause of the Parliament, helped to draw up the accusation against the king, and was murdered by several exiled royalists, 2nd May, 1849, at the Hague, where he had been sent as ambassador.

Dor'king, a market-town in the heart of Surrey, on the Mole, 29 miles S.W. of London by railway. It is picturesquely situated, and is composed in great part of fashionable villas. There are several handsome churches, among them that of St. Barnabas, with a spire 150 feet high, built by Sir G. Scott in 1859. D. has some trade in flour, chalk, and lime, and gives name to a certain breed of fowls. D. is on the Roman road between London and Chichester. Pop. reg. sub-dist. 12,396; and civ. par. 10,961.

Dor'mant (Fr. *dormir*, 'to sleep'), in heraldry, describes an animal lying on the ground with its forepaws outstretched, and its head resting on them. *Couchant* describes it with the head erect.

Dormant or **Poten'tial Vital'ity,** a term given to certain phenomena observed in some animals and plants, wherein the vitality of the organisms appears to exist in a state somewhat analogous to that we familiarly term *suspended animation* in man. Thus the seeds of plants may be kept in a dried parched state for many years, and yet spring into healthy plants when placed in their natural conditions—namely, in moist earth. The familiar examples of wheat and peas found in ancient mummy cases illustrate the occurrence of P. or D. V. in plants. And a no less remarkable instance of D. V. is the case of certain seeds which had been covered over in Greece by the refuse of some mines not worked since the classic ages. These seeds, being a few years ago uncovered, sprang up into plants, and reintroduced into that neighbourhood plants which had been unknown since the times of the ancients. In animals an example of D. V. is seen in the case of the *Rotifera* (q.v.), or 'wheel animalcules,' highly-organised beings, of minute size, and common in all our fresh-water pools. These beings may be artificially desiccated, just as they are dried in nature by the summer sun, from the pools in which they live. They may be blown about as mere dust-specks by the wind, and may continue in this mummified state for months and years. Yet on the addition of a little moisture they at once resume all the functions of their lives with renewed vigour. Other animals (such as snails), and other animalcules (such as the Bell animalcules), &c., may similarly exhibit an apparent suspension for lengthened periods of all their vital functions. Instances which are sometimes given of insects, of fishes, and of other animals exhibiting this state of D. V. are not to be accounted true examples of these phenomena. The quiescent state of an insect undergoing its metamorphosis is not to be compared to the seemingly total suspension of all the functions of life, as seen in Rotifera; and such fishes as the Lepidosirens (q.v.) or mud-fishes (see also DIPNOI), when lying packed in their mud-nests, are not destitute of vitality any more than a hybernating bear or mouse can be said to be dormant. In the one case we have apparently complete cessation of all vitality, in the other the animals are simply in a state of torpidity, but breathe and exhibit other evidences of the presence of life. When we inquire as to the conditions which affect organisms so as to produce D. V., or those in virtue of which beings of high structure can apparently have their functions temporarily annihilated, we find that biology can say nothing definite in reply. To say that D. V. ensues as a result of the withdrawal of natural surroundings (as in the drying of the Rotifera), is simply a restatement of facts, and not an explanation of the *rationale* of the phenomena. We must, however, carefully distinguish between the use of the terms *revitalise* and *revive*. We can revive the being which exhibits D. V. or suspended animation by restoring it to its due surroundings, but we cannot revitalise a dead organism. Much confusion has arisen in discussing this subject from the indiscriminate use of these terms.

Dor'mer (Fr. *dormir*, Lat. *dormire*, 'to sleep') is an attic room formed by raising a gable resting on the rafters, and projecting vertically above the sloping roof of a house, and was so called because it was a contrivance resorted to for increasing the sleeping-accommodation of a house. D.-windows (Fr. *lucarnes*) have often been made an important detail in Gothic architecture, and the flamboyant *lucarnes*, constructed in France towards the end of the 15th and beginning of the 16th centuries, were especially elegant.

Dormer Window.

Dor'mitory (Lat. *dormitorium*, from *dormire*, 'to sleep'), the sleeping-hall of a religious house, boarding-school, hospital, &c., in which a number of beds for the inmates are ranged. The D. of the Abbey of Fontinelle (constructed in the 8th c.) was 208 feet long, 27 broad, and 64 high. In later times the D. of a monastery was often a series of cells, all opening upon a long gallery.

Dor'mouse, a genus of *Rodentia* (q.v.) belonging to the family *Myoxidæ*, which differs from the true mice, being more nearly allied to the Jerboas (q.v.), squirrels, &c. The family is known by the smoothness and compressed form of the incisor teeth, the molars numbering eight in each jaw, and having transverse markings on their crowns. The genus *Myoxus*, represented by the lerot or garden D., and by the common D., is known by its members possessing ears of moderate size, and long whiskers. The front feet have four toes and a rudimentary thumb, the hinder feet five toes. The tail is long and hairy. The members of this genus are confined to the Old World, and occur mostly in Europe. The common D. attains a length of five inches, is white-throated, of a light reddish-brown on the upper, and a lighter tint of the same colour on the under parts. It is nocturnal in habits, and its nest is built usually in some secure nook in a tree. The food consists of corn and nuts. The D. sleeps during winter; hence its name. The young number three or four at a birth. The lerot occurs in S. Europe, and attains a length of eight inches. Its colour is grey, tinted with red above and white below; there is a patch of black below the eye. It commits much havoc in fruit-gardens. The fat D. or loir, found also in S. Europe, was formerly eaten by the Romans, and was fattened in cages named *gliraria*.

Dormouse.

Dorn'birn, or **Torn'büren** ('thorn-dwelling'), an industrial town of Austria, in the crown-land of Tyrol and Vorarlberg, 8 miles S. of the Lake of Constance. It has manufactures of spinning, weaving, and embroidery. Pop. town 10,678; district 23,876.

Dor'noch, (Gael. *Dor-n-ach*, 'the field between two waters') the capital of Sutherlandshire, Scotland, and the only town in the county, is situated at the mouth of the D. Firth, which, with an inward reach of 22 miles, separates Ross-shire from Sutherland. It is a royal burgh (since 1628), was formerly the residence of the Bishops of Sutherland and Caithness, and has a cathedral said to date from the 11th c., which was destroyed by fire in 1570, and partially restored in 1837. It is now used as the parish church. D. attracts many summer visitors for bathing and golfing. Along with Wick, Cromarty, Dingwall, Kirkwall, and Tain, it returns one member to Parliament. Pop. parl. bor. and civ. village (each) 514.

Firth of D., a narrow sinuous arm of the North Sea, 20 miles long, receives the Shin, Oykel, Carron, and smaller streams.

Dorogobush', or **Dorogobouj,** a town in the government of Smolensk, Russia, on the Dnieper, 50 miles E.N.E. of Smolensk. It is well built, and has ten churches. It was partly burned by the French under Eugène, in their retreat from Moscow, 27th October, 1812. Pop. 17,090.

Dor'pat, or **Dörpt** (Rus. *Guriev*, Esth. *Tartolin*), a town on both sides of the Embach, government of Livonia, Russia, 150 miles N.E. of Riga. It is mostly built of brick or wood, and has a granite bridge across the Embach, which is frozen from the end of October to the middle of March. Its famous university, founded by Gustavus Adolphus in 1632, suppressed in 1710, and re-established by Alexander I. in 1802, is now attended by 710 students, and has a library of 85,000 volumes, botanical gardens, &c. The language of the people is Esthonian, but that of literature and of the learned is German. There is an active trade. D. was founded by the Russians in 1030, and was taken by the Teutonic Knights 1223, afterwards becoming an important member of the Hanse League. It has been the seat of a bishop since the 13th c., came into the possession of Poland in 1583, of Sweden in 1625, and was partly destroyed by Peter the Great in 1704. Pop. 34,897, of whom many are Germans.

Dorse, a species of *Gadidæ* or Cod—somewhat doubtfully regarded as a distinct species—found in the northern seas and in the Baltic. From its liability to variation in colour it has received the name of 'variable cod.' Its average length is two feet. It is hardly known in Britain.

Dor'set, House of, an English family, settled in Sussex, which traces its origin from Hildebrand Sackville, one of the followers of William the Conqueror. The chief members of the family are the following:—**Thomas Sackville,** the first Earl of D. (See SACKVILLE.) **Edward Sackville,** grandson of the above, was born in 1590. James I. viewed him favourably, and put him at the head of the troops sent to aid the Elector-Palatine in the Thirty Years' War. In 1621 he was sent as ambassador to the French court, and in 1624 succeeded to the title of Earl of D. Although Charles I. was very partial to him, D. often opposed the king's unconstitutional acts, and in 1640, when he was one of the regents appointed during the king's absence in Scotland, exposed and prevented the massacres arranged to take place in Ireland in October, 1641. In 1641, as President of the Council, he strove to reconcile the king and Parliament, but mediation proving useless he espoused the royal cause, and fought bravely at Edgehill. He died at Witham, 17th July, 1652. Clarendon says he was distinguished for wit and learning. He left two sons, **Richard D.,** born in 1622, who was a member of the Long Parliament, imprisoned as an abettor of Strafford, became Lord-Lieutenant of Sussex, and died in 1677; and **Charles Sackville, Earl of D.,** who was born at Witham in 1637, went to sea under the Duke of York in 1665, and on the night before the sea-fight, in which the Dutch Admiral Opdam's vessel was blown up, composed his well-known ballad, *To all you Ladies now on Land.* He was a distinguished patron of literature, and the friend of Dryden, Waller, and Butler, whose *Hudibras* he introduced to the royal notice. He opposed James II.'s despotic measures, and was a favourite courtier of William III., whom he accompanied to Holland, and who made him Lord Chancellor. D. died at Bath, 19th January, 1706. He was highly praised by Prior, and by Pope in his *Epitaph on D.* His writings consist of satires and songs, which, though trifling, are generally elegant and piquant. His son **Lionel** was made Duke of D. by George I. in 1720, and died in

1765. The title became extinct in 1843, on the death of **Charles Germain,** nephew and successor of that Duke of D. who was Byron's youthful friend.

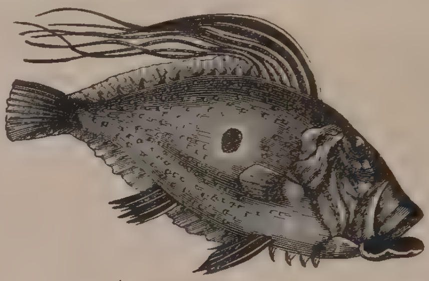
Dorsetshire, a southern county of England, bounded S. by the English Channel, W. by Devon, E. by Hampshire, and N. by Somerset and Wilts. It is level in the N., but is traversed by chalk hills (Dorset Heights) in the centre. The coast-line, 75 miles long, is deeply indented on the E. by Poole Harbour, while in the W. it forms part of Lyme Bay. It is in places precipitous, occasionally standing out in bold headlands, as at Swanage, St. Albans (934 feet high), and the Bill of Portland. The chief rivers of D. are the Stour, Trent, and Frome. In the W. the formation is oolitic, in the E. cretaceous. D. is an agricultural county, and the principal occupations are grazing and dairy and sheep farming. Area 632,272; pop. anc. county and admin. county (each), 194,517; and reg. county, 188,995. D. contains four parliamentary divisions, each of which returns one member: Eastern, 57,217; Northern, 45,763; Southern, 49,896; and Western, 41,641. There are estimated to be 89,953 acres under corn crops (barley or bere 31,196, and oats 31,188); 52,616 under green crops (potatoes 1644); 45,946 under clover, sainfoin, and grasses in rotation; 298,634 under permanent pasture and grass not broken up; and 25 under flax. Bare fallow and uncropped arable land account for 3087 acres, and small fruit is cultivated over 310 acres. Mountain and heath, used for grazing, cover 14,075 acres; and wood and plantations occupy 31,457, while 126 are laid out for nursery grounds. For live stock see separate articles, CATTLE, HORSE, PIG, and SHEEP. There is a large export trade in dairy produce, and in Portland and Purbeck building-stone, coarse marble, and potter's clay. Dorchester is the capital, and the other notable towns are Poole, Bridport, Sherborne, Weymouth, and Melcombe-Regis. There are ample means of intercommunication by the London and South-Western, Great Western, and Midland railways. D. has many interesting British and Roman remains, as barrows, stone-circles, camps, amphitheatres, &c. The ruins of Corfe (q.v.) Castle, a residence of the West-Saxon kings of England, are among the finest in the island.

The Dorset Sheep, in form of head and horns, resembles the blackfaced ewe sheep, but the whiteness of its face shows it to be less hardy. Dorset sheep are to be found in many parts of England, and also in Scotland. They are long in the leg, light in shoulder, and their average weight per quarter is from 20 to 25 lbs. The wool is of good quality, but the fleece is light, 4 to 5 lbs. being a good clip. Their chief merits are their excellence as nurses, and their great fecundity, twins with the ewes being a common circumstance. Their lambs are dropped in October or November.

Dort, or **Dor′drecht** (from Old Ger. *trift*, 'pasture' or 'meadow,' 'the pasture on the water'), an ancient town on an island on the Maas, province of S. Holland, Netherlands, 12 miles S.E. of Rotterdam, partly fortified on the land side. It is admirably situated for trade, having not only the Rhine and the Maas in its vicinity, but being furnished with numerous canals. Large rafts of wood from Switzerland and Upper Germany are floated down on the Rhine to D., which has numerous saw-mills, extensive ship-building yards, salt and sugar refineries, manufactures of tobacco, and a trade in seeds, grain, oil, and flax. D. is famous in Church history for a great synod, held in 1618-19, which condemned the doctrines of Arminius (q.v.). The hall in which the divines met is now converted into a playhouse. It is perhaps still more memorable as the place where the United Provinces, after the expulsion of the Spaniards, held their first Assembly in 1572. Pop. 32,934.

Dort′mund, a town in the province of Westphalia, Prussia, on the Cologne and Minden Railway, 47 miles N.N.E. of the former city. Its railway station is one of the largest on the Continent, with immense workshops for the manufacture of rolling stock. D. has also manufactures of woollens, linen, cotton, tobacco, and cutlery, breweries, and flour-mills, and is the centre of an important mining district. It is a very old town, and figures in the romantic and fabulous history of the Dark Ages. D. was already a town in the year 800, and was afterwards variously called, in mediæval Latin, *Throtmanni*, *Trutmanna*, *Trutmonia*, *Tremonia*; in German, *Trotmunde* and *Dortmunde*. It was a free imperial city and a member of the Hanseatic League, lost its prosperity during the Thirty Years' War, but has recovered it in recent times. Its old walls (12th c.), pierced by five gates, have been almost wholly removed. Pop. 89,663.

Do′ry, or **John Dory,** a well-known species of Teleostean fishes, usually regarded as included in the *Scomberidæ* or Mackerel family, and distinguished, as a genus, by possessing a divided dorsal fin, the front or spinous part of which is less developed than the soft portion. The body is deep, and bony plates exist along the bases of both dorsal and hind fins. The name 'J. D.' is supposed to be a corruption of the French *jaune dorée*, a term given to this fish from the brilliant yellow colour of its body. The body is compressed, and the head curiously shaped, the mouth being very protrusible. Each ray of the first dorsal fin gives off long tendril-like processes. The colour exhibits a general yellowish hue, but the tints which pass over the body as the fish is dying are as varied as they are beautiful. The food of the D. consists chiefly of smaller fry and cuttlefishes. Its flesh is highly esteemed. It is also known by a peculiar black mark on each side, which superstition ascribes to the marks of the apostle Peter's finger and thumb, as he took this fish from the water to obtain the tribute-money. The average length is about 16 inches. The D. occurs in most of the seas of Europe.



John Dory.

Dott′erel, a species of *Charadriadæ* or Plovers, occurring in Britain, in N. Europe and N. Asia, but also migrating to the S. of Europe in autumn. The plumage is of a general brownish tint on the upper parts, the cheeks and throat being white, while the breast and under parts are white. The average length of this bird is 8 or 9 inches. It is captured for food in large quantities, and is in reality shy and wary, although usually reckoned a stupid animal.

Dou′ai, or **Douay,** an ancient town of France, department of Nord, on the Scarpe, 21 miles by railway S. of Lille, and about 70 miles S.E. of Calais. Of its once formidable fortifications there are some remains, and its notable buildings and institutions are the Church of Notre Dame (partly of the 12th c.); the artillery magazine and barracks; the imperial cannon-foundry; the Hôtel de Ville, a magnificent Gothic structure, with beautiful belfry; the library (46,000 vols.); the museum of natural history, antiquities, and art; a college for the education of English Roman Catholics, a university academy, and schools for law, physics, mechanics, chemistry, mathematics, gunnery, and for the training of male and female teachers. The industrial establishments comprise machine-shops, foundries, lace and thread factories, and chemical works. D. is connected by a number of canals and by the river Scheldt with the chief towns and departments of Belgium, and it is the centre of an active trade in oil, sugar, soap, brushes, linen goods, machines, and instruments, &c. Pop. town 29,909; arrond. 133,037.

Doub′le Bass. See CONTRA-BASS.

Doub′le Con′sciousness is the name of a morbid mental condition, generally of periodic recurrence, which remains unconnected with the ordinary mental life of the patient, but the separate portions of which coalesce through memory and the ordinary laws of association, and thus form the material, if not the distinct conception, of a second personality. The stronger developments of this have occurred in the cases of hysterical and insane patients; but there is a milder form in which somnambulism, along with a consciousness of external impressions, alternates with healthy normal consciousness. The magnetic sleeper does not remember after waking what he has smelled, tasted, heard, spoken, or done during the sleep; but when subjected to magnetism again, the memory of that and all previous magnetic sleeps revives. The sense of identity is often lost in the magnetic sleeper, although the sleeper may speak with accuracy of things known to him in his usual state. It is not known what causes the 'fault' in the mental connections. It has been hypothetically assigned to the independent action of the two hemispheres of the cerebrum (Holland, *On the Brain as a Double Organ*). It is not proved that the hemispheres do act in this manner; were that known, the problem would then be to connect this independent action with the morbid conditions of D. C., and to explain how the isolation is produced and terminated, and how the experience of the isolated hemisphere is prevented from afterwards coalescing with the healthy action of the whole brain. The idea of unconscious cerebration, or of mental life without consciousness, does not to any extent explain the phenomena of D. C., although it suggests how portions of experience, lost to ordinary consciousness, may be reached by a wave of nervous excitement.

Doub'le Flat, in musical notation, a sign indicating that for the note to which it is prefixed a note two semitones lower is to be substituted. A **Double Sharp** indicates the similar substitution of a note two semitones *higher*.

Double-Shott'ing was the practice, in the naval tactics of an earlier day, of loading a gun with double the usual weight of shot for the purpose of increasing the destructive power. The design of modern cannon, and the perfect condition in which it is necessary to maintain them, render this practice impossible at the present day, while the rapidity gained by the adoption of the contrivance of breech-loading renders it unnecessary.

Doub'let (Fr. *doublet*, from *doublé*, 'double,' because lined), an article of apparel resembling a jacket, introduced into England from France about the middle of the 15th c., and worn by all classes for upwards of 200 years. Its use in England is marked by constant change of shape: the original garment was sleeveless, but sleeves were afterwards added; at one time it was tight-fitting, at another time loose; again 'pease-cod bellied,' then long-waisted; till it finally, in the reign of Charles II., lost its individuality and was superseded by the waistcoat.

Doub'ling of the Cube. See DUPLICATION OF THE CUBE.

Doubloon' (Span. *dublon* and *doblon*, 'double'), the name of a gold piece of the value of two pistoles. During the 18th c. and subsequently, the value of the D. varied at different times. For some time previous to 1772 the value had been £3 1s. 10d.; in that year the pieces were called in. They were subsequently reissued of the value of £3 4s. 8d. The value of the *dublon de Isabella*, issued in 1848, was £1 0s. 8d.

Doubs, a frontier department of France, bounded N. by Haute-Saône and Alsace, W. by Jura, E. by the Jura range, and narrowing in the S. almost to a point. It is chiefly watered by the river from which it takes its name, and has the Oignon for its western boundary. The country is very mountainous, presenting three distinct zones in climate and productions—(1) the rich vine *Plaine* to the W., between the rivers D. and Oignon; (2) the *Moyenne-Montagne*, rising to a height of about 900 feet, and affording good pasture; and (3) the *Haute-Montagne*, running from N.E. to S.W. (from 2000 to 4000 feet high), partly covered with pine forests. Agriculture is gradually improving. D. is specially rich in minerals, including iron, coal, gypsum, and marble. It possesses many mines, large furnaces, and ironworks. In addition it has many active industries, and is traversed by the Rhône-au-Rhin Canal, and by the Dijon-à-Belfort Railway. Besançon is the capital, and the other important towns are Montbéliard, Pontparner, and Baume-les-Dames. Area 2018 sq. miles; pop. 303,081.—The *river D.* rises in the S.E. of the department, flows N.E. along the French frontier, forms a sharp loop within Swiss territory, and after several windings proceeds in a S.W. direction, eventually joining the Saône below Dôle, after a course of 115 miles.

Dough (Old Eng. *dah*, from *deawian*, 'to moisten'), the mixture of flour, yeast, salt, and water, prepared by bakers for putting into the oven to make bread.

Doug'las (Gael. *Dubhglaise*, 'black stream'), the chief town in the Isle of Man, lies on a fine bay, on the S.E. side of the island, at the mouth of a small river of the same name. From the beauty of the scenery, and the salubrity of the air, it is a favourite sea-bathing place. A deep-water landing pier and pier with breakwater are provided. The older and lower part of the town is quaint and not uninteresting. Castle Mona, formerly a residence of the Duke of Athole, is now a hotel. D. has some linen, paper, and woollen manufactures. Pop. 19,525. Another town of the same name in the county of Lanark, Scotland, has a pop. civ. par. 2266; and civ. town 1018.

Douglas, the Family of. The origin of this famous Scottish family is unknown, but they were 'rooted in the country at the time when the Norman adventurers crowded in' (Burton). According to a legend, the name D. was derived from the exclamation of a Celtic chief, who, being sought by a Scottish king after a victory due to his prowess, cried '*Sholto Du-glas*' ('behold the dark-grey man'), and was rewarded with a valley in Clydesdale, which was henceforth known as the Valley of D., whence his descendants took their name. The first of the house known in history is **William of D.,** a kinsman of the powerful house of Murray, who lived at the end of the 12th and beginning of the 13th centuries, and probably drew his title from his lands on the D. Water, in Lanarkshire. He was succeeded by his eldest son, **Archibald,** or **Erkenblad of D.,** who was made a knight, and left two sons, William and Andrew. From Andrew descended the Douglases of Dalkeith and the Earls of Morton. The estates of D., now considerably enlarged, passed in succession to William and to his sons Hugh and William, surnamed the *Hardy*. This **Sir William of D.,** after various exploits in which he showed the reckless hardihood characteristic of the family, joined Wallace in 1297, yielded to Edward I., and died in prison, at York, about 1302. He held land on both sides of the Border and in various counties of Scotland. His son, **the Good Sir James of D.,** was the heroic and skilful associate of Bruce in the Scottish War of Independence. He was surnamed the 'Black D.' from his dark complexion. He was the *beau idéal* of knighthood, and was said to have fought in seventy battles and been victorious in fifty-seven. In compliance with Bruce's dying request (see BRUCE), Sir James sailed for the Holy Land, bearing the king's heart in a silver casket, and fell in a fight in Andalusia, in 1330, against the Moors of Granada. In memory of this expedition the Douglases bore a bloody heart and a crown upon their shields. The Good Sir James was succeeded by his brothers Hugh and Archibald. The latter married the daughter of John Comyn of Badenoch, and his son William became, in 1357, first Earl of D., and, through marriage, also Earl of Mar. His son James, second Earl of D., married Margaret, eldest daughter of King Robert II., and fell at Otterburn, in 1388. As he left no sons, his sister inherited the Earldom of Mar, while **Archibald D.,** surnamed **the Grim,** a natural son of the Good Sir James, succeeded to the Earldom of D. He added by marriage the barony of Bothwell to his estate, and married his eldest son and daughter to the eldest daughter and son of the king. He died in 1401. His son **Archibald** made an alliance with France, and in reward for his services in the French wars was made Count of Longueville and Duke of Touraine. He was slain at Verneuil in 1424, The fortunes of the House of D. culminated with his son **Archibald,** who also fought in the French cause. He died in 1439. At this time the Douglases held two-thirds of Scotland S. of Edinburgh, besides various estates in the N. The people viewed them as champions of Scotland against England, especially after the victory of Otterburn, and since they had, single-handed, won back the Border-lands which Edward Baliol had ceded to Edward III. Moreover, through the marriage of the Good Sir James's brother with the sister of the Red Comyn and the niece of Baliol, the Douglases could found a most plausible claim to the Scottish throne, and but for Baliol's unpopularity they would have contested the accession of Robert II. Bitter rivalry arose between the Stuart kings and the Douglases. **William,** Archibald's successor, a youth of seventeen, was murdered along with his brother in Edinburgh Castle in 1440 by King James II., a crime popularly spoken of as the 'black dinnour of Earl D.' The Scottish Earldom of D. was held by the murdered stripling's indolent grand-uncle, **James the Gross,** until 1443, when William, son of James, inherited the D. domains both in France and Scotland. This **William** of D. was lieutenant-general to James II., united Galloway to his possessions by marriage with his cousin, the Fair Maid of Galloway, and ruled almost as an independent sovereign until 1452, when James II. enticed him to Stirling Castle, under pretence of wishing a conference, and there stabbed him to death. His brother James declared war with the treacherous king, but shortly fled to England, leaving Archibald and Hugh D. to continue the struggle. They were beaten at Arkinholm in 1455 by George, fourth Earl of Angus, who belonged to a younger branch of the Douglases which was then at feud with the great house, but by which the fortunes of the family of D. were afterwards restored. James of D., who had fled to England, made a raid into Scotland with Albany in James III.'s reign, was captured, and spared on condition of entering Lindores Monastery. **House of Angus.**—This family sprang from a liaison between William, first Earl of D., and Margaret Stewart, Countess of Angus and Mar, whose descendants became Earls of Angus. After the victory at Arkinholm the fourth Earl of Angus was rewarded with the dominions of the beaten Douglases. Hence the popular remark that the 'Red D. had put down the Black,' Angus being of a florid complexion.—**George, Fourth Earl of Angus,** died in 1462, and was succeeded by **Archibald,** nicknamed 'Bell-the-Cat' (see JAMES III.), who was for some time Warden of the East Marches and Lord High Treasurer of Scotland. His eldest son fell at Flodden, his third son, Gawin D. (q.v.), entered the Church, and his son by a second marriage, Sir Archibald D. of Kilspindie, became Lord Treasurer of Scotland under James V. He was succeeded by **Archibald,** son of the George D. slain at Flodden. Archibald married Margaret, widow of James IV., and sister of Henry VIII. of England, by whom he had a daughter, afterwards mother of Henry Darnley (q.v.). During the minority of James V. Scotland was distracted by feuds between Angus and the Hamiltons. In the battle known as 'Clean the Causeway,' fought in the High Street, Edinburgh, the Hamiltons were, for a time, thoroughly beaten; and Angus, being made guardian of the young king in 1526, was practically sovereign till 1528, when James escaped from his custody. Thenceforth his power dwindled, and finally his estates were forfeited, and himself, after a stubborn resistance, was driven into England. On the death of James V. in 1542, Angus returned to Scotland, and was reinstated in his former possessions. He died in 1556. He was succeeded by his nephew, upon whose death the Earldom was held by **Archibald,** the 'Good Earl,' and from 1588 to 1591 by Sir William D. of Glenbervie, great-grandson of Archibald Bell-the-Cat. The old privileges of the D. family were restored to his son **William,** tenth Earl of Angus, who was appointed lieutenant-general of the kingdom, and privileged to lead the van in battle, carry the crown at a coronation, and give the first vote in Parliament. He became a Roman Catholic, and died at Paris in 1611. **William,** eleventh Earl of Angus, was in 1633 made Marquess of D. One of his sons was made Earl of Selkirk in 1646, another Earl of Forfar in 1666, and another Earl of Dumbarton in 1675. **Archibald,** the grandson of the first Marquess of D., was made Duke of D. in 1703, a title which expired with the decease of the first duke in 1761, when the Marquessate of D. descended to the seventh Duke of Hamilton, who belonged to a younger branch of the D. family. The D. estates, however, were in the great 'D. cause' transferred from the Duke of Hamilton to a son of Lady Jane D., sister of the first Duke of D. The new heir received the title Baron D. of D. Castle in 1790, a title which became extinct on the death of the fourth Lord D. in 1857. The D. estates then fell to the Countess of Home. **Earls of Morton.**—The Earls of Morton are lineal descendants of William of D., the first D. known to history. Sir William D. of Liddesdale, son of Sir Archibald of D., the successor to the first William of D., in 1320 obtained the lordship in Dalkeith which, along with other lands, descended to his nephew, Sir James D. of Dalkeith, whose eldest son married a daughter of Robert III.; and their grandson was, in 1458, made first Earl of Morton. The present inheritor of the title is the direct descendant of William of D., the chief of the D. family in the 13th c. **House of March and Queensberry.**—The descendants of Sir William of D. of Drumlanrig, illegitimate son of the second Earl of D., became Counts of Drumlanrig in 1628, Marquesses of Queensberry in 1633, Dukes of Queensberry in 1684, and Earls of March in 1697. In 1810, on the death of the fourth Duke of Queensberry, the title Duke of Queensberry and the lands of Drumlanrig devolved upon the Duke of Buccleuch, the title Earl of March upon the Earl of Wemyss, and the title Marquess of Queensberry upon Sir Charles D. of Kelhead. See Douglas's *Peerage*, by Wood; Chalmer's *Caledonia* (Lond. 1807); Cosmo Innes's *Registrum Episcopatus Moraviensis* (Edinb. 1846); and *Registrum Honoris de Morton* (Edinb. 1853); Hume of Godscroft's *History of the Houses of D. and Angus* (Edinb. 1748); and Burton's *History of Scotland*, especially ch. xxviii.

Douglas, Gawin, a Scottish poet, born in 1474, was the third son of Archibald Earl of Angus, surnamed 'Bell-the-Cat.' He was educated at St. Andrews University, and entering the Church, became successively Rector of Hawick, Provost of St. Giles at Edinburgh in 1501, and Bishop of Dunkeld in 1516. Party strifes finally lost him his see, and he had to take refuge at the court of Henry VIII. He is said to have received a pension from the king, and lived on terms of friendship with the foremost men in England, till his death of the plague in 1522. By his own wish, he was buried in the Hospital Church of the Savoy. D.'s first literary essay was a translation of Ovid's *De Remedio Amoris*, but this has been lost. In 1501 he wrote the *Palice of Honour*, dedicated to James IV. This is an allegorical poem, inculcating the principles of duty, its idea perhaps taken from Chaucer's *Temple of Fame*. That Bunyan borrowed from it, as has been supposed, is very unlikely. D.'s next poem was *King Hart*, an allegory of human life, in which the heart of man is represented under the type of a monarch. This work shows its author to have been acquainted with the *Piers Plowman* of Langland. A short poem in four stanzas by D., called *Conscience*, is also preserved. In 1512 he began his great work, the *Translation of the Æneid of Virgil*, which was completed just two months before Flodden. This was the first rendering of the *Æneid*, or indeed of any Latin classic, into English verse, and gives the twelve books with original prologues, characterised by a diffuse splendour of description. The work is marked both by strength and simplicity. D. is the first writer who applies the Celtic name 'Scotch' to the dialect of English used N. of the Tweed. His complete works have been elaborately edited by Small (Edinb. 1874). The first volume contains a careful and exhaustive life of the poet.

Douglas, General Sir Howard, Bart., G.C.B., son of Admiral Sir C. D., was born at Gosport in 1776, early entered the army, served in the Peninsular War in 1808-9, and was Governor of New Brunswick from 1823 to 1829. He successfully contested Liverpool in 1832 and 1835, was

Lord High Commissioner of the Ionian Islands from 1835 to 1840, and M.P. for Liverpool from 1842 to 1847. He became a general in 1851, and died November, 1861. He wrote treatises on *Naval Gunnery* and *Naval Evolutions*, *Considerations on the Value and Importance of the British and N. American Provinces*, and *An Essay on the Principles and Construction of Military Bridges*, &c.

Douglas, John, D.D., was born in 1721 at Pittenweem, Fifeshire, and after being educated at Oxford, entered the Church of England, and rapidly (1750) obtained preferment, being made in 1787 Bishop of Carlisle, and in 1792 Bishop of Salisbury. He died 18th May, 1807. D. was not undistinguished in literature. He was intimate with Dr. Johnson, and the most notable of his contemporaries. He is faintly remembered for his vindication of Milton against the forgeries of Lauder, and still more faintly for his answer to Hume in his *Criterion, or a Discourse on Miracles* (1754). D. also edited Cook's *Third Voyage*.

Douglas, Stephen Arnold, an American statesman, was born at Brandon, Vermont, 23rd April, 1813. He began life as a cabinetmaker, but afterwards studied law and settled in Jacksonville, Illinois, where he was known by the sobriquet of the 'Little Giant.' D. was chosen State Secretary in 1840, a judge in 1841, entered the House of Representatives in 1843 as a Democrat, and was a Senator from 1847 to 1861. He advocated *Popular Sovereignty* in the Territories, and in 1854 his Kansas and Nebraska Bill, repealing the Missouri Compromise, let loose a torrent of political passion over the whole country. D. was the presidential candidate of the Northern Democrats in 1860, when Lincoln was elected. He died 3rd June, 1861. D. was idolised as a leader in the Western States. A splendid monument, costing $80,000, was erected to his memory at Chicago, on the banks of Lake Michigan.

Douglass, Frederick, an American orator, was born of a negro mother and white father at Tuckahoe, in Maryland, about 1817. He was a slave, first on a plantation and afterwards in Baltimore, but having taught himself to read and write, escaped from bondage at the age of twenty-one. For a time he worked on the wharfs of New Bedford, Mass., but soon attracting notice by his gifts, was employed as an agent of the Anti-Slavery Society. In 1845 he published his *Autobiography*, and soon after visited England, where the thrilling story of his life, and his manly oratory, excited much sympathy. For some years he was editor of a paper in Rochester, N.Y., and in 1855 wrote *My Bondage and Freedom*. In 1870 D. became an editor in Washington, and in 1872 Presidential Elector for New York state; 1877-81 Marshal for Columbia; 1889 U.S. Minister at Haiti.

Doune (Gael. 'the hill'), a town in the parish of Kilmadock, Perthshire. It is famous for its fairs, the town standing at one of the entrances to the Highlands. *D. Castle* is a ruinous fort, with massive walls and towers, picturesquely crowning a steep green bank on the Teith. Pop. 940.

Dour, a town of Belgium, province Hainaut, 9 miles S.W. by W. of Mons. In its neighbourhood are several iron and coal mines; weaving, bleaching, tanning, &c., are also carried on. Pop. of commune 10,603.

Dou'ro (Celt. 'the water') or **Duero,** one of the largest rivers of the Spanish peninsula, rises in the N. of the province of Soria, flows first S.E. towards the town of Soria, then turns S., and finally W. towards and through Portugal, ultimately falling into the Atlantic at Oporto, after a course of 480 miles. For about 52 miles it forms the boundary between Portugal and Spain. It is generally rapid and unfit for extensive navigation, but traverses a naturally rich and picturesque country.

Douroucouli, a species of monkey occurring in Brazil and the Guianas. Its length is about 9 inches, while its tail measures $1\frac{1}{4}$ foot. Its soft grey-furred back has a brown line drawn from the neck to the tail. Three stripes mark the head. The belly is brownish-yellow. It sleeps during the day and hunts for small birds and insects during the night. It pairs early and does not change its mate.

Douroucouli.

Dove, a general name given to all the members of the *Columbidæ* or Pigeon family, but used only in a popular and general sense, the term being without any specialised signification. The name is probably derived from the same root as the word 'dive.'

Dove, in Christian art, was regarded as symbolical of purity, and is for that reason carved upon the tombs of infants and young girls. It was the recognised type of the Holy Spirit from the circumstance that the Spirit descended upon the Saviour in the shape of a D. To signify that at baptism the infant is admitted into the church, the D. is often carved on the covers of fonts in many English and foreign churches. Frequently a gold or silver D. was suspended from the vault of the ciborium in which the Holy Eucharist is preserved. In baptistries, also, a pigeon of gold was kept for the same purpose. In old pictures the D. frequently appears either as the symbol of purity, of the purified soul, or of the Holy Spirit. A simple gold nimbus, or one encircling a black cross, often surrounds its head, and seven rays proceeding from its head signify the seven gifts of the Holy Spirit. The figure of a D. with an olive branch is the emblem of peace, while one rising from the lips of dying saints is emblematical of the flight of the disembodied spirit. A D. with six wings, two attached to the head, two to the shoulders, and two to the feet, is a type of the Christian Church.

Do've, Heinrich Wilhelm, a German physicist and meteorologist, was born at Liegnitz, in Silesia, 6th October, 1803, studied at Breslau and Berlin, became in 1829 Professor of Natural Philosophy at Berlin, and applied himself chiefly to the investigation of meteorological phenomena, as climate, winds, &c. The sciences of optics and electricity also claim a share of his attention, his most practical discovery being probably the application of the stereoscope to the detection of forged bank-notes. He is best known in England by his treatise on the *Distribution of Heat on the Surface of the Globe*, published by the British Association in 1853.

Dovecot. Pigeons are protected by the statute 7 and 8 Geo. IV. c. 29, under which any person who unlawfully and wilfully kills, wounds, or takes any house dove or pigeon, under such circumstances as shall not amount to larceny at common law, on conviction before a justice of the peace, shall forfeit and pay over and above the value of the bird, any sum not exceeding £2. The Act does not extend to Scotland, but the breaking into a D. is under an old Scotch statute held to be theft, and severely punishable. See PIGEON.

Do'ver (probably Celt. *dfr* or *dwr*, 'water,' but possibly the Old Eng. *ofer*, 'the shore,' with a prefix), a municipal and parliamentary borough, seaport, and a great centre of international traffic, on the E. coast of Kent, at the entrance to a valley running along the N. slope of the N. Downs, 88 miles from London by the South-Eastern, and 77 by the London, Chatham, and Dover, Railway. It is the chief of the Cinque Ports (q.v.). During recent years D. has considerably increased in population and in wealth; its older streets have been widened and improved, a number of its old and interesting buildings restored, large and elegant commercial and other establishments erected, and its suburbs much extended. The principal buildings are the hotels, the marine telegraph offices, and the lines of residences built along the Esplanade, Marine Parade, and East Cliff. St. Mary's and St. James's churches, in both of which structures Norman features are still traceable, have been well restored, and the ancient Maison Dieu was restored (1861), and in part rebuilt, from designs by A. Poynter. On the N.E., on the cliffs, is D. Castle, a powerful fortress, embracing with its old and new works an area of about 50 acres, and fortified by walls, ditches, bomb-proof magazine, batteries, &c. In the barracks there is accommodation for from 3000 to 4000 men. Other heights around the town are surmounted by barracks and fortifications. The commercial activity of D. arises chiefly from the circumstance that it is the great port of intercommunication between England and the Continent. Steamers are constantly plying to Calais, Boulogne, and Ostend. Extensive works have long been carried on at the port of D., with the view of making it a harbour of refuge. Of these, one of the most important was the Admiralty Pier, commenced in 1874, designed to enclose an area of 520 acres. In 1891 a bill was passed in parliament providing for the extension of the pier and harbour accommodation at D. The Harbour Board then took over the Admiralty Pier and obtained the right to levy a tax of one shilling on every passenger using the continental service of steamers. The extension by 580 feet of the Admiralty Pier and the erection of an East Pier 2760 feet in length were also provided for by the bill, and the memorial stone was laid by the Prince of Wales on 20th July, 1893. The increase to the harbour area is estimated at 36 acres. On 6th September, 1894, was laid the first marine block of the East Pier on the bed of the sea. A submarine cable was laid from D. to Calais in 1850. D. sends one member to Parliament, and the parliamentary borough consists of the parishes of St. James and St. Mary, East Cliffe, and Dover Castle, and parts of the parishes of Buckland, Charlton, Guston, and Hougham. An important British stronghold prior to Cæsar's invasion, it was the *Dubris* of the Romans. Owing to its position on that part of the English coast nearest to France, it has frequently been the scene of important events during the history of the country. D. was the point at which Cæsar made his first attempt to land. It was created one of the Cinque ('five') Ports by Edward the Confessor. The town was restored and strengthened by William the Conqueror. It was attacked and plundered by a French fleet in 1295, and its castle has been frequently besieged. The defensive works were greatly strengthened in 1745, when a visit of the Pretender was expected, and again in 1804, when Napoleon threatened invasion. Pop. mun. bor., co-extensive with parl. bor., 33,300; and reg. dist. 40,466.

Ancient Church and Pharos, Dover.

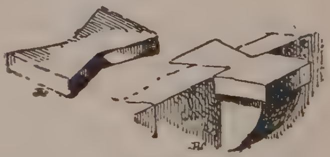
Dover, the capital of Delaware, U.S., is situated on a rising ground, 5 miles W. of Delaware Bay, and 65 miles S.S.E. of Philadelphia by railway. It has a handsome state-house, a library of 36,000 volumes, and many churches, while the streets run at right angles, and are lit with gas. There are large steam flour and saw mills, and a trade chiefly with Philadelphia in flour and fruit. Pop. 3061.

Do'veron, or **Dev'eron,** a river of Scotland, rises on the slope of the Buck of the Cabrach (Cairngorm range), Aberdeenshire, flows N. in that county for about 7 miles, and then in a generally N.E. direction, partly in Aberdeenshire, partly in Banffshire, and partly between the two, till passing Banff, it enters the sea after a course of about 55 miles. D. and its affluent the Bogie are both good trout-streams.

Dover's Powder consists of 1 part of ipecacuanha, 1 part of opium, and 8 parts of sulphate of potash. The dose is 10 to 12 grains. It is a powerful diaphoretic, producing copious perspiration, and is very beneficial at the onset of a cold. D. P. is often sold in shops under the name of *Sweating Powder.*

Dover Strait (Rom. *Fretum Gallicum;* Fr. *Pas de Calais*), the narrow seaway between Great Britain and the Continent, leading N. into the North Sea, and S. into the English Channel. It varies in width from about 20 to 25½ miles, the distance from Dover to Cape Grisnez being 21 miles, and to Calais 25½ miles. It varies in depth from 2 to 30 fathoms, and recent surveys seem to prove that its bottom is formed of homogeneous beds of chalk, and that the project of boring a submarine tunnel through these beds is practicable. A company, formed in 1872, commenced borings at Dover, but the work was stopped by government in 1882. Repeated attempts have since been made to obtain parliamentary sanction for the scheme, notably in 1888, 1890, 1891, 1893 (experimental works), and 1894 (experimental works), but without success, distinguished officers having reported against it, and the sentiment of the majority of the nation being opposed to it. In 1894 a bill was brought forward to empower the Channel Bridge and Railway Company to construct a bridge or viaduct for steam or other locomotion across D. S. An estimate of experimental expenditure was prepared (£98,900), but before the end of the session the bill was withdrawn. A petition was presented in 1894 to the Chamber of Deputies, France, urging the government to consider the schemes put forward for improving the communication between France and England. The schemes submitted were:—(1) train steam ferry, (2) tunnel under the Channel, (3) transmarine tunnel, (4) bridge over the Channel, (5) tubular railway, and (6) mixed passage. A committee of the Deputies considered the petition and reported in favour of the construction of a permanent railway and improved communication between the two countries, but beyond that they offered no suggestion.

Dove-tail, a method of joining stone and wood by which a tenon, in shape like a dove's tail, is fitted into a notch similar to it in size and shape. As wood shrinks more across the grain than along it, a D. is always a weak point in carpentry.


Dove-tail.

Dow, Dou, or **Douw, Gerard,** a Dutch painter, born at Leyden, 17th April, 1613, entered at the age of fifteen the studio of Rembrandt, and painted there for three years. The vigorous and original character of his genius is evinced by the fact that though during these three years he attained to much of Rembrandt's power of colour and of light and shade, he freed himself from the influence of the great master of chiaroscuro, and devoting himself exclusively to the study of nature, created a style which was as remarkable for its delicacy and perfection of finish as Rembrandt's was for breadth and unique effect. The threads of lace and texture of carpets are distinguishable in his smallest works, which, notwithstanding this devotion to detail, are powerful in effect and splendid in colour. His 'Dropsical Woman,' the most remarkable of his works for number of figures, correct and various expression, magical effect of light, and wonderfully minute and successful work, was bought by the King of Sardinia for 30,000 francs, and is now in the Louvre. Other works are the 'Mountebank,' 'Dentist,' 'Grocer,' 'Fiddler,' and the 'Interior of a Household,' in which the painter represents his mother reading the Bible to her aged husband. His portrait, painted by himself, was valued at Paris in 1837 at 10,700 francs. D. died at Leyden in 1680.

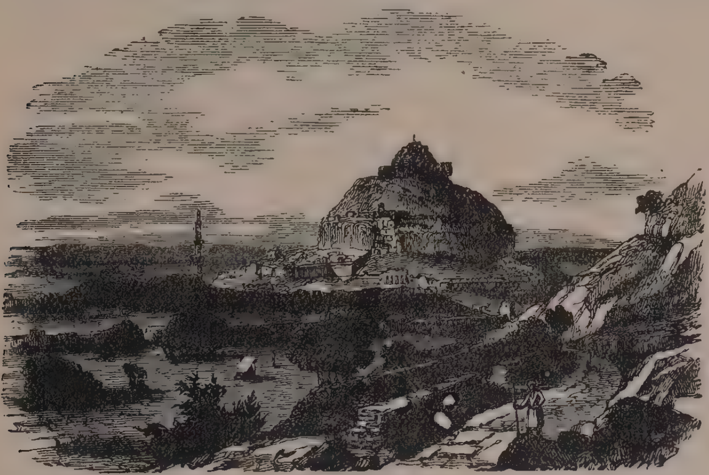
Dow'ager (Fr. *douairière*, 'one dowered,' from the Lat. *dos*, 'a dowry' or 'marriage gift'), the distinctive name of a widow with a Jointure or Dower (q.v.). It is chiefly used in England as a title in high rank to distinguish a widow from the wife of her husband's heir bearing the same name. A 'queen-D.' is the widow of a king.

Dow'er (Fr. *douaire*, from Lat. *dotarium*, and that from *dos*), in English law, is that portion of property to which a wife was entitled on the death of her husband. D. was either by *common law* or *custom*. By the first, the widow was entitled during her life to one-third of the lands and tenements possessed by her deceased husband at the time of his death. The second varied with the custom of the place. By Gavelkind (q.v.) it was one-half. The Dower Act (3 and 4 Will. IV. c. 105), however, placed the right of his widow to dower entirely in the hands of the husband while living, and enacted that women married after 1st January, 1834, could not claim D. out of land disposed of by their husbands during their life or by will; and any partial encumbrance effected by a husband became good against D. See BAR OF DOWER, JOINTURE.

Dow'lais, a town in Glamorganshire, and a station on the Brecon, Merthyr, and Rhymney railways, $1\frac{1}{2}$ miles N.E. of Merthyr Tydvil, is the seat of one of the largest ironworks in the world, the property of the Guest family. These works, which, with the collieries, employ about 11,000 men, comprise blast-furnaces, puddling-furnaces, and rolling-mills, and produce 150,000 tons of iron annually. Steel-making is also extensively carried on by Siemens' and Bessemer's processes. The town has a public library and literary institute. Pop. ecc. par. 16,807.

Dow'las, a coarse linen cloth which was widely used as a shirting before the introduction of calico, but has been almost entirely superseded for the purpose by that fabric.

Dowlat'abad, or **Daulatabad** (*Deogiri*, 'abode of prosperity'), a fortified town of India, in the territory of the Nizam of Hyderabad, on a tributary of the Godavari, 15 miles W. of Aurungabad, and 165 E.N.E. of Bombay. It is now in part deserted, and has but little trade. A strong, isolated rock-fortress, 500 feet high, commands the town. D. was the seat of government of a satrap from Delhi for many years, but on the death of Aurungzebe in 1707 the town fell to Asaph Jah, who founded the dynasty of the Nizam, and it has remained in the hands of the rulers of Hyderabad ever since. Pop. 1307.



Dowlatabad.

Down, a maritime county in the S.E. of the province of Ulster, Ireland: greatest length about 50 miles, greatest breadth 38. The coast-line of 67 miles is indented by the inlets of Belfast Lough, 3 miles broad and 15 deep; Strangford Lough, 10 miles deep, with a breadth varying from $\frac{1}{2}$ to 3 miles; and Dundrum and Carlingford Bays. The S. of the county is occupied by the Mourne Mountains, which rise in Slieve Donard to 2796 feet, while a smaller group occupies the centre. With these exceptions the soil is for the most part level, and tolerably fertile, especially on the banks of the streams, which, as well as the lakes, are generally small. The Upper Bann and the Lagan are the principal rivers. Of the 611,927 acres, constituting the land area of D., 114,990 are under corn, beans, and pease crops (oats 104,662); 68,971 under green crops (potatoes 45,109); 17,628 under flax; 67,187 (for hay) under clover, sainfoin, and grasses in rotation; and 10,357 (for hay) under permanent pasture or grass not broken up. Fallow and uncropped arable land account for 625 acres, while woods and plantations occupy 14,070. Turf bogs cover 2452 acres, marsh and barren mountain, 49,580. For live stock, see articles CATTLE, HORSE, PIG, and SHEEP. Linen is the chief manufacture, much of which is woven in the houses of the small farmers; and there are numerous flax and cotton mills. The principal exports are grain, dairy produce, pork, and hides, with hosiery, cotton, leather, thread, and coarse woollens. The chief towns are Downpatrick, Newtonards, Newry, and Donaghadee. D. contains four parliamentary divisions, each of which returns one member: East D., pop. 52,274; North D., 54,179; South D., 51,652; West D., 50,890. Pop. 267,059. See Knox's *History of the County Down.*

Down'ham Market (Old Eng. *dun*, 'a hill,' and *ham*, 'a dwelling'), a town in the county of Norfolk, on the right bank of the Ouse, 40 miles W. of Norwich, with a bell-foundry and a mustard manufactory. It was long celebrated for its butter-market, which has now been removed to Swaffham. It has also a large horse-fair. Pop. 3006.

Down'ing College, Cambridge, founded by Sir George Downing, of Gamlingay Park, whose will, dated 20th December, 1717, directed that on the failure of certain relatives to whom his estates were devised in succession, these should be employed to found a college. The charter was received 22nd September, 1800, but the buildings were not ready for the reception of undergraduates till May, 1821. The foundation consists of a master, a professor of law, and another of medicine, six fellows, and two honorary fellows. The non-resident fellows hold their fellowships for seven years. There are six scholarships and two minor scholarships; each of them being worth at least £50 per annum. In 1894 the college had 97 members of the senate, 80 undergraduates, and 262 members on the Boards.

Downpat'rick ('Hill of Patrick'), or **Down,** named from an intrenched *dun* near the cathedral, the capital of the county of Down, on the right bank of the Quoile, $26\frac{3}{4}$ miles S.E. of Belfast, by the Belfast and County Down Railway. It is divided into the English, Irish, and Scottish quarters; the streets are steep, and the houses well built. Quoile Quay, about a mile from the town, can accommodate vessels of 100 tons burden. D. has manufactures of linen, soap, and leather, imports coal, iron, salt, and bark, and exports grain, cattle, pigs, and potatoes. Until 1885 it returned one member to Parliament. Pop. 3132.

Downs (Old Eng. *duna*, Ger. *dünen*, Fr. *dunes*, 'hills'), a word found both in the Teutonic and Celtic tongues, and applied to (1) the margin of sandhills commonly forming the strand of the sea, and (2) a tract of bare sandy upland only affording pasture. Locally the name is given in England to two parallel ranges of broad low hills running in an E. direction from the middle of Hants to the sea-coast, the S. D. terminating at Beachy Head, and the N. D. coming upon the sea at Dover. These ridges, neither of which exceeds 900 feet in height, enclose the valley known as the Weald (q.v.). The well-known breed of sheep to which the S. D. give name attests the quality of the pasturage.

The *Downs* is also the name of a roadstead off the E. coast of Kent, between Deal and Ramsgate and within the Goodwin Sands. It is 8 miles long by 6 broad, and affords anchorage of from 4 to 12 fathoms.

Downton ('Hill-town'), an old town of Wiltshire, 6 miles S.E. of Salisbury, on the Avon, here divided into three streams. It has a grammar-school, a paper-factory, tanneries, and malting-houses. A conical mound still remains of its old castle. Near D. is the estate and residence of Standlinch, the gift of the nation to Lord Nelson's heirs. Pop. reg. sub-dist. 6140; and civ. par. 3430.

Down-tree, a name given in the W. Indies to *Ochroma Lagopus*, one of the *Malvaceæ* (sub-order *Bombaceæ*), the cork-wood of Jamaica, on account of its downy seeds being used to stuff beds, &c.

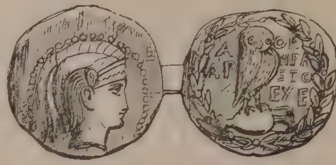
Doxol'ogy (Gr. from *doxologeō*, 'I give glory to'), a hymn of praise to God, of which there have been several in use in the Christian Church, viz.:—(1) The Little D., or *Gloria Patri*, the original form of which was 'Glory be to the Father, and to the Son, and to the Holy Ghost, world without end, Amen.' The words 'As it was in the beginning,' &c. (supposed to have been added by the Council of Nice against Arianism), began to be used in the Western Church (except in Spain) in the 7th c. (2) The Great D., or *Gloria in Excelsis*, the angelic hymn of Luke ii. 14, which has been chiefly used in the Communion Service. (3) The Trisagion, or seraphic hymn of Isa. vi. 3, but varied from the original. (4) The Hallelujah, which was either a repetition of that word itself (= 'Praise the Lord'), after Rev. xix., or one of the Hallelujah Psalms. (5) The last paragraph of the Lord's Prayer (in Matt.). See Bingham's *Eccles. Antiq.*, Walcott's *Sacred Archæology*, &c.

Doyle, Richard, one of the greatest of English comic artists, was born, of Irish extraction, in 1826. He gained his reputation originally as a clever sketcher for *Punch*, in the 5th vol. of which (1846) appeared his first contributions. In 1850, however, he threw up a connection with this periodical that was bringing fame and fortune, on account of its attacks upon Cardinal Wiseman and Roman Catholics generally. D. illustrated the works of various well-known authors, including Leigh Hunt and Thackeray, and contributed to the *Cornhill Magazine* many sketches, *e.g.*, the 'Bird's-eye Views of Society.' He published *The Continental Tour of Brown, Jones, and Robinson* (1854); a Christmas-book, *In Fairyland: Pictures from the Elf World* (1869), and afterwards devoted himself to water-colour painting. He died 11th December, 1883.

Do'zy, Reinhart, a profound Oriental scholar, was born 21st February, 1820, at Leyden, where he took the degree of doctor in 1844, and was appointed librarian of the Oriental MSS. belonging to the university, in 1850 extraordinary, and in 1857 ordinary, Professor of History. He established his reputation in the learned world by his *Dictionnaire détaillé des Noms des Vêtements chez les Arabes* (Amst. 1845). This was followed by a series of works which shed a wholly new light on the history of the Arabs in North-Western Africa and Spain during the Middle Ages. He died 26th April, 1883.

Drach'enfels ('Dragon's rock'), one of the *Siebengebirge*, or Seven Mountains, 8 miles S.E. of Bonn, rising 1056 feet above the Rhine, and crowned by a castle which commands a view as far as Cologne, 20 miles distant. The name is derived from the legend of a dragon, which inhabited a cave within it, and was killed by the hero of the *Nibelungen Lied* (q.v.).

Drach'ma, Drachm, Dram (Gr. *drachme* or *dragma*, 'a handful') was a weight, and also the principal silver coin of the Greek currency. Of the D. there were two standards of different weights and values—the Attic and the Æginetan. The former was chiefly in circulation in Northern Greece, the maritime states, and Sicily, and was equal to about $9\frac{3}{4}$d. English money; the latter was used in Bœotia, in parts of Northern Greece, and in all the Peloponnesian states except Corinth, and averaged about 1s. $1\frac{3}{4}$d. In either case the D., which always consisted of 6 obols, was the 100th part of a mina, and the 6000th part of a talent. The mina and talent were not coins, but expressions of computation denoting the weight of the money. The D. varied in weight, under the different standards, from $65\frac{1}{2}$ to 110 grains. Thus the mina at the lowest estimate = 15 oz., or nearly 1 lb. avoirdupois; at the highest = 1 lb. $9\frac{1}{3}$ oz. avoirdupois. In the modern Greek currency the D. consists of 100 lepta, and = $8\frac{1}{2}$d. sterling. The English avoirdupois D. = $27\frac{11}{32}$ troy grains; the apothecary's D. = 60 troy grains, or a little less than the D. of the Attic standard. (Hussey, *Ancient Weights and Money*.)



Athenian Drachma (exact size).

Dra'co (Gr. *Drakōn*), a famous lawgiver of Athens, whose enactments, called *thesmoi* in contradistinction to the *nomoi* of Solon, were drawn up about 621 B.C. D.'s code was one of extreme severity, the punishment of death being affixed to almost every crime. Hence it was said that the 'laws of D. were those of a dragon' (Gr. *drakōn*), and 'that they were written not in ink, but in blood.' Their influence, however, was in the highest degree beneficial, inasmuch as the administration of justice was no longer arbitrary, but placed on a settled basis. Moreover, a most salutary result of his legislation was the establishment of the Ephetæ or court of appeal in cases of unintentional homicide. The extreme harshness of his laws, however, rendered them not only unpopular, but odious; and under Solon's milder code capital punishment was abolished in the case of all crimes save murder. Owing to the disfavour of his fellow-citizens, who deemed his laws rigorous beyond endurance, D. was obliged to repair to Ægina. Here he was received at the theatre with an enthusiastic welcome that proved fatal to him; for he was stifled by the garments that were showered upon him in token of respect and admiration.

Draco, a northern constellation filling the space between Ursa Minor and Ursa Major, Hercules and Lyra. γ Draconis, a star of the second magnitude, and the brightest in the constellation, is situated in the straight line joining Deneb and Arcturus, and is celebrated as the star by which Bradley discovered the aberration of light.

Dracon'tium, a genus of plants belonging to the Arum family (*Araceæ*), natives of the E. and W. Indies. The flowers of some, like those of the Arum family, have very disagreeable odours. One species, the many-leafed D., has a powerful action on the nervous system, and is used in America for asthma.

Draft, in mercantile affairs, is a written order by a creditor addressed to his debtor calling on him to pay a certain sum to the drawer or to a third party. Acceptance (q.v.) completes the transference of the debt from the drawer to the payee.

Drag, an apparatus used for increasing the friction of a vehicle upon a road, so that in going down hill its speed may be easily controlled, and it may not press upon the horses. In its most common form it consists of an iron slipper which can be placed under one of the wheels (on the road), and is attached by a chain to the body of the vehicle. It is now for almost all fast-running carriages superseded by a Brake (q.v.), which can be applied instantaneously by the driver's hand or foot.

Drag'oman (Fr. *drogman*, Ital. *drogomanno*) is a very old word. It probably comes through the Spanish form *torsimanni* and *trujaman*, from the Arabic *tardjemān*, 'an interpreter.' The Low Latin form of the word was *turchi-*

mannus, the Low Greek *dragoumanos*. The French chroniclers Villehardouin and Joinville mention an officer named 'drughemant,' whose business it was 'enromancer,' or to put into French, the Saracenic despatches. It is now applied generally to the guide or interpreter in the Levant districts, but specially to the official interpreter attached to foreign embassies or the consular service in the Turkish empire. The D. is a recognised function in the elaborate training system of the French consulate. The D. frequently represents the consul in courts of justice when cases are being tried which affect the consul's fellow-countrymen.

Drag'on, in zoology, a name used (when qualified by the adjective 'flying') to denote certain Lizards (q.v.), such as the *Draco volans* of the Eastern Archipelago, which can sustain themselves in the air by means of a parachute-like expansion of the skin, supported on certain of the specially-extended front ribs. The name Great D. is also given to another species of lizard inhabiting tropical America, and 4-6 feet long. The Fringed D. of Java and Sumatra is an olive-grey coloured lizard, having brown bands across its back, and possessing a tail eight inches in length, while the body measures only three. Certain fishes (*e.g.*, the *Pegasus draco*) are named sea-dragons, from their weird looks, and are included in the Teleostean order. See DRAGON.

Dragon (Gr. *drakōn*, 'the keen-sighted'), in Greek mythology, a monster which may be regarded as the symbol of anarchy, and to contend with which was the task of heroes. Hercules, Apollo, and Perseus are all represented as slayers of dragons. The D. was a favourite fiction of the Greek poets; a D. kept the garden of the Hesperides, and the chariot of Medea was drawn by dragons, these animals, from their clearness of vision, according to the solar myth, being supposed to bear the sun through the heavens. In the Vedic mythology the D. Vritra is the antagonist of Indra. In the *Nibelungen Lied* the D., as in the Greek mythology, was a destructive agency which the hero set himself to cope with. In the Apocalypse the angel lays 'hold on the D., that old serpent, which is the devil.' Hence painters and sculptors often represent the triumph of Christianity over unbelief by a D. transfixed or trodden under foot. The most familiar instance of this is the picture of St. George and the D. It was a common emblem on the shields and banners of the Teutonic knights who first settled in England. The Celts selected the D. as the emblem of sovereignty, and in Christian art it was emblematic of sin. In heraldry the D. is a common emblem, and when other animals are represented as dragons behind, they are technically known as *dragonnés*. See Max Müller's *Comparative Mythology* in *Oxford Essays* for 1856, and Cox's *Manual of Mythology*.

The Fringed Dragon.

Dragon Blood, or **Gum Dragon,** a resinous exudation from the trunks of trees of various orders. Most of it is obtained from *Pterocarpus draco*, a leguminous tree of S. America, and from the red sandal-wood tree of the E. Indies. It is also yielded by *Dalbergia monetaria* of Guiana, and in Mexico by the euphorbiaceous *Croton draco*. Some is obtained from the dragon-tree of the Canaries. It is found in the caves of the Guanches or ancient inhabitants of these 'fortunate isles,' and is believed to have been used in embalming. It is not now known in America. D. B. is soluble in oils and turpentine: it enters into the composition of some of the most esteemed varnishes, is used for dyeing horn the colour of tortoise-shell, in the composition of tooth powders, various tinctures, &c. It is not now used in medicine. *Dæmonorops draco* (*Calamus draco*), a native of the Malay islands, yields also D. B., hence it is known as the D. B. palm. The resin exudes from the ripe fruits, while inferior kinds are got by boiling the fruits after they have been shaken.

Drag'onet, a genus of Teleostean fishes, belonging to the family *Gobiidæ* or Gobies, and distinguished by having the ventral fins separate and distinct, two dorsal fins, and one small gill-opening on each side. The Gemmeous D., also known as the foxfish, sculpin, and gowdie, is a familiar species. Its length is from 10 to 11 inches, and it is dazzling in colour, being yellow on the upper and white on the under parts. The first rays of the dorsal fin are greatly elongated.

Dragon-Fly, a well-known genus of *Neuropterous* insects, forming the type of the family *Libellulidæ*, which is known by the large globular head, the long abdomen, and the deep thorax. The antennæ are very short, and the mandibles or larger pair of jaws are highly developed. The variegated D.-F. is a common species, as also the cross-barred D.-F. These insects are familiar to all from their bright azure hues, the large size of their wings, and their peculiar gyrating flight, usually near pools of water. The French have named them *demoiselles*, from the grace and agility of their movements. They undergo a hemimetabolic or incomplete Metamorphosis (q.v.). The larvæ are aquatic, and appear as active grubs, provided with a powerful masticatory apparatus, like a 'mask,' with which they war on weaker insects. They breathe by means of branchiæ or gills in the hinder part of the body; the water which has been used in breathing being forcibly ejected from this cavity, and thus propels the larvæ forward. After passing ten or eleven months in the larval and chrysalis states, the insect usually attaches itself to some water-plant, and as the larval skin splits along the back, the perfect winged insect emerges therefrom, and after drying its wings, launches forth into the air.

American Dragon-Fly.

Dragon, Green, a plant belonging to the Arum family, with peculiar black fetid flowers, and a spotted stem, somewhat resembling the skin of a serpent; hence its name, and also its supposed virtue of curing the bites of serpents. It is a native of Southern Europe.

Dragonnades' (from *dragon*, 'a dragoon'), the name given to the forcible conversion of Huguenots to Catholicism by means of free quartering of soldiers upon them, which took place in the reigns of Louis XIV. and Louis XV. The Intendants, Foucault and Bâville, were the chief organisers of the movement in Poitou, Montauban, Béarn, and Languedoc; but the Catholic clergy, the pious Bourdaloue as well as the intolerant Fléchier, were its animating spirit. When in 1685 the Edict of Nantes (1598) and the Edict of Grace (Nîmes, 1629) were both revoked, the cavalry already quartered in the districts undertook to suppress the assemblies or conventicles (then pronounced to be illegal), and large districts being defined as 'insurrectionary,' they were authorised by Louvois to use every violence in carrying out the penal laws. One town in the Cévennes, St. Hippolyte, paid 240,000 livres in three months for billeting (Benoît, *Histoire de l'Édit de Nantes*). The D. were continued, whenever soldiers could be spared, down to 1750. There was no formal Edict of Toleration till 1787.

Dragon Root, a plant of the Arum family, whose tuber is used in America as a stimulant of the secretions in chronic bronchitis and other affections of the chest, and also for ulceration of the mouth.

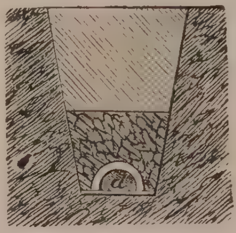
Dragon's Mouth. See BOCA.

Dragoon' (Fr. *dragon*), a name originally given to a light horseman trained to fight on foot as well as on horseback; now applied in the British service to heavy cavalry soldiers, who are armed with swords and breech-loading carbines, and who wear brass helmets. Dragoons were first raised in France in 1660 by Mareschal de Brissac. Markham (*Souldier's Accidence,* 1645) states that the dragoons of his time were armed with a 'faire dragon,' and Meyrick accordingly presumes that the soldiers took their name from their chief weapon. The *dragon* was a short firearm or carbine, and bore on its muzzle the worked head of the fabulous beast indicated—which was believed to spout fire.

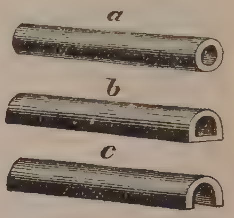
Dragör, a town on the S.E. coast of Amager, a small island in the Sound, with a harbour for small vessels, and a pop. of 1825, chiefly occupied in trading, fishing, linen-weaving, and bleaching. It is an important pilot-station, and the inhabitants collect much salvage. D. was an important place in the Middle Ages owing to the herring fishery in the Sound.

Draguign'an, the capital of the department of Var, France, at the foot of the woody Malmont, on a tributary of the Argens, 45 miles N.E. of Toulon by railway. It is the seat of a court of the first instance, and of a communal college, and has a large court house, a hospital, a public library, a theatre, a botanical garden, and fine promenades. Its manufactures are chiefly wine, oil, silks, soap, leather, and brandy. D. is an old town, and was at one time strongly fortified. Pop. commune 9816; arrond. 81,484.

Drain'age signifies cuttings in the ground to carry off superfluous water from the soil and subsoil. There are few subjects that have created more discussion than D., and of late years some have doubted its profitableness. Complaints have been made that in dry hilly regions, since D. was introduced, the fallen rain discharges itself too quickly into the rivers, swelling them inordinately, and thereby doing harm to low-lying lands. The general experience, however, is that D. has vastly increased the productiveness of land, turning marshes and barren clay-lands into fertile fields, and removing malaria from the atmosphere. The benefits from the draining of land were noticed in the days of Columella, but were not taken advantage of. Open drains and ditches have been in use from time immemorial, and in spite of scientific and practical teaching still exist to an unprofitable extent. On many farms in Great Britain the cuttings for conveying away water are uncovered, and consequently inefficient, as they fill with weeds, preventives of outfall. The arching over of many would cost comparatively little. The land reclaimed would in the course of twenty-one years' lease return at least 20 per cent. upon the outlay. The depth and width of drains are points not yet settled. The system of D. must depend on the nature of the soil. Deep drains are essentially necessary on clayey soils, not so much on friable or medium soils; neither in the latter need the pipes be placed so closely together. Drains made fifty years ago on very heavy clay land, only 12 feet apart, and 2 feet 8 inches in depth, filled with stones above the pipes, have been found to answer well; but those 42 feet apart, 5 feet deep, with 1-inch pipe have proved better. Deep drains take longer to remove the water than shallow, but the soil where 4 or 5 feet D. is practised is never liable to get sour. Drains less than 3 feet in depth are now eschewed by all practical men, so also is the placing of stones or gravel upon the tops of the pipes. To prevent the choking of drains, it is recommended that small pipes passing through fences or near trees should be of iron, as plants are sure to enter crevices in clay tiles. The tiles used now are not so uniform in size as formerly, but they are generally round, with a bore of two inches in diameter, and a length of from 12 to 15 inches. Collars preventing the encroachment of weeds or efflux of water are used at the joinings. The profit to the farmer from draining heavy wet land, 4 feet deep, at from 24 to 45 feet apart, Bailey Denton showed to be 7s. 6d. per acre. Drain-cutting has been accomplished with ploughs in some parts, but as a rule the spade prevails. These implements gradually narrow as they cut from the surface of the soil to the bottom of the drain. The main drain ought to be cut at the lowest level of the field. Into that its tributary tiles should discharge their waters right and left. Steam ploughing has done much to eradicate the furrow-draining system. See Rev. Adam Dickson's *Treatise of Agriculture*; Stephen's *Book of the Farm*; Mechi's *How to Farm Profitably*; *Monthly Magazine,* 1798; Bailey Denton's *Draining*; Robertson's *Survey of Midlothian,* 1795.



Section of an Underground Drain.



a, Pipe Tile; *b,* Sole Tile; *c,* Horse-shoe Tile.

Drainage Tubes are surgical appliances made of india-rubber or caoutchouc, of various degrees of thickness, and in some cases medicated with carbolic acid or other disinfectants. They are used to evacuate chronic collections of pus, as in empyema, when the surgeon considers it inadvisable to evacuate the pus by a free incision. They are introduced into the abscess by means of a trochar and canula, and tied so that the matter drains away slowly, either through, or more frequently along the sides of the tubes. D. T. are sometimes inserted into wounds to allow deep-seated matter to escape as soon as it is formed.

Drake, Friedrich, a German sculptor, was born at Pyrmont, 23rd June, 1805, and studied under Rauch at the Berlin Academy. His numerous works, which are chaste and massive, include statues (Jos. Jakob Moser in Osnabrück, a colossal Friedr. Wilhelm III. in the Berlin Thiergarten, and another in Stettin, Rauch and Schinkel in Berlin, an equestrian statue of King Wilhelm in Cologne, 1867, statuettes of the brothers Humboldt, of Göthe, &c.), groups (*e.g.* on the Berlin Schlossbrücke), busts (Oken, Ranke, &c.), mythological works, and genre pieces.

Drake, Sir Francis, one of the greatest of English sailors, was born in the year 1540 at Tavistock in Devonshire. He was educated, at the expense of Sir John Hawkins, in Kent, whither his father, a zealous Puritan, had been forced to flee. He went to sea when very young, and made various coasting voyages, besides visiting the Continent, until, fired by the exploits of Hawkins, he joined that commander in an ill-fated expedition to the Spanish Main. D. returned in poverty, and vowed revenge on Spain, his inflexible hatred of which was fostered by his losses and his Puritanical training. He then made several cruises in the W. Indies, where he went through many wild adventures, and became a terror to Spain. In 1572 he pillaged Nombre de Dios, and, in the same year, from a 'high and goodly tree' in Darien, first saw the Pacific, and 'besought Almighty God to give him life and leave to sail once in an English ship on that sea.' In 1577 D. sailed from England for S. America with five ships and

162 men, passed the Straits of Magellan, till then untraversed by Englishmen, and plundered and destroyed all along the coasts of Chili and Peru. He sacked various ports, took the treasure-gallion which sailed from Lima, and then, his one remaining ship, the *Pelican*, being loaded with spoils in value of about £500,000, sailed boldly for the Moluccas, rounded the Cape of Good Hope, and anchored in Plymouth harbour, 24th September, 1579. He was received with general enthusiasm, and was knighted by the Queen, and the *Pelican* was long preserved at Deptford. This voyage, though barren in geographical results, had a mighty moral effect, and emboldened D.'s countrymen for the coming struggle with Spain. In 1585-86, D. revisited the Spanish Indies, plundering Vigo on his outward voyage, sacking Santiago, and ravaging Carthagena and San Domingo. In 1587, when the Armada (q.v.) was about to sail, D., with thirty small vessels, entered Cadiz harbour, burnt a hundred storeships and galleys, then swept the coast to Cape St. Vincent, destroyed four large castles, and ended by descending on Coruña. This gallant and skilful dash at the Spanish ports, which he called a 'singeing of the Spanish king's beard,' delayed the sailing of the Armada for above a year, and enabled Elizabeth to prepare her defences. In 1588 he served as vice-admiral, under Howard, in the fleet which drove back the Armada, a result largely due to D.'s splendid seamanship and fiery daring. Had not he been checked by Howard, the rout of the Spaniards would have been even more disastrous. On returning from an unsuccessful expedition to Portugal in 1589, he was made member of Parliament for Plymouth, which he provided with water by an aqueduct, 20 miles long, built at his own expense. In 1595 he set out for the W. Indies, but unfortunately quarrelled with and finally separated from Hawkins, who shared with him the command of the fleet. After a brave but unsuccessful attack on Puerto Rico, he burnt Rio de la Hacha, Rancheia, Santa Martha, and Nombre de Dios, when a disease broke out among his men, of which the great navigator died, 27th December, 1595. More than any other man, D. was the founder of England's naval greatness, and the sincerity of his patriotism was shown in the readiness with which he sacrificed his wealth to aid in repelling the Armada. He was, says Fuller, 'chaste in his life, just in his dealings, true of his word, merciful to those that were under him, and hating nothing so much as idleness, contemning danger, and refusing no toil.' See Barrow's *Life of Admiral Sir F. D.*, and Purchas's *Pilgrims*.

Dra'ma (Gr. *drama*, from *draō*, 'I act'), or **Dramatic Po'etry,** is essentially the poetry of action. Its form is dialogue. It differs from every other species of composition, whether epic, lyric, or descriptive, inasmuch as it seeks to place before the mind an impersonal representation, by the writer, of the actions of others in a series of scenes of animated discourse and lively movements, by which the story is vividly portrayed and naturally evolved as a changing and progressive phase of human existence. In colour, interest, intensity, and charm, it surpasses all other forms of poetry, for whereas these exhibit phases of thought or feeling or fancy, D. P. deals with action, which is life itself. The elements of the dramatic art are universal. In the lowest stages of civilisation we discern rude attempts to impart amusement by dramatic representation, and even among children we see the art in embryo—in the mimicry of their seniors, and in their celebrations of weddings and funerals.

D. P. is divided into *tragic* and *comic*. The former is characterised by earnestness, the latter by mirth. Instances of vigorous dramatic composition are to be found in the Hebrew Scriptures, *e.g.*, in Job and in the Song of Solomon; and also in the ballads of the Greek rhapsodists, who doubtless combined the functions of the actor with those of the bard; but we must seek the birth of the legitimate D. in the Greek festival of Dionysus. The enthusiasm peculiar to the worship of the wine-god was in itself calculated to develop the dramatic art. Both *tragedy* and *comedy* sprung up in Greece about 580 B.C. The origin of both terms has been disputed. Tragedy (from *tragos*, 'a goat,' and *ōdē*, 'a song') is variously explained as the song at which a goat was sacrificed, or for which a goat was the prize, or in the performance of which the actors were clad in goatskins. Some derive comedy from *kōmos*, 'a revel,' others from *kōmē*, 'a village,' and *ōdē*. It may thus mean either the *revellers' song* or the *village song*. The D., according to Aristotle, had its origin in the dithyramb, and in its earliest form seems to have been little more than a choral song by a rustic smeared with the lees of wine. By-and-by an interlocutor was added, who filled up the breaks in the song by a narrative. Down to the times of Thespis (B.C. 536) and Phrynichus (B.C. 512), tragedy made but little way. The former introduced regular dialogue, and made one entire story occupy the pauses in the chorus. Thus the story became in time subordinate to the dialogue. It was not, however, till the appearance of Æschylus that the Greeks had a regular theatre. He gave the D. life and divinity, and invested it with pomp and splendour. His compositions are characterised by simplicity, harmony, and sublimity. Sophocles, thirty years his junior, and in the delineation of human nature perhaps his superior, strove in the serene contemplation of human destiny to portray ideal heroism, and to clothe all he touched with enduring loveliness and beauty. He added a third actor, and otherwise improved the stage. Euripides appealed rather to the sensibility than to the imagination of his audience. By metaphysical subtleties, eloquent disputations, startling effects, and scenes of suffering, he mars his work, while he lacks the serenity, grandeur, and religious awe which reign in Æschylus and Sophocles.

Greek comedy rose with Susarion, an itinerant mountebank (B.C. 580). Epicharmus and Phormes, according to Aristotle (Poet. sec. xi.), were the first to fashion fables, which originally came from Sicily; while Crates introduced them at Athens. The most famous names of this period, that of the Old Comedy, are Magnes, Cratinus, Eupolis, Pherecrates, and Aristophanes. Of these, the last is by far the greatest. The Middle Comedy includes about forty names. The most celebrated are Antiphanes, Eubulus, Anaxandrides, Alexis, Araros, Philippus, and Timocles. None of their works have reached us. In what respect the Middle differed from the Old Comedy, scholars are not agreed, and some critics reject this division. The New Comedy, which includes the names of Menander, Philemon, Diphilus, Apollodorus, and Posidippus, is a mixture of tragedy and comedy. It is a direct growth from Euripides, whom its poets regarded as their master. Of Menander and Philemon—the most celebrated—only fragments remain.

The Romans were not of a dramatic turn. Their earliest rude ideas of the art, and even their term for a player (*histrio*), were derived from the Etruscans; their farces (*Fabulæ Atellanæ*) from the Oscans; while the higher compositions of Livius Andronicus, Nævius, Ennius, Plautus, Cæcilius, Terence, Pacuvius, and Attius, were either reproductions or adaptations of Greek originals. Of the comic writers, we can judge only by the extant works of Plautus and Terence. The plays of the former have a Roman vigour and freshness which impart to them, notwithstanding their Greek origin, a great amount of originality; but they are inferior to those of Terence in felicity and purity of language. Of the early period of tragedy we know next to nothing; among the lofty attempts of the Augustan age we learn that the *Medea* of Ovid was much admired. The dramas of Seneca, though often bombastic and turgid, scarcely merit the vituperation of Bernhardy and Schlegel, for they contain passages of great beauty, and are interesting as the only entire Latin tragedies extant.

For fourteen centuries after Seneca, the D. slumbered in Europe. Italy was the scene of its revival. In most European countries the mysteries, miracle plays, and moralities of the Middle Ages were the germ of the modern D. (See MIRACLE PLAYS.) In Italy, however, the new D. did not spring mainly from the mediæval religious plays, but was partly a result of the Renaissance, and partly a continuation of the comic theatre of ancient Rome. The Renaissance (q.v.) called forth pieces based on Seneca, Plautus, or Terence, couched at first in Latin, but dealing with contemporary history. These were common in the 14th and 15th centuries, and among the best writers of them were Mussato, Landovico, Bernardin, and Petrarch (q.v.), the founders of the Academic school. Gradually Latin was disused in dramatic works; comedies were written in Italian by Ariosto, Aretino, and Macchiavelli; and early in the 16th c. tragedy was inaugurated by Trissino's *Sophonisba* (1515). In antagonism to this learned school there arose a vigorous popular D., not a growth of the Renaissance, but a direct descendant from the *Mimi* and *Fabulæ Atellanæ* of ancient Rome, which had lingered through the Middle Ages in the rural districts of Italy, and in the 15th c. were known as *contrasti*, as *commedia*, and as *farsa*. (See FARCE.) From these *contasti*, laughable impromptu dialogues, sprang the *commedia dell' arte*, or *scenarii*, farcical pieces, the plot of which was sketched before representation, while the dialogue was improvised by the actors. These became very popular, and helped to mould the rising comedy of France. The Italian pastoral D., which largely influenced English poetry (see ENGLISH LITERATURE), was quite aloof from the early religious plays, and purely a fruit of the Renaissance, springing from the ancient idylls, and aiming at a fanciful delineation of Arcadian and mythological scenes. The leading pastoral plays were Poliziano's (q.v.) *Orfeo* (1472), Tasso's (q.v.) *Aminta* (1513), and Guarini's (q.v.) *Pastor Fido* (1583). The pastoral gave birth to the Opera (q.v.). Comedy flourished richly in the 16th, but waned in the 17th c., the *commedia dell' arte* supplanting the *commedia erudita*, or Academic pieces, and tending to crystallise character into a few types, until, in the 18th c., Goldoni (q.v.) restored genuine comedy, and Alfieri (q.v.) re-installed classic tragedy. Among later Italian writers of tragedy are Monti, Manzoni, and Niccolini.

The Spanish D. began with the great national movement at the close of the 15th c., and, unlike the Italian D., was wholly alien from the Greek and Roman theatre, but flowed through the *entremesses* or interludes from the Catholic religious plays, on which the *autos sacramentales* or devotional dramas of many famous authors were based, and from the old chivalrous ballads and epics, whence it drew its romantic colouring. The earliest true dramas are the *Mingo Rebulgo*, a satiric pastoral, written in the first half of the 15th c., and *La Celestina*, a kind of historic comedy, written about 1450. The Spanish D. was distinguished by a florid style, intricate plots, and a pervading glow of patriotic and religious fervour. The chief Spanish dramatists were Cervantes (q.v.), Lope de Vega (q.v.), and Calderon (q.v.). Second to these were Alarcon, Molina, Moreto, and Solis. The greatest recent dramatist is Moratin (q.v.).

The Portuguese D. arose in the 16th c. with Miranda, who followed Plautus and Terence; Ferreira, whose *Ignez de Castro* was modelled on Greek tragedies; and Gil Vicente (q.v.), the greatest dramatist of Portugal, who founded a Romantic school. Since Vicente, Portugal has produced no dramatist of very high merit.

The French D. was descended from the mediæval mysteries, &c., through the farces and *soties*, or satiric pieces of the 15th c. The best writer of *soties* was Pierre Gringoire, and one of the farces, *Pierre Pathelin*, is the earliest example of genuine comedy in French. The first tragedy was the *Cleopatra* (1552) of Jodelle, who, with his followers, La Peruse and Garnier, imitated Seneca. In the 16th c., comedy, though still crude, was more vigorous than tragedy, being sprightly, fluent, and sarcastic. It was largely cast in octosyllabic verse, and its chief writers were Jean de la Taille and Larrevy. At the beginning of the 17th c. a romantic D. was arising in France, but Molière (q.v.), the greatest French dramatist, displaced the comedy of intrigue by the comedy of character and manners, and his contemporary, Corneille (q.v.), founded the French *classic* school of tragedy. This *classic D.*, which was brilliantly represented by Racine (q.v.) and Voltaire (q.v.), and which attained its zenith under Louis XIV., was marked by rigid adherence to the Unities (q.v.), by formal and often over-emphatic rhetoric; and, though generally wanting in passion and natural variety and freedom, possessed many noble reflective and declamatory passages, and great purity, stateliness, and finish of style. After the death of Voltaire, the French D. dwindled until the rise of the Romanticists (see ROMANTICISM), who, about 1830, led by Hugo (q.v.), founded a new school, after a bitter struggle with the Classicists. The best of the new romantic plays were, compared to the dramas of Corneille and Racine, less chaste and pale, more rich and turbid in diction, more flexible and musical in verse, wider in range of character, and more impassioned in its representation. The most recent French D. has greatly influenced the English stage, many of the plays of Sardou and others having been adapted for representation in England. To France belongs the honour of having produced perhaps the greatest living dramatic artist, namely, Madame Sarah Bernhardt.

The German D. has had no continuous development, and has never displayed the bright luxuriance of the English and French theatres. In the 16th c. the religious plays, under the influence of Hans Sachs (q.v.) and Ayrer, expanded into a popular D., and in the 17th c. there was marked dramatic progress in Silesia. In the 18th c. an exotic school, imitative of the French D., arose, but was checked by Lessing (q.v.), who founded a realistic and impassioned national D. The greatest German dramatists since Lessing are Göthe (q.v.) and Schiller (q.v.). For the German romantic school, including Tieck, Arnim, Halm, Körner, &c., which chose Shakespeare as model, see ROMANTICISM.

The English D. was an outcome of the mysteries, &c., through the moralities and interludes of the 16th c. The first English comedy is Udall's *Ralph Royster Doyster*, the prototype of the numerous comedies of London life, acted before 1557, and the first tragedy is *Gorboduc, or Ferrex and Porrex*, acted in 1562. From 1580 to 1596 the chief dramatists are Peele, Greene, and Marlowe, and, secondary to these, Lodge, Kyd, Munday, Chettle, and Nash. Their works were bombastic, sensuous, and charged with lawless and fiery imagination. The mature Elizabethan D., represented by Shakespeare, Jonson, Beaumont and Fletcher, Dekker, Webster, Ford, and Massinger, blended an artistic beauty born of the Renaissance with an unrivalled strength of passion and wealth of thought kindled by the national energy and progress. Shirley links the Elizabethan with the Restoration D., in which tragedy sinks into rant, and poetic comedy gives place to a comedy of manners, shameless, vigorous, and sparkling with the clearest wit. The chief names of this period, in which French influences prevail, are Dryden, Shadwell, Lee, Crowne, Otway, Rowe, Congreve—'the English Molière'—Wycherley, Vanbrugh, and Farquhar. In the 18th c. tragedy declined, Johnson and Addison attempting it unsuccessfully; but spirited, humorous comedies were produced by Cibber, Colman, Cumberland, and especially by Goldsmith and Sheridan. In the 19th c. many writers have composed noble dramatic works, especially Shelley, Landor, Coleridge, Byron, and Taylor, which are not suited for representation. Joanna Baillie, Sheridan Knowles, Talfourd, Bulwer Lytton, and Westland Marston have sought to infuse poetry into acting plays; and among the poets who have recently adopted the dramatic form are Swinburne, Tennyson, Browning, and Nichol. The present acting D., which has suffered greatly from the ascendency of spectacle and burlesque, is seen at its best in the realistic comedies of Robertson and Albery, the beautiful whimsicalities of W. S. Gilbert (music by Sir A. Sullivan), the tragedies of Wills, the sensational plays of Wilkie Collins, and the farces of Byron. See Donaldson, *Theatre of the Greeks* (1849); Schlegel, *Vorlesungen über Dramatische Kunst und Literatur* (2nd ed. Heidelb. 1817); Freytag, *Die Technik des Dramas* (Leipz. 1865); Klein, *Geschichte des Dramas* (3 vols. Leipz. 1865); Ward, *English Dramatic Literature* (2 vols. Lond. 1875); and also ENGLISH LITERATURE.

In 1850 an effort was made by Robertson in the plays of *School*, *Ours*, &c., to return to realism, while Irving followed Fechter in the revival of Shakespeare in 1874. Sir Henry Irving has been described by William Archer, the celebrated dramatic critic, as standing half-way between realism and romanticism, as representing life, but life concentrated into more intense interest. While Gilbert continues to produce his charming phantasies, melodrama still holds sway at the Adelphi, and scenic effect is to be found at Drury Lane, there has been, since the days of Robertson, an increasing rebound towards realism, a reaction from the idealistic school which has been made somewhat at the expense of truth to the exclusion of the brighter side of nature in the selection of morbid and painful themes; and the influence of Ibsen, the great dramatist of the North, has been largely felt. Unfortunately, the talent of Ibsen has been directed chiefly to the delineation of the painful and the commonplace usually with a motive rendered curiously obscure. The two most powerful of modern realistic plays have been written by Pinero, viz., *The Second Mrs. Tanqueray*, and *The Notorious Mrs. Ebbsmith*, in both of which the sex problem has been brought forward for open discussion, with a tendency towards rendering the stage the platform of a debating society. Other popular plays of the same school have been *The Idler* (Haddon Chambers), *Lady Windermere's Fan* at the St. James's, *The Dancing Girl* (Henry A. Jones) at the Haymarket, and *Sowing the Wind* (Sydney Grundy) at the Comedy.

For dramatic art in such countries as Siam, China, and Japan, the reader is referred to a short sketch entitled *Dramatic Art in the Far East*, in *Chambers's Journal*, 2nd September, 1895.

Dramm'en, the third seaport of Norway, on the Dramsfjord, at the mouth of Drams-Elv, 30 miles S.W. of Christiania. It consists of three separate parts—Bragernäs, Stromsö, and Tangen, which are connected by bridges. Its manufactures are beer, tobacco, cordage, &c., and it has the largest timber trade in Norway. Pop. 20,687.

Dra'per, John William, LL.D., an American savant, was born at Liverpool, England, 5th May, 1811, emigrated to the United States in 1833, and graduated in the University of Pennsylvania in 1836, in which year he was appointed Professor of Chemistry in Hampden and Sydney College, Virginia. In 1839 he became Professor of Chemistry in the University of New York, and two years later assisted in starting the University Medical College of New York, with which he was connected till 1868. He died 4th January, 1882. His chief works are *Text-Book of Chemistry* (1846), *Natural Philosophy* (1847), *Human Physiology* (1856), *History of the Intellectual Development of Europe* (1863), *Future Civil Policy of America* (1865), *Philosophical History of the Civil War* (1867), and *The History of the Conflict between Religion and Science* (Lond. 1874).

Dra'pery (Fr. *drap*, 'cloth'), in painting or sculpture, the clothing of the human figure. The fit disposition of D. is an important object in art, and in modern times, from the comparatively unbecoming nature of dress, offers considerable difficulties to the artist. This difficulty is sometimes eluded by draping a figure in antique costume, or in a loose cloak, but many great sculptors, and notably Thorwaldsen, have coped successfully with the disadvantages of modern costume. In representing D., attention must be paid to historic accuracy in the dress painted or chiselled, to the action represented, and to the outlines of the figure covered by the D. The object of the sculptor is to impart to D. a conventional repose and a firmness that does not prevent it from being transparent and flowing. See COSTUME and FASHION.

Draught or **Draft** of water of a vessel is the depth to which she is immersed when afloat. A scale of feet is marked at one or both ends of the ship, by which the D. can be at once known at any time.

Draughts (Fr. *les dames*, Ger. *damenspiel*), a game played by two persons on a board similar to that used in chess. Each player has twelve 'men' or pieces, one set being black, the other white. These are placed on the white (in Scotland on the black) checks, occupying at the beginning of the game the first three rows before each player. They are moved forwards in a diagonal or zigzag direction, and only one square at a time. When a piece has safely reached the adversary's end of the board, it is made a 'king,' being crowned with another piece for the sake of distinction, and thenceforth having the additional power of moving backwards. The sole object of the game is to capture or 'take' the opposing 'men,' or to hem them in so as to hinder further progress. A piece can only be taken, *i.e.*, conveyed from the board, when it is placed immediately in the way of another, and a check behind it is left blank. The victorious piece is then lifted over the one taken and placed in the empty square beyond. As a general rule, in playing, it is best to concentrate one's forces, and to keep none of the men 'at home.' Success greatly depends on getting an early king. D. is less scientific, but more popular than chess, to which it holds much the relation of bagatelle to billiards. It has been said that 'life is too short for chess,' but a game at D. occupies little time, and is a recreation, not a study. See *Handbook of Games for Gentlemen* (Lond. 1876).

Drave, or **Drau,** one of the chief tributaries of the Danube, rises in the Pusterthal on the S.E. frontier of the Austrian Tyrol, flows E. through the crown-lands of Carinthia and Styria, and E.S.E., forming the boundary between Hungary on the N. and Croatia and Slavonia in the S., to its junction with the Danube, about 10 miles below Essek. It is 382 miles long, and becomes navigable at Villach, in Carinthia, whence downwards there is considerable traffic.

Dravid'ian Languages and Peoples. The term D. has been applied by philologists to a group of cognate languages, whose present home is almost entirely confined to the S. of India. The name itself is derived from *Dravira*, the Sanskrit appellation for the Tamil country, the most ancient and powerful of the Southern Indian kingdoms; and the name Tamulian has been sometimes used for the entire group. The D. L., which all conform to a common type, belong to the more highly-developed stage of the so-called Turanian family of speech. They are agglutinative in the fundamental portions of their grammar; but they also exhibit incipient inflections, which can for the most part be reduced to separate words incorporated with the roots. Their alphabet is manifestly derived from some prototype of the Devanágarí character; but it differs from the Sanskrit proper in being rounded rather than angular, and cursive rather than either inscriptional or capital. The D. group consists of two sections, Southern and Northern. The following are the subdivisions and the numbers of persons by whom they are severally spoken:—*Southern* (1) Tamil, 15,229,759; (2) Telugu, 19,885,137; (3) Kanarese, 9,751,885; (4) Kodagu (*Coorgi*), 37,218; (5) Malayálam, 5,428,250; (6) Tulu, 491,728; (7) Toda and Kota, 1937; (8) Sinhalese, 187; (9) Mahl, 3167. *Northern* (10) Gond, 1,379,580; (11) Kandh (*Khond*), 320,071; (12) Ornon, 368,222; (13) Mal-Pahadia, 30,838; (14) Kharwar 7651; and (15) Brahui, 28,990. Telugu is spoken in the N.E. of the Madras Presidency; this language is the sweetest of the fifteen, but its literature is composed of translations from the Sanskrit. Kanarese is spoken in the Carnatic and the State of Mysore; its literature, though recent, is partly original. Tulu, which is largely mixed with the Kanarese, is spoken by persons living on the western coast between Cochin and Goa. Tamil is spoken by those who live in the tract between Madras city, Cape Comorin and Mysore; it boasts an indigenous literature, cultivated as early as the 9th c., and the Tamil race is by far the most civilised and energetic of the D. peoples. By way of accounting for the peculiarities of this language, a curious legend has become traditional in S. India to the effect that when God distributed the various languages, the Tamil nation was either forgotten or ignored. Thereupon, a deputation of Tamils was sent to implore God to give them a language. When they reached the Presence, God was walking about his garden in the cool of the evening, and He asked them what they wanted. Falling on their knees they humbly signified their grievous necessity and moved the Almighty to have pity on them. So passing from flower-bed to flower-bed, God plucked off the pods of the different plants that had seeded, and having crumpled them up in His hands, He cast the mixed seeds towards the Tamils and said: 'Take, let these be your language.' Malayálam is spoken by the inhabitants of the part known as the Malabar coast, which runs up on the W. from Cape Comorin; nearly two-thirds of this language are said to be of Sanskrit derivation. The Gonds live in Central India, the Kandhs in Orissa, the Ornons in Chota Nagpore, and the Mahlis in the districts bordering on the Ganges. Some of the tribes, dwelling as far N. as the slopes of the Eastern Himalayas, are D. in origin. It is probable, therefore, that one-fifth of the total population of India is D. See *A Comparative Grammar of the Dravidian and South Indian Family of Languages* by the Rev. R. Caldwell, LL.D.

Draw'back is used in commerce to denote the paying back, on exportation, of duties previously paid on commodities. It thus allows the commodity to be sold at its natural cost; while a bounty enables the exporter to sell below natural cost. The object of the D. is that commodities on which taxes fall may be exported for sale abroad as if they had not been taxed. It is therefore defended by Adam Smith as remedying the inequalities of taxation varying in different countries; otherwise peculiar facilities of production would be required to compete against a commodity produced and not taxed abroad. The system of warehousing imports for exportation does away with D., because it avoids taxation. In certain cases the D. exceeds the tax, and then forms a bounty. Under statutes 16 and 17 Vict. c. 107, 26 and 27 Vict. c. 33, and (the Customs Consolidation Act) 39 and 40 Vict. c. 36, persons intending to claim D. must give notice to the officer of excise; also no D. is to be paid on goods less in value than the D. claimed, or upon tobacco not wholly manufactured from imported tobacco; and goods re-landed (except in the usual way of importation), or carried to any of the Channel Islands, after D. has been paid for exportation shall be forfeit, as well as the ship from which they were re-landed, and the master of the ship or any person, by whom or by whose orders or means the goods have been re-landed, shall forfeit a sum equal to the drawback paid, or treble the value of the goods, or incur a penalty of £100, at the choice of the Commissioners. Great difficulty is often caused by the experiments to determine the gravity of samples of beer for exportation, on which the amount of D. depends. See also DEBENTURE and IMPORTATION.

Draw'ing, the art of representing objects or natural scenery in black and white or in colour upon a flat surface. In ordinary parlance a D. is a representation of an object or series of objects in outline, with or without lights and shadows, and executed in pencil, chalks, sepia, or Indian ink. In the constructive arts, a D. is a preparatory plan in which the proportions of a machine, building, &c., are accurately set out for the guidance of the constructor. In art, the term has a much wider signification. A water-colour D. may be a highly-finished painting in which no *drawn lines* appear. The term D. is also applied to a preparatory study or sketch in oils of a subject or part of a subject, to be afterwards worked up into a finished picture in oil-painting. Elementary D. is now regarded as an essential branch of primary education, and as such is taught in all schools, while in the army, and in many professions and trades, the ability readily and graphically to delineate common forms, plans, sketch-maps, scenery, &c., is regarded as an accomplishment second only in importance to writing. D. defines forms of objects by means of outline and shadow, and renders the relation between near and distant objects apparent by the help of Perspective (q.v.). According to Greek fable, a girl who drew the outline of the shadow of her lover's profile on a wall created the art. Ardices and Telephanes are said to have been the first to have indicated the roundness of the figure by the process of hatching. Monochrome, or drawing in one colour, using tints of varying depths, is said to have been first practised by Philocles and Cleanthes. The invention of this process led the way to the use of various colours in the representation of objects—in other words, to the art of painting. Among the Greeks, D. was studied rigorously and thoroughly. Pamphilus, the instructor of Apelles, required his pupils to study the art ten years. D. is the basis of all art, and while it is all-important at the commencement of an art training, it is little less so at all succeeding stages. In D. to a far greater degree than in colour, the expression—the soul, so to speak—of a picture or other work of art consists. Without D., colour has no intelligence. As the greatest merit, therefore, of the greatest work of art resides in the quality of its D., it is manifest that a thorough knowledge of the principles of the art and a perfect training in its practice are indispensable to success in high art. In teaching D., the prevalent practice in the schools of the Continent, namely, to teach the pupil to represent nature by means of light and shade, rather than, as with us, by rigid outline, is undoubtedly the preferable method, rigid outline, except in the forms of crystals, &c., being in nature practically unknown. An excellent work on D., as applied to the ornamental arts, has been written by E. S. Burchett, who lectured on geometrical and perspective D. at the National Art Drawing School, South Kensington. See Ruskin's *Elements of D. in Three Lessons for Beginners.*

Drawing and Quar'tering, the form of capital punishment for Treason (q.v.), was that the criminal should be drawn on a hurdle from gaol to gallows, and hanged; and that afterwards the body should be divided, then quartered, and disposed of according to the orders of the sovereign. It was the privilege of the sovereign to change the punishment of D. and Q. into beheading. D. and Q. are now abolished under statute 33 and 34 Vict. c. 23.

Drawing-Board, a board upon which paper is fixed in order that it may be drawn upon. For many engineers' drawings the paper is merely attached to the board by drawing-pins or by sealing-wax; but for more elaborate drawing, or for water-colours, the paper is attached by glueing all round while damp. The glue hardens very rapidly, and the paper, as it slowly dries and shrinks, is stretched perfectly smooth and flat.

Draw-Plate, a steel plate, having in it a series of holes gradually diminishing in size, through which metals to be formed into wire are drawn.

Drayton-in-Hales, or **Market-Drayton,** a town in Shropshire, on the Fern, 19 miles N.N.E. from Shrewsbury, and 153 miles N.W. from London. It is an old town, and is supposed to be the *Caer-Draithon* of the Romans. The parish church was built in the reign of Stephen. D. has manufactures of paper and haircloth, markets during the week, and several fairs in the year. Pop. reg. dist. 14,196; and reg. sub-dist. 10,292.

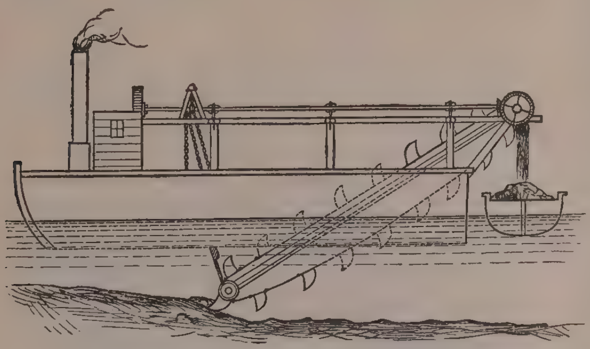
Drayton, Michael, an Elizabethan poet, was born at Hartshill, near Atherston, Warwickshire, in 1563, and is said to have been educated at Oxford, but little is known of his life. He produced *Harmonie of the Church,* his first work, a paraphrase of parts of Scripture, in 1591; *Idea: Shepherd's Garland fashioned in Nine Eclogues,* in 1593; *Idea's Mirror, Amours in Quatorzains,* a number of sonnets, and the tale of *Endymion and Phœbe,* in 1594; *Mortimeriados,* afterwards recast under the title of *The Barons' Wars,* in 1595; *England's Heroical Epistles* in 1598; *Polyolbion* in 1612-22; and *The Battle of Agincourt* in 1627. He died 23rd December, 1631, and was buried in Westminster Abbey. D. was a true poet, but forfeited popularity by the prosaic theme and tedious length of his chief work, the *Polyolbion,* a metrical guide-book to England and Wales, in buoyant Alexandrine verse, and full of noble, patriotic, and descriptive passages. *The Battle of Agincourt,* a fiery, vivid lyric, one of the finest war-poems in the language, is said to have been the model of Campbell's *Battle of the Baltic.* The most charming of D.'s works is *Nymphidia, a Tale of Faery-land,* wrought with the nimblest, brightest fancy, abounding in delicate oddities of conception and choice touches of colour. See Hooper's edition of *The Complete Works of Michael D.*

Dream'ing is the activity of the mental faculties, more or less, during sleep. Some suppose that even in the most profound sleep we dream, although the dreams may not be remembered. Of this there is no proof, and, on the contrary, it is highly probable that in profound sleep the cerebral centres, on the activity of which all our mental states depend, are in a state of complete rest. Others suppose that D. is a mark of imperfect sleep. Usually in D. there is a less complete exclusion of sensory impressions than in deep sleep, and thus the dream may be influenced by external impressions, although the mind is not conscious of them as such. In D. the cerebrum is partially active, while the sensorium, or that part of the nervous system which is the first recipient of impressions on the senses, is capable of being excited, not only by impressions on the sense organs, such as eye and ear, but by inferences transmitted to it by the cerebrum. In D. there is no volitional control over the current of thought, and there is usually an utter want of coherency in the images that appear before the mental eye. Nor does this excite any surprise in the dreamer. In D., also, trains of thought pass through the mind with great rapidity, so that, during a few minutes, events happen which in the waking state might occupy hours or even days. Time seems to be abolished. In D. sometimes sensibility to external impressions may be entirely suspended, and sometimes not. In the latter case, suggestions may be made to the mind of the dreamer, as by whispering into his ear. To such an extent may this be done, that the train of thought of the dreamer may be controlled by others, and he may even be made to act his dreams by speech or muscular movements, while all the time he is quite unconscious of any such suggestions, and may have no recollection of them when he awakes. Such forms of D. may be regarded as transitional to the state of Somnambulism (q.v.).

Dredge, a kind of net for dragging or sweeping the bottom of the sea, lakes, or rivers, and retaining the animals, &c., that enter it. The oldest and most familiar form of D. is that important item of deep-sea fishing-gear, the oyster-D. The zoologist's D., a most valuable implement of scientific research as regards marine fauna, differs from it in size and detail. The open frame takes a pyramidal form; at its base are two iron scrapers, and suspended from them is a bag of closely-netted twine, enclosed in an outer net of hide.

Dredging in deep sea and scientific exploration has of late years assumed a high importance, as making us acquainted with the fauna or life of deep-sea areas. Dredging may now be carried on at a depth of four or more miles, the chief obstacle to the descent of the D. (viz., the action of the strong under-currents, which tend to sweep the D. away from the ship in the direction of the surface) having been overcome through the use of heavy weights, which are attached to the D.-rope at intervals, and which thus gradually pull the machine to the ground. The equipment of a scientific dredging expedition is no light matter, as may be learned from a perusal of Wyville Thomson's work, *The Depths of the Sea*, in which full details as to the management of the D. in deep water, as well as other interesting information regarding deep-sea exploration, will be found.

Dredging Machine. A mechanical contrivance for raising mud, sand, &c., from the bottom of a river, dock, harbour, or canal, for the purpose of facilitating navigation or constructive operations. The most simple apparatus is the bag-and-spoon dredger, consisting of a large spoon-shaped frame, with a leather bag suspended from it, attached to a long pole. It is raised by means of a winch, a chain being attached to the spoon. For deepening canals in Holland, or for excavating for pier-foundations, &c., this dredger is much resorted to. For deepening the bed of a river and maintaining an open channel for large ships, or for cutting the bar of a river, the steam dredger with a chain-and-bucket system is invariably employed. The annexed cut shows its general features. A moveable frame or ladder carries an endless chain with a series of buckets attached. The buckets, full of material, ascend on the upper side of the ladder, and as they turn the cam at the top to descend on the under side, they empty their contents into a barge beneath. In some dredging vessels the bucket system is worked through an opening amidships, in others over their extremity. Some vessels have a double bucket system, working on each side. Large dredges are fitted with a screw propeller, and some are capable of raising 500 tons of silt per hour. An ingenious method of dredging has been patented, in which hydraulic power raises the dredged material. Two pipes, descending one on each side of a boat, are joined at their lower ends by a curved pipe with an open rake-shaped mouthpiece. By the forward movement of the boat, mud, shingle, &c., are forced into the mouthpiece, and are impelled with great speed up through the discharge-pipe by water forced down the other pipe.



Steam Dredging Machine.

Dren'the, the least populous province of Holland, between the Hanoverian frontier and the Zuyder Zee. Assen, the capital town, has a pop. of 9169. The surface is in great part sandy waste, alternating with bleak stretches of morass. The province is traversed by the D.-Hoofd and Oranje canals, and by two lines of railway. Little or no wheat is cultivated, but there is much cattle-rearing, bee-culture, and peat-digging. Four Government industrial colonies have an aggregate pop. of 10,000. Area, 1030 sq. miles; pop. 137,456.

Dres'den, the capital of Saxony, one of the states of the German Empire, is beautifully situated on both banks of the Elbe, 110 miles S. by E. of Berlin, and 78 N.N.W. of Prague. It is divided into the *Altstadt* and *Friedrichstadt* on the left, and *Neustadt* and *Antonstadt* on the right bank of the Elbe, which is here crossed by the splendid old Augustan bridge of seven arches, and by the fine iron railway (or Marien) bridge. The city has several squares, gardens, and promenades, as well as the famous Brühl Terrace overhanging the river. It is a great centre of culture, standing high in musical science, and having earned the name of the 'German Florence' on account of its rich art-collections. Its principal buildings are the uncouth Royal Palace (begun 1534), with its green domes and its rare collection of precious stones and gold and silver work; the Zwinger Palace, containing a museum of natural history, a splendid cabinet of engravings, and a collection of tools and mathematical instruments; the world-famous Museum or art gallery; the Japanese palace, remarkable for its royal library of 305,000 volumes, and for its porcelain and classical antiquities; the Frauenkirche, with a tower of 335 feet; the Catholic Hof Kirche; a Jewish synagogue; the Royal Theatre (1878), one of the finest in Europe; an arsenal; and orangery. The D. picture gallery contains about 2000 works, chiefly of the Italian and Flemish schools. Of the former, Raphael's 'Sistine Madonna,' Correggio's 'La Notte,' and Titian's 'Venus' and 'Tribute-Money,' are the most celebrated specimens; there are also pictures by Francia, Paul Veronese, Giulio Romano, Leonardo da Vinci, Bellini, Perugino, the Caracci, Guido Reni, &c. The Flemish collection is singularly rich, embracing 41 specimens of Rubens, 21 by Vandyck, many of Rembrandt, Snyders, Breughel, Ruysdael, Gerard Dow, and Teniers. Among the other more notable names represented are Holbein, Poussin, and Claude Lorraine. D. has a fine-art academy (1764), polytechnic, veterinary college, many good schools and public institutions, some light industries, and an extensive trade on the Elbe. It is the convergent point of five railways. To the S. of the city lies the romantic and picturesque region known as 'Saxon Switzerland.' Pop. 276,522.

The oldest portion of D., the Sorben colony, is known to have existed as early as 1206. In 1485 it became the residence of the Albertine line. The Reformation was here welcomed by Heinrich the Pious, 1539. The town, which had been burned in 1491, was in great part newly built under August II. and August III. By the Peace of D., the Austrian War of Succession was brought to a close, 26th December, 1745. Its fortifications were begun in 1810, and three years later followed the Battle of D. (q.v.). In the revolution of 1849 the city suffered much from barricade struggles.

The D. Conference for remodelling the constitution of the German 'Bund' sat from 23rd December, 1850, to 15th May, 1851. The Prussians occupied D. in the Austro-Prussian war of 1866.

Dresden, The Battle of, was the last of the great victories of Napoleon. This city, the central point of the French operations in August, 1813, was held by St. Cyr with some 30,000 troops, when the allied army unexpectedly appeared on the 23rd. But the advantage of a surprise was thrown away. The Austrians delayed action till the arrival of Klenau's left wing. On the 26th the attack began, but that morning Napoleon, who had been in Silesia, reached D. with his Guards. The assault, though brilliant, was repulsed, and after two days' fighting, the allies retreated on the night of the 27th. On quitting the city (7th October) Napoleon left there some 30,000, who were besieged by the Russians, and who, after a period of misery and famine, capitulated, and were made prisoners of war.

Dreux, a town of France, department of Eure-et-Loir, on the river Blaise, 45 miles W. of Paris. It has manufactures of serge and coarse cloth, tanneries, iron-foundries, and dye-works, and a trade in grain and cattle. D. was the scene of a battle in 1562, in which the Huguenots were defeated, and their leader, the Prince de Condé, taken prisoner. The ruins of the ancient castle of the Comtes de D. contain a fine chapel, built by Louis Philippe as a burying-place for the Orleans family. Pop. commune, 9364; arrond. 65,471.

Drey′se, Johann Nicolas von, the inventor of the needle-gun, was born at Sömmerda, near Erfurt, 20th November, 1787. From 1809 to 1814 he worked in the imperial armoury, Paris. Thenceforth he devoted himself to the manufacture of fire-arms, and in 1827 produced the first model of a needle-gun, an invention which he afterwards developed, and which, in 1840, was adopted in the German army. D. was placed at the head of a large manufactory of fire-arms in Sömmerda, and appointed a privy-councillor. He died 9th December, 1867.

Driff′ield, Great (Old Eng. *Driffelda*), a market-town in the East Riding, York, 196 miles from London by rail. It stands in a fertile district at the foot of the Wolds, and consists mainly of one street. The chief buildings are the corn-exchange, the mechanics' institute, and All Saints Church. D. has manufactures of wool and cotton, and several foundries, and flour and bone mills. Several tumuli have been found in the neighbourhood. Pop. civ. par. 5703.

Drift, a name applied in various senses in geology. Thus it may be used to denote sand and other loose matters which have been blown by winds, and which have been collected together to form 'sand-dunes.' These 'drifted sands' become consolidated by the growth in them of various hardy grasses, such as 'sand-grass.' Sand-dunes are most common along seaboards where high winds prevail, as on the sea-coasts of France and Spain, which face the Bay of Biscay. On the coasts of Devon, Cornwall, Norfolk, Lincoln, and Nairn, in Britain, sand-drifts may also be seen. The name D. is applied more distinctively, however, in geology to the glacial deposits belonging to the *Pleistocene*, *Recent*, or *Post-Pliocene* period of the Kainozoic rocks. These deposits are evidently the result of ice-action, and are also known under the names of 'boulder clay,' 'till,' &c. They occur in Britain as far S. as the Thames, over S. and Central Europe, and in N. America as far S. as the 39th parallel. They appear as sands, clays, and gravels, representing ice-carried débris, and, as in Wales, may occur at heights over 2000 feet above the sea-level. The fossils of the D., as might naturally be expected, are referable chiefly to living species of northern or Arctic kind; and many characteristic shells (such as *Pecten Islandicus*, *Fusus Islandicus*, *Scalaria Greenlandica*, &c.) occur in this formation. See also BOULDER CLAY.

Drill, a species of Catarrhine monkeys very nearly allied to the mandrill, and inhabiting the Guinea coast. The colour is not so brilliant as in the latter species, nor are the cheekbones so prominent. The upper parts are of a greener hue than those of the mandrill. The face and ears are black, and the soles of the feet are hairless. The D. is smaller than its neighbouring species, but in habits it closely resembles the mandrill.

Drill, a stout twilled linen fabric used for such articles of dress as require great strength and durability.

Drill, an instrument used for boring metal, stone, wood, glass, ivory, and other hard substances. Ordinary drills are made of very hard steel, and they are worked either in the lathe or the brace, or by the bow and string, &c. For rock-boring the diamond rock-D. is now generally adopted—an instrument with cutting edges made of the so-called black diamond (the boart or carbonado) of Brazil.

Drill, in agriculture, is applied to the rows in which any crop is sown, and also to the implement used for sowing seed in rows, as opposed to broadcast sowing.

Drill is the instruction of officers and men in the use of arms in the evolutions of the field. Until within the last few years the system of military manœuvres was based on a system of D., which consisted in a series of changes of formation chiefly from line to column and from column to line. But recent warfare has proved that an attack in column is—since the vast improvements lately made in the range and precision of artillery and small arms—a thing no longer possible. Again, an attack in rigid line is, owing to the impossibility of facing modern fire in any close formation whatever, equally impossible. The column and line therefore having practically ceased to exist as formations in actual warfare, the whole aim and system of D. has been changed. Attack is now only possible in skirmishing order with supports and reserves in rear. But the attack in skirmishing order pre-supposes a considerable degree of individual freedom of action; and under present conditions the aim of all D. is to develop, and at the same time to regulate, that freedom of action. Thus the scope of D. has within late years been greatly extended. The object of military training is no longer to ensure mechanical precision in the performance of unvarying evolutions, but to develop natural aptitude and judgment, so that in the advance in loose order every possible advantage offered by the ground may at once be perceived and seized by each individual combatant. The aptitude and judgment referred to, however, cannot be attained by the old system of D. In skirmishing, men are so widely scattered that their movements can no longer be controlled by word of command. A greater degree of responsibility must therefore be reposed in the non-commissioned officers and in the men themselves. But before these can be safely intrusted with this degree of responsibility and freedom of action, they must be regularly trained to act together in skirmishing order over a wide extent of country. This training it is one of the main objects of the Autumn Manœuvres to provide. For details of the new D., reference may be made to the recent regulations. See *Wellington Prize Essay*, by Lieut. F. Maurice; Captain (General, Sir) Henry Brackenbury's *Tactics of the Three Arms; Changes of Tactics Consequent on the Improvement of Weapons and other Circumstances*, by Lieut.-Col. Middleton; and *Field Exercises and Evolutions of Infantry, as Revised*.

Drill′ing, military, without lawful authority, is punishable under statute 60 Geo. III. and 1 George IV. c. 1. s. 1 (redrawn). Thus every person commits a felony, and is liable upon conviction thereof to seven years' penal servitude, who is present, or attends any such unlawful assembly, for the purpose of drilling, &c., any other person; or who trains or drills any other person without lawful authority; or who assists or aids therein. Persons who attend or are present on such occasions to be drilled or trained, commit a misdemeanour, and are liable on conviction thereof to two years' imprisonment (without hard labour) and fine.

Drin′king U′sages. The ceremony of drinking healths, or of uttering a pious, friendly, or moral sentiment before taking wine, has doubtless had its origin in the religious observances of antiquity. In the Bible we have frequent mention of a 'drink-offering' to the true God as well as to false gods, and among the Greeks and Romans a libation to the gods was a usual part of religious ceremony. Our own custom of health-drinking is probably of Teutonic origin; though we do not find the introduction of Christianity to have been followed by the suppression of drinking habits among our ancestors, or even by the diminution of them. 'The introduction of Christianity,' says Milner (*Archæologia*), 'among our ancestors did not at all contribute to the abolition of the practice of wassailing. On the contrary, it began to assume a kind of religious aspect, and the wassail-bowl itself, which in the great monasteries was placed on the abbot's table, at the upper end of the refectory or eating-hall, to be circulated among the community at discretion, received the honourable appellation of "Poculum Charitatis." This in our universities is called the "grace-cup."' The late Lord Cockburn in his *Memoirs* gives an amusing and interesting account of the fashion of drinking healths and toasts, as it prevailed in fashionable society in Scotland in the end of the last, and during the first quarter of the present century. Abroad there is a nominal drinking usage consisting in the universal expectation of servants, drivers, &c., with whom the traveller may come in contact, of a small gratuity, *pour boire* (Ger. *trinkgeld*). In the Highlands of Scotland it used to be the custom to speed the parting guest with what was called a *deoch-an-dorris* or stirrup-cup; for which the landlord of an inn made no charge. See Dunlop's *D. U. of Great Britain*, *Memoirs of Lord Cockburn*, and *Reminiscences of Changes of Social Life in Scotland* by the Very Rev. Dean Ramsay.

Drip'stone, a projecting moulding over the heads of doorways, windows, arches, niches, &c., which receives its name from the use it subserves of throwing off rain-water. From its position it is always ornamental, and in many situations in which there is no exposure to rain, this weather-moulding, as it is sometimes called, is retained simply from its value as an ornament. In Early English the D. was a small arched moulding, deeply hollowed on the under side, the ends of the arch usually resting on a corbel or boss of foliage; in the Decorated style it, like every other detail, was much enriched, being frequently crocketed and surmounted by a finial, so as practically to form a canopy; in the Perpendicular style it assumed a square form over the doorway.

Driver, or **Spanker,** in ships, the name of a large sail sometimes set upon a gaff on the mizzen-mast.

Driving, Law Regarding. Under statute, no stage-coach or public carriage is allowed to carry more passengers than it is constructed for. A space of 16 inches must be allowed to each passenger. Penalties are enacted against intoxication or negligence on the part of any one employed about the coach or carriage, and against careless or furious driving. See CARRIERS.

St. Lawrence Gate, Drogheda.

Drogh'eda (Irish Gael. *Droichead-Atha*, 'the bridge of the ford'), a seaport of Ireland, forming a county by itself, enclosed within the counties of Louth and Meath, province of Leinster, 4 miles above the mouth of the Boyne, and 31 miles N. of Dublin by railway. There is a railway viaduct 95 feet high across the Boyne, and a lattice railway bridge across the Royal Canal. Of more recent structures the chief are the waterworks, which deliver an ample supply of good water, the townhall, with assembly-room to accommodate 700 persons, the cotton-factories, and flax-mills, in which the bulk of the working population are employed. There are tanneries, breweries, a number of iron, salt, and soap works, and shipbuilding yards. At the entrance to the harbour are three lighthouses. Grain, cattle, and provisions are exported, and tea, brandy, and timber are imported. For agricultural returns, &c., see LOUTH. An important synod, summoned by the Pope's Legate, and the effect of which was greatly to extend papal authority and influence in Ireland, was held here in 1152. D., as a frontier town of the pale, was an important military station between the 14th and 17th centuries. Here Irish Parliaments were frequently held, and the right to coin money was exercised. The town was captured and its garrison destroyed by Cromwell in 1649, and in 1690 it surrendered to the royal forces after the battle of the Boyne. Of the fortifications scarce a remnant exists, and St. Lawrence Gate is the only part in any state of preservation. There is, however, a number of interesting remains of old religious houses, as the Dominican and Franciscan friaries, and the Hospital of St. Mary. Pop. of county of the town 11,873.

Droh'obicz ('the woody place'), a town of Austrian Galicia, on the Tisminica, a tributary of the Dneister, about 45 miles S.W. of Lemberg. It contains a military training school, and has important saltworks. Pop. town 17,784; district 75,642, many of whom are Jews.

Droit d'Aubaine (Lat. *alibi nati*), a usage in France, abolished in 1819, by which the moveable estate of an alien became the property of the sovereign, any will made notwithstanding. Exemptions were made in favour of the Scotch, Savoyards, Swiss, and Portuguese.

Droits of the Admiralty. See ADMIRALTY DROITS.

Droit'wich (Lat. *Salinæ*), a municipal borough, Worcestershire, in the valley of the Salwarp, 7 miles N.E. of the city of Worcester. It is connected with the Severn by a canal. The manufacture and export of salt, got from the brine-wells by evaporation, constitute the principal trade of the town. The name is derived from *wich* or *wick* (the Scandinavian *vig*, 'bay,' as salt was obtained by the evaporation of sea-water in shallow bays), and *droit*, 'tax.' It thus signifies the salt-springs where the tax was paid. Some Roman remains have been found here. Pop. parl. div. of county 48,745; reg. sub-dist. 7606; and mun. bor. 4021.

Dromathe'rium, an extinct genus of Marsupial (q.v.) mammalia, the remains of which (consisting of the lower jaw) are exceedingly interesting as forming one of the earliest traces of mammalian existence on our globe. The D. remains occur in the Triassic rocks of N. America. D. was a mammal of small size, and appears to have been very nearly related to the little banded ant-eater of New South Wales. *D. sylvestre* is the name which has been given to the D. remains. The lower jaw contains 'ten small molars in a continuous series, one canine, and three conical incisors—the latter being divided by short intervals' (Owen).

Drôme, a department in the S.E. of France, bounded on the W. by the Rhône, which separates it from the department of Ardèche, and surrounded on the N.E., E., N., and S. by the departments of Isère, Hautes-Alpes, Basses-Alpes, and Vaucluse. In the E. the country is covered with mountains (highest peak 8068 feet), giving rise to westward-flowing streams, the chief of which is the Drôme (length 103 miles). In the S. there are ranges of vine-clad hills, and fertile plains with numerous mulberry plantations, supporting an extensive local silk husbandry. One-half of the area is cultivable, and vineyards and forests occupy large tracts. The raw silk produced amounts to 585,000 lbs. annually, worth ten million francs. The four vineyards of Die, Douzere, Saillans, and Mercurol alone produce thirty-three million gallons of highly-esteemed wines named *vins du Rhône* annually; but the finest vineyard is that of Hermitage, which produces the excellent red and white wines of *Meal* and *Grieffieux* and of *Baume*, *Muret*, and *Reaucoule*. Cloth and serge are extensively manufactured; there are 130 silk factories, and numerous potteries, tanneries, &c. Silk, timber, cattle, wine, honey, wax, and olives are exported. The department is traversed from N. to S. along the banks of the Rhône by the Lyon and Avignon Railway. Valence is the chief town (pop. of commune 25,283). Area, 2518 sq. miles; pop. 306,419.

Drom'edary, a species of *Camelidæ* or Camels (q.v.), also known under the names of African and Arabian camel, and distinguished by its possessing a single hump only. This species in other respects resembles its neighbour the Bactrian camel, which has two humps, the two species being said to breed together, whilst their hybrid progeny is also said sometimes to be fertile. The D. is by far the most valuable of the two species in so far as its usefulness to man is concerned. It is a much more elegant animal than the Bactrian camel, and is altogether swifter and more agile. The D. is much used for riding, the *heixies* or 'swift camels' being highly bred and trained animals of this species. The average speed of the D. is from 8 to 10 miles per hour, but their power of passing over long tracts depends rather upon their endurance than actual speed. See also CAMEL.

Dromore' (Irish Gael. *Druim Mor*, 'great ridge'), a cathedral town in the county of Down, on the Lagan, 17 miles S.W. of Belfast by railway. The inhabitants are principally employed in the preparation of flax, and in linen manufactures and muslin embroidery. The see of D., which also gives name to a Roman Catholic bishopric, is said to have been founded by St. Colman (6th c.), and was incorporated (Act 3 and 4 Will. IV. c. 37) in the diocese of Down and Connor. Jeremy Taylor was Bishop of D. Pop. of township 2359.

Dron'theim, the German form of the Norwegian Trondhjem (q.v.).

Drone-Fly, a genus of *Diptera* (q.v.), or Flies belonging to the family *Tabanidæ*, and noted for its close resemblance to the hive-bee. The larvæ are known as 'rat-tailed maggots,' and are found in mud.

Drop'sy (Gr. *hudōr*, 'water') is an accumulation of water or serum into one or more of the serous cavities of the body, or into the meshes of the areolar tissue. It may arise from various causes, as inflammation, or effusion into the cavity of the chest after pleurisy; or it may be due to disease of the liver, heart, kidneys, or other internal organs. The treatment varies with the cause; diuretics, purgatives, diaphoretics, and tonics are all beneficial.

Drop'wort. See SPIRÆA and WATER DROPWORT.

Drosera'ceæ, the Sundew order, a natural order of Dicotyledonous plants, the leaves of which are often covered with glandular hairy-looking prolongations of the substance. There are about ninety species and seven genera known, most of which are inhabitants of bogs and marshy places. Acrid and slightly acid properties are the characteristics of the order. The exact relatives of the order are doubtful, but probably Hooker's view, that it should be placed near the *Saxifragaceæ*, is correct. It is found in Europe, India, China, Cape of Good Hope, Madagascar, N. and S. America and Australia.

Dros'te-Hüls'hoff, Annette Elizabeth, Fraulein von, was born at the family seat of Hülshoff, near Münster, 12th January, 1798. Her constitution was delicate, and her life one of almost unbroken retirement. In her later years she began to embody the deepest and tenderest experiences of the female mind in a series of lyrics and poetic tales. Her expression is at times misty, but this is far more than atoned for by her originality of thought and truthful rendering of subjects at once poetical and elevating. She is perhaps the only real poetess Germany ever produced, and certainly takes a foremost place among modern writers. She died 24th May, 1848. See Schücking's *A. von D.*

Drou'et, Jean Baptiste, Comte d'Erlon, an eminent French marshal, born 29th July, 1765, at Reims, entered a regiment of volunteers in 1792, and distinguished himself in the campaigns both on the German frontier and in the Peninsula. He was faithful to the fortunes of his master, Napoleon, and was commander of the first *corps d'armée* at Waterloo. In 1832, after the Revolution of July, he received the command of the army of Vendée, and (1834-35) held the post of Governor-general of Algeria. D., who was made a marshal in 1843, died 25th January, 1844.

Drou'yn de Lhuys, Édouard, a French statesman, was born in Paris, 19th November, 1805. He carried off all the first prizes at the Collége Louis-le-Grand, was initiated into politics as *chargé d'affaires* at the Hague, and afterwards held a similar post in Spain. In his political career D. distinguished himself mainly by his opposition to Guizot, whom he helped to overthrow in February, 1848. When Louis Napoleon was President of the French Republic, D. was Minister of Foreign Affairs, and held the same portfolio after the *coup d'état*. In consequence of the results of the Conferences of Vienna of 1855 in regard to the Crimean war, he resigned, to be recalled, however, in 1863. He resigned again in 1866, but received many imperial dignities. After the fall of the Empire at Sedan, D. withdrew to St. Helier, Jersey. He died 1st March, 1881.

Dro'vers ('drivers,' *i.e.*, of cattle) are those who buy cattle in one market to sell in another. They are traders subject to the bankrupt laws. The name is also commonly applied to those whose business is to drive cattle to or from the markets. Statute 5 Eliz. c. 12 bore hardly upon D. and was repealed by statute 12 Geo. III. c. 71.

Drowning, death from submersion in water, was commonly practised in the Middle Ages as a form of capital punishment, and as such was only abolished in Scotland in 1685 and in Austria in 1776. Much attention has been recently devoted to the subject of the recovery of persons after apparent death from D., and the following are now established rules:—(1) place the body in a horizontal position, and gently move it from a prone to a half-prone position, or retract the arms with slight force; (2) rub the limbs upwards with dry cloths; and (3) restore Respiration (q.v.) either by direct inflation of the lungs by the breath or by bellows. See ASPHYXIA.

Droyls'den, a growing suburb of Manchester, four miles E. of that city, and a station on the Lancashire and Yorkshire Railway. It has several good churches, a literary institute, spinning-mills, dyeworks, printfields, &c. Pop. civ. par. 12,810.

Droy'sen, Johann Gustaf, a German historian, born at Treptow in Pommern, 6th July, 1808; studied at Stettin and Berlin; became professor in Berlin in 1835, and Professor of History at Kiel in 1840; was elected to the National Assembly in 1848; appointed professor in Jena in 1851, and again in Berlin, 1859. His writings include translations of Æschylus and Aristophanes.

Drugg'et, a coarse woollen fabric, either woven or felted, chiefly employed as a crumbcloth for laying over carpets, or as an inferior kind of carpeting.

Drugs are medicinal substances used by the physician to cure disease and alleviate human suffering. They are derived from the animal, mineral, and vegetable kingdoms.

Dru'id, the name for priest among the ancient Celtic nations. Zeuss (*Gramm. Celt.*, vol. i. p. 8) derives it from *drui*, an old Celtic term for oak-tree. The Druids taught their pupils by means of verses, which were committed to memory, but never allowed to be written; consequently we have no record by themselves either of their doctrines or their ritual, and derive such scanty knowledge as we have of them from writers who were strangers to their language and hostile to their tenets. Cæsar (*Bell. Gall.* vi. 13) is our principal authority, although many other authors, Greek and Latin, write concerning them.

The Druidical system was skilfully and elaborately organised. Like the Magian in Persia, it drew to itself almost the entire power of the state. Its priests naturally regulated everything pertaining to divine worship. They had also the complete control of the education of the people, and further secured to themselves the exclusive interpretation both of the civil and the criminal law. If any one, high or low, opposed their decrees, 'they interdicted him from the sacrifices,' a sentence with consequences so ruinous that no one could withstand them. Besides possessing these extensive powers, the Druids were exempt from military service and taxation; consequently admission to their ranks was an object of ambition to the highest in the land, and the rivalry for the office of supreme head, or arch-D., often led to bloody warfare. The Druids held the immortality and the transmigration of souls, taught geography and astronomy, discussed the nature of things, and the powers of the immortal gods. The preparatory training of candidates sometimes occupied twenty years, and both Strabo and Lucan speak of their possessing a profound spiritual discipline. In Gaul they worshipped the Greek and Roman deities, principally Mercury, but also Mars, Apollo, Jupiter, and Minerva, to all of whom they offered human victims in sacrifice. Probably the Gauls learned the above names from their neighbours, the Italians; but in Britain, whence the Gauls derived their Druidical knowledge, the sun, under the name of *Bel*, appears to have been the principal object of worship. In the S. as well as in the N. of Scotland, the beginning of summer is still known as *Beltein* (q.v.), and the beginning of winter is in all the Gaelic-speaking districts known by a word signifying 'the fire of peace.' At both these terms the fire on every hearth throughout the land was extinguished, and every householder had to go to the D. to obtain sacred fire directly from him. None dared lend it to his neighbour. We have the memory of this old tyranny still preserved in some Highland districts, where people will on no account allow any fire to be taken out of their houses at either of the above seasons, and we have the kindling of fires upon hill-tops both in the islands and on the mainland (where those who observe it can give no account of the practice, except that it is a habit derived from their ancestors), evidently a remnant of the old fire-worship.

A Druid Priest.

The oak-grove is said to have been the favourite place of Druidical worship, and peculiar sacredness was attached to the well-known mistletoe, a parasite of the oak. Many of their temples have been well called 'groves of stone,' where several stone pillars are ranged in concentric circles, with a large slab sometimes resting on the tops of two of these pillars. Others of these 'Druidical stones,' or 'circles,' as they are popularly termed, are arranged with less regularity; but at Carnac in Brittany; Avesbury, Stanton Drew, and Stonehenge in England; Stennis in Orkney; and Callernish in Lewis, as well as in many other places—they present rude but very remarkable and imposing proofs of mechanical power and skill. Some modern antiquaries maintain that these great pillars are only monuments to the dead; but there seems no valid reason to question the general belief that, like so many of our churches, they formed both temple and tomb, and this belief is confirmed by the fact that, in very many parishes in Scotland, the Christian church is known by the name applied to the old Druidical circle, *clachan* = the 'stones.'

It is also said that Druidism was never known in Scotland. The ancient language of the country proves this opinion to be erroneous. Many places are named as the abodes of Druids. In the Gaelic Bible the magicians of Egypt are called Druids. In common discourse, a person who by persuasion acquires complete control of another is said to exercise Druidism over him, and the meteors known as shooting stars are called 'the death of a D.,' implying the belief that their souls ascended in fiery chariots. The Druidical worship was forbidden by the Emperor Claudius as early as A.D. 55. It is said that a few years later thousands of the priests were massacred in Mona, or Anglesey, by the Roman general Suetonius; but they retained power until the Celtic nations were converted to Christianity.

Drum, a well-known musical instrument of percussion. The *kettle-D.*, of which every orchestra has at least two, is the most important form of the instrument. It is made of copper, and by screws which alter the tension upon the D.-head can be tuned to any musical note within a certain limited range. The ordinary *side-D.* of military bands, and the bass or 'big' D., which is also used in the orchestra, have a sound of some sonorousness, but not of definite pitch, and are useful chiefly in marking rhythm.

Drum was the name of a somewhat uproarious evening assembly of the fashionable about the middle of the 18th c., chiefly convened for the purpose of card-playing, and so called according to Smollett, 'from the noise and emptiness of the entertainment.'

Drum, in machinery, a short hollow cylinder of iron or wood, revolving on a shaft or axis, useful for driving all kinds of mill-gearing and machinery by means of an endless belt or band. The beating apparatus in the threshing-machine is termed the D.

Drum of the Ear. Properly speaking this is the middle ear, or tympanum, although, in ordinary language, the term is frequently used to denote the membrane between the external ear and the middle ear—*membrana tympani*. See EAR.

Drum-Fish, a general name given to those fishes, which, like the Maigres (q.v.), make a kind of grunting noise, but applied more specially to the bearded D.-F. of the N. American coasts, which produces a noise closely resembling the beating of a drum. In this Teleostean fish, which is included in the family *Sciænidæ*, the chin is provided with many small *barbules* or filaments. The first dorsal fin is provided with ten spines, whilst the hind fin is two-spined.

Drum-Major, an army officer, equal in rank to a sergeant of the line, who superintends all 'time bugling,' as the calls for the men to dress, for falling in, reveille, tattoo, &c., trains the drummers and fifers, and is supposed to regulate the pace on the line of march. In the days of 'flogging' it was the duty of the D.-M. to train the drummers to wield the 'cat.'

Drumm'er, a person in every regiment, not to be confounded with any of the drummers in the regimental band of music. He conveys instructions by various beats of the drum, drums out any soldier discharged in disgrace, and used to inflict the lash when the soldier was flogged. See BEAT OF DRUM.

Drumm'er, a large species of Cockroach (q.v.) common in the West Indies, and named from the noise it makes during the night, chiefly by knocking its head against wood.

Drumm'ond, Captain Thomas Henry, a distinguished civil engineer and inventor, was born at Edinburgh, 1797, obtained a cadetship at Woolwich, and was engaged by Colonel Colby in the British trigonometrical survey of 1820. While engaged in this survey he produced the famous light known by his name (see DRUMMOND LIGHT), and also invented a Heliostat (q.v.), an instrument for the vivid and distant reflection of the sun's rays. He was appointed head of a commission to determine the boundaries of boroughs, according to the provisions of the Reform Bill of 1832. In 1835 he was raised to the post of Under-Secretary for Ireland, and before long gained the confidence of all classes by his unflagging energy and intelligence. As head of a commission he made a valuable report on a railway system for Ireland in 1836. He died, keenly regretted by his own friends and by the friends of Ireland, 15th April, 1840. See M'Lennan's *Memoir of Thomas H. D.* (Edinb. 1867).

Drummond, William, the chief Scottish poet of the 17th c., was born of an old and honourable family at Hawthornden, 13th December, 1585. D. was educated at the High School and University of Edinburgh, graduating in 1605, after which he left for the Continent to study civil law. From 1606 to 1608 he resided in France, and in 1609 returned to Scotland. Next year his father died, when D. found himself master of the family estate and of ample means, and abandoned legal studies for the life of a student in his retreat at Hawthornden. His first published work, an elegy on the death of Prince Henry, entitled *Tears on the Death of Mœliades*, appeared in 1613. In 1616 he published *Poems, Amorous, Funerall, Divine, Pastorall, in Sonnets, Songs, Sextains, Madrigals*, the prevailing tone of which is sad, for his betrothed had died in the previous year. His next work, *Forth Feasting, a Panegyric to the King's Most Excellent Majesty*, celebrated King James's visit to Scotland in 1617. In 1618 Ben Jonson spent two or three weeks at Hawthornden, an event recorded in D.'s *Notes of Ben Jonson's Conversations at Hawthornden*, discovered by Laing in the Advocates' Library, Edinburgh. In 1623 appeared his last poetic work, the *Flowers of Sion*, religious poems, to which was appended the *Cypresse Grove*, a brief prose essay on death. Two years later D. visited France, and probably the Low Countries, Germany, and Italy. He returned in 1630, and in 1632 married Elizabeth Logan, a member of the Restalrig family. In 1633 D. began his *History of Scotland under the Five Jameses*, and during his closing years was a vigorous political pamphleteer. He was an ardent royalist; and the execution of Charles I. so affected him that it is said to have hastened his death, 4th December, 1649.

D.'s verse is pensive and thoughtful, and, in general, coloured by a sensuousness derived from Spenser. The vulgar *Polemo-Middinia* (Oxford, 1691) would be a violent contrast to his usual style were its authenticity less problematical. D.'s sonnets, which gave him the title of the 'Scottish Petrarch,' show him perhaps to greatest advantage, being more natural than his longer pieces. His works contain a decided pastoral element, and his Italian studies imparted to his poetry a peculiar melody. D. stands almost alone in Scottish poetry between Gavin Douglas and Allan Ramsay.

D.'s collected works were edited by Bishop Sage and Thomas Ruddiman (Edinb. 1711); by Lord Dundrennan and Irving for the Maitland Club in 1832; and by Cunningham (1833) and Turnbull (1857). See Masson's *D. of Hawthornden* (1873).

Drummond Island, in the N.W. extremity of Lake Huron, is 20 miles long and 10 broad, and belongs to Michigan. There is a settlement here which carries on some trade.

Drummond Light, or **Limelight,** is produced by the play of an oxyhydrogen flame upon a cylinder or ball of lime, which, becoming vividly incandescent, evolves an intensely brilliant and pure white light. The oxygen and hydrogen gases are stored separately, and are only allowed to mingle near the nozzle of the blowpipe, because of the highly explosive character of the mixture. Although lime is very refractory under the blowpipe, the prolonged action of the flame upon one point causes it to crumble away, thereby destroying the steadiness of the light, but this disadvantage is in a manner met by turning the cylinder of lime on its axis by clockwork. Experiments were made with the limelight as early as 1820, but the late Captain (then Lieutenant) T. H. Drummond, R.E., in 1826, was the first to apply it practically. While conducting a trigonometrical survey of Ireland and Scotland he used the light, placing it in the focus of a parabolic reflector, for signalling between distant and lofty eminences. On one occasion he made a successful observation by means of it between stations—Ben Lomond in Stirling and Knock Layd in Antrim—95 miles apart. In 1861 the South Foreland lighthouse was fitted with the limelight apparatus. As the light results from the incandescence of the lime, there is no combustion of atmospheric air and no formation of carbonic acid gas, but in regard to the extension of the limelight to ordinary illumination, these sanitary advantages are neutralised by the inconvenience in preparing the gases and the absence of continuity of the light. It is chiefly employed to enhance scenic effects and for magic-lantern exhibitions.

Drunk'enness. See INTOXICATION.

Drunkenness. Persons completely drunk, being incapable of legal consent (see CONSENT and CONTRACT), cannot enter into a contract or obligation; but a minor degree of intoxication may be insufficient to reduce a contract, unless fraud is proved against the other party to it. D. does not excuse crime, though in minor cases it may be held to palliate it. To be drunk privately is not an offence against law; but to be drunk in a public place or licensed house is punishable by fine, to be drunk and disorderly by fine or imprisonment, and to be drunk and to refuse to quit licensed premises by fine or imprisonment (with hard labour). Under the Habitual Drunkards Act of 1879 and the Inebriates Act of 1888 any person who voluntarily (at first) submits to confinement with a view of breaking himself or herself of the habit of getting drunk, and with a view of recovering health and moral tone and strength, may be kept in confinement for any term (stated at time of application) not exceeding twelve months, and may be arrested and sent back by order of a justice of the peace to the asylum or retreat whence he or she escaped. Few persons have up to now made application under these Acts.

From the 15th report of the Inspector of Retreats under the above Acts, which has been issued in September, 1895, it would appear that so far the working of these preventive measures has proved fairly satisfactory; but, in the opinion of the inspector, no appreciable progress can be made towards repressing the habit of D. until retirement to the Retreats is rendered compulsory.

Drurajapatam', or **Durgarayapatnam** (Telugu, 'city of the minister'), a seaport of British India, district of Nellore, province of Madras, 64 miles S. of Nellore, and 60 N. of Madras. It lies on an inlet of Blackwood Harbour, the safest harbour on the Coromandel coast, and near the entrance to Pulicat Lake, which has been artificially extended to Madras city. Salt is the chief manufacture. Pop. 2008.

Dru'ry Dru, a naturalist, born in London, 4th February, 1725, was a goldsmith in the Strand for several years, but eventually abandoned himself to the study of natural history. His chief work was his *Illustrations of Exotic Entomology* (Lond. 1773-82), with its excellent drawings. D. died 15th January, 1804.

Dru'ses, a people inhabiting the less fertile parts of the mountains of Lebanon and Anti-Lebanon. They have arisen from a mingling of Kurds, Arabs, and the Mardi, a tribe from the Caspian, and have derived their name from Drusi, probably a tailor—modern *trozee*—who lived in the 11th c., and preached the divinity of Hakim, a Caliph still adored as a god by the D., and expected to come as a 'messiah' through

Central Asia from China. They also worship a golden calf, but the rites of their religion, which seems a mixture of Christian, Sadducee, and Mohammedan doctrines, are concealed. They are understood, however, to be subject to seven moral commandments: profession of unity of Hakim as God, acquiescence with his works, obedience to his orders, exclusion from their community of all infidels and demons, abjuration of all other religions, offensive and defensive alliance against the outside world, and habitual observance of truth to one another, not to members of other religions. They at present number 78,200, and are divided into two classes, the Okals and the Jakals. The Okals, or the learned section, are initiated in the mysteries of the Druse creed, profess rigid morality, and form a senate for administering affairs. The Jakals, or unlearned, can rise to the class of Okals through a long and severe novitiate. Many of the Okals retire to places of worship on lofty summits, called Holowas, several of which are dedicated to Job and other prophets. The D. are famed for their fine breed of horses, and for their skill in the use of the *djereed* or javelin. A curious belief that they are mystically connected with the Scotch, and possess the same faith, has spread among them. The D. attained their greatest prosperity in the first half of the 17th c., under the Emir Fakardin, but since his death in 1631 have been nominally subject to the Turks. With the Maronites (q.v.), or Christian tribes of the Lower Lebanon, they have had long and bitter feuds, and in 1860 horrible massacres were perpetrated by both parties. The D. are a brave and intelligent race, and do not practise polygamy. They cultivate vines and corn on the terraces which they have raised on the sides of the mountains. Their chief manufactures are shawls, mantles, &c., of silk; and for local wants, wine, arrack, yarn, and soap. Their chief town is Dair-el-Kamar (q.v.), about 50 miles S.E. of Beirut.

Druse Man and Woman.

Dru'sus, a distinguished Roman family, of which the following were the most remarkable members:—1. **M. Livius,** who became consul, B.C. 112, and who throughout his official career was the successful representative of the senatorial party, and opponent of C. Gracchus.—2. **M. Livius,** son of the former, was early a strong partisan of the senate, but subsequently displayed great skill in manipulating the mob, whom he bought over by conciliatory laws and lavish gifts. The social irritation thus caused was inflamed by the favour shown to the Latins and other foreigners, and the career of D. closed in an intricate network of conspiracy and intrigue. Arrogant in disposition, he died unregretted by all, B.C. 91. —3. **Nero Claudius,** commonly called D. Senior, stepson of Augustus, brother of Tiberius, and father of Germanicus, was born B.C. 38. He acquired the highest distinction both in administration and in war. He defeated the Rhætians (B.C. 15), subdued tumults among the Gauls (B.C. 12), and in pursuit of their allies advanced to the German Ocean. Thereafter, during a series of brilliant campaigns, he subjugated in succession the leading tribes of the Germans, and, at the expense of fearful bloodshed, established over them the supremacy of Rome. He received after death the agnomen *Germanicus*. He died, B.C. 9.

Dry'ads (from Gr. *drus*, 'an oak'), inferior divinities in the Greek mythology, who came into existence with particular trees and died with them. See NYMPHS.

Dry'den, John, an English poet, was born at Aldwincle, Northamptonshire, 9th August, 1631. He belonged to a good family of staunch Puritan principles, was educated under Busby at Westminster, and took the degree of B.A. at Cambridge in 1653. Having inherited property worth £40 a year on his father's death in 1654, he studied at Cambridge until 1657, when he entered on a literary career in London. In 1658 he produced *Heroic Stanzas on the Death of Oliver Cromwell*, and at the Restoration, changing, as Johnson says, with the nation, offered a tribute to Charles II. in his *Astræa Redux*. In 1663 he married Lady Elizabeth Howard—a union which proved unhappy. The *Wild Gallant*, his first play, and the *Rival Ladies*, a tragi-comedy, were acted in 1663, and his rhymed tragedy, the *Indian Queen*, was very successful in the following year. The Great Plague of 1665 closing the theatres, D. for a while gave up play-writing to celebrate the Dutch war and Great Fire of 1666 in his *Annus Mirabilis*. Between 1668 and 1670 he produced several plays, which won great popularity, and about this time he engaged to write three plays a year for the King's Theatre, in return for an annual share in the profits equal to £300 or £400. In 1668 he advocated rhyming tragedies in his *Essay on Dramatic Poetry*, and was chosen laureate in 1670; but in 1671 the town was set a-laughing by the *Rehearsal*, a farce written by Buckingham and Butler, ridiculing D.'s tragedies, and caricaturing him under the name of Bayes. D. continued to compose plays with less success than formerly up to 1681, when he produced *Absolom and Achitophel*, a satire—the best which had as yet been written in English—denouncing Shaftesbury's and Monmouth's schemes to oust the Duke of York from the succession. He attacked Shaftesbury again in the *Medal;* crushed Shadwell, a Whig poetaster, in *MacFlecknoe;* and defended the Church of England in *Religio Laici* (1683). After the death of Charles II., lamented in D.'s *Threnodia Augustalis*, he abandoned the Anglican for the Romish faith, a change of which the sincerity is denied by Macaulay, but maintained by Bell, one of D.'s editors. He defended his new religion in the *Hind and the Panther* (1687), an elaborate allegory, in which the different Churches appear as beasts. The Revolution removed him from the laureateship, and ended his controversial career. In his old age he had to write for a livelihood. He translated Juvenal, Persius, and Virgil (1696); wrote the *Ode on St. Cecilia's Day*, a masterpiece of changing rhythmical effects; and in 1700 published his *Fables*, adaptations from Boccaccio and Chaucer, the most graceful and fanciful of all his writings. During his closing years he was regarded as a literary dictator, holding his court at Will's Coffee-house, among the young wits and noblemen. He died on the 1st May, 1700, and was buried in Westminster Abbey.

D. does not belong to the highest class of poets, for he is wanting in imagination, passion, and tenderness. His cardinal merits are clearness, keenness, and vigour. As a playwright, seeking to combine the incompatible characteristics of the Elizabethan and the French drama, he produced hybrid tragedies and indecent comedies; strained after sublimity, and floundered into rant; offered obscenity instead of humour, and stilted rhetoric instead of eloquence. As a satirist he is unequalled among Englishmen. No other is so comprehensive, fervid, and penetrative; none unites such majesty of verse with such trenchancy of epithet; none shows such mastery of metrical logic. But he was not a satirist of the noblest type. He did not attack the wickedness of his age.

His translations are somewhat unfaithful; his bluff homeliness occasionally outrages the Virgilian art, and his tales from Boccaccio and Chaucer want the subtle charm of the original. His prose is at once dignified, incisive, and idiomatic. He was a great literary reformer as well as a great satirist; he purged English verse of conceits, and instead of a crabbed and flimsy, left a flexible, natural, and robust poetry. The best editions of D. are Bell's, in three vols., with an admirable biography; and the *Globe*, edited by W. Christie, which has the best text. Critical estimates of D. may be found in Masson's and Lowell's *Essays*, and in Taine's *English Literature*. See also Ward's *History of English Dramatic Literature* (1875).

Dry'ing Machines. A variety of contrivances are in operation, chiefly in bleaching, calico-printing, and dye-works, for effecting the rapid drying of textile substances in the various processes connected with these arts. The apparatus chiefly relied on in bleaching and calico-printing is a series of tinned-iron or copper cylinders, mounted in a frame and heated by steam, around which the material passes, and is carried forward by their revolution. A number of substances, however, such as thread and yarn in the hank, cannot be treated by such an arrangement, and for these a machine, called the hydro-extractor, is employed. It consists essentially of a cylindrical metallic drum, mounted on a pivot, so arranged that it can be turned with great velocity, and the drying is effected by the centrifugal force thus communicated to the material placed within the drum and the particles of water it contains. Drying is also effected in 'stoves' or apartments heated to a high temperature either by steam-pipes or flues.

Drying Oils. See OILS.

Dry'ophis, a genus of *Ophidia*, or Snakes, forming the type of a special family of Colubrine (q.v.) serpents, and represented by such forms as the golden tree-snake of Mexico. In these snakes, which are also represented in the Old World, the body is long and slender, and the head narrow; whilst the upper jaw is longer than the lower jaw, and the snout pointed.

Dry-Plate Processes, photographic processes by which dry sensitive plates are prepared and preserved for subsequent use, thus obviating the inconvenience of a field-operator carrying his various chemicals and a tent or dark room in which to work. In the wet collodion process the plate must be manipulated while the film is moist, because when dry it becomes insensitive and impervious to the developing liquid; but in practising the dry process the sensitive plate may be prepared at home, exposed in the camera some days or weeks afterwards, and developed at home. Dry plates are not quite so sensitive as wet plates, and consequently require longer exposure. Various dry processes are practised, and for practical details of two of the principal—the collodio-albumen process, and the dry collodion process of Dr. H. R. Morris—Hardwick's *Photographic Chemistry* may be consulted. See also Thomson's *History and Handbook of Photography*, translated from the French of G. Tissandier.

Dry-Point, a finely-pointed needle used to cut fine lines in engraving, and so called because in using it the tool alone is employed—no acid being used. The lines so produced are as durable as they are delicate.

Dry-Rot, a disease of wood caused by the attacks of various species of fungi, the root-like mycelium of which spreads through the substance, destroying all before it. The best remedy consists in careful selection of wood, 'perfect ventilation, and patient seasoning, added to the employment of such kinds of wood for particular purposes as may be most suitable to the situation they are intended to occupy.' Saturating the timber with creosote, which coagulates the albumen, and makes it enter into combinations unfit for vegetation, is one of the favourite modern remedies. D.-R. may, however, also be caused by a slow chemical combustion, quite independent of fungi. Well-seasoned timber will last long without being attacked by D.-R. In England there is found wood in many buildings a thousand years old; and wood in a perfect state of preservation was taken from behind the frieze of the Parthenon, where it had been placed 2000 years ago. Charred blocks of wood were found during Layard's excavations in Nineveh. See also KYANISING.

Dry-Stove, in gardening, is a house in which a high temperature, combined with dry air, is maintained, for the purpose of growing cacti and other fleshy plants which belong to hot, arid climates.

Du'al. The term applied in grammar to a form which exists in some languages in nouns, pronouns, and verbs, when only two persons or things are spoken of. For example, in Greek, *anthrōpos* is 'a man,' *anthrōpō*, 'two men,' *anthrōpoi*, 'men.' Sanskrit, Arabic, Ancient Greek, and Hebrew all have a D. number, the latter in nouns only. Gothic and Old English also have it to some extent, the former in verbs, the latter in the pronouns of the 1st and 2nd persons—*wit*, 'we two,' *git*, 'ye two.' The words *duo* and *ambo* scarcely warrant us in assuming that such a form ever existed in Latin. The fact that it is only in ancient languages that we find a D. form goes to prove that it is not a refinement of speech—not *an abridged form of the plural which usage afterwards limited to the number two*, as Buttmann and others have held, but that it is one of the earliest births of language; that it indicates a lack of the power of abstraction, and that it gradually disappears on the development of that power.

Du'alism, in religion, is the deification of two principles, absolute good and the greatest evil. As an absolute good and an absolute evil cannot coexist, it has often been supposed that the evil principle was originally good, but lost his first estate. But as mutation would imply inferiority and dependence, it has again been supposed that good and evil are only manifestations of one absolute being, and that evil, being only negative, will ultimately disappear. D. was a religious faith in Persia long before Zoroaster. Plutarch and Marcion were both Dualists. The Manichæism that disturbed early Christianity was a form of D. In philosophy, the term is applied to the view that there are in the known universe at least two orders of phenomena mutually independent, the laws of the one not admitting of explanation by those of the other. In metaphysics D. means the coexistence of substances of which the essences exclude each other. The metaphysical alternative is the existence of a solitary substance, of which everything else is a mode, or modification of an attribute; the scientific alternative is one aggregate of phenomena with a twofold aspect.

Dubarr'y. See BARRY, COMTESSE DE.

Dubit'za or **Dubicza** (Slav. 'the place of oak-trees'), a frontier fortress of Bosnia, on the right bank of the Unna, 6 miles above its confluence with the Save. It was frequently besieged by the Austrians, was stormed by them in 1685 and 1687, and again, after a heroic defence by the Turks, in 1788. Pop. 4080. On the opposite side of the Unna is the strong fortress of Austrian D.

Dub'lin (Irish Gael. *Dubh-linn*, 'black pool,' of which the *Eblana* of Ptolemy is probably a corruption), capital of Ireland, and one of the finest cities in the empire, is situated on the mouth of the Liffey, at the head of Dublin Bay. It is divided into two nearly equal parts by the Liffey, which runs from W. to E., and affords, with the great thoroughfare running from N. to S., from Rutland Square by Sackville Street, Carlisle Bridge, Westmoreland Street, and Grafton Street to St. Stephen's Green, a key to the topography of the city. The S. and S.E. are the most aristocratic quarter, while the business portions are the centre, N.W. and S.W. D. is surrounded by the Circular Road, nearly 9 miles long, forming a favourite drive and promenade. Offshoots of the Wicklow Mountains occur to the southward of D., and the fine mountain scenery constitutes a picturesque background to many of the street views on the S. side. The river is spanned by several bridges (including the Loop Line Railway bridge). Carlisle Bridge (re-named O'Connell Bridge by the Corporation) connects the two great thoroughfares Sackville and Westmoreland Streets, and is the point from which the finest views of the river and the public buildings are obtained. Of these latter, the chief are (on the S. side of the river) the

Bank of Ireland, formerly the Irish Parliament House, of which the old House of Lords remains substantially unaltered, while the House of Commons has been converted into the Bank of Ireland; it is a large classical edifice, with porticoes and colonnades, standing on the N. side of College Green; Trinity College (see DUBLIN UNIVERSITY), on the E. side of College Green, consisting of several quadrangles occupying an area of about 40 acres; the chief façade is a handsome elevation in Portland stone, in the Corinthian style of architecture; the College Library and Museum (in which are the Book of Kells and King Brian Boromtis' harp); the Museum of Science and Art; the Castle stands on high ground at the W. end of Dame Street, but is neither remarkable for its architectural merits nor imposing in its proportions; the cathedral of St. Patrick, with the memorial stones of Swift (once Dean here) and of 'Stella'; the General Post Office; Customhouse; the Exchange; the four courts on the N. side of the river, an imposing classical building, consisting of a centre, flanked by a square on each side, and occupied by the Superior Courts; the Roman Catholic University; Nelson's Monument (134 feet), from which a fine view of the city and environs is obtained; the Royal Irish Academy, containing a valuable collection of national antiquities; the National Gallery of Ireland, with collections of works in sculpture and painting; the Cathedral of Christ Church, to the W. of the Castle, opened after a very fine 'restoration,' in May, 1878; the Leinster Hall, on the site of the old Theatre Royal, in which concerts, public meetings, &c., are held; the O'Connell Monument, Sackville Street, &c. The societies, hospitals, institutions, and theatres are numerous. Of the parks and squares, the chief are the Phœnix, in the extreme W. of the city, and on the N. side of the river, a magnificent enclosure of 1752 acres, in which military displays frequently take place, and containing the Wellington testimonial, an obelisk 205 feet, and erected in memory of the great Duke's achievements, at the cost of £20,000; St. Stephen's Green (20 acres); Merrion Square (13 acres); College Park and Squares; Rutland Square, &c. The Rotunda, between Sackville Street and Rutland Square, is a noble suite of public rooms for concerts and festive and other meetings. D. is the seat of Anglican and Roman Catholic archbishops. The S.W. district of the town, named the *Liberties*, was once occupied by an industrious and prosperous community of silk-weavers, the descendants of a Huguenot colony that settled here in the reign of William III. The silk industry almost dying out in the locality, the Liberties became the most squalid, unattractive, and turbulent quarter of the city, but has latterly much improved. No national manufacture except that of Irish poplin centres in D., and the industrial establishments, cotton, woollen, and linen fabrics, breweries, distilleries, &c., are engaged largely in the supply of local wants; but the export of porter, whisky, cattle, and butter has much increased during recent years. Water communication with the W. and S. of Ireland is maintained by the Royal and Grand Canals; from five railway stations lines of railway radiate to different parts of the country, but the most valuable means of access is the port of D., from which large steamers ply regularly to Holyhead, Liverpool, Glasgow, &c. The harbour, which freely admits vessels of considerable draught, has been greatly improved by the construction of two breakwaters. The city returns four and the University two members to Parliament. The parl. divs. of the city are: College Green, 67,923; D. Harbour, 71,530; St. Patrick's, 64,611; and St. Stephen's Green, 65,652. D. is first mentioned by Ptolemy. It originally occupied the ridge that now forms its centre, and was occasionally called in Irish Gaelic *Drum-Col-Coille*, 'hill of hazelwood.' Its early history is veiled in obscurity. The Danes held it from 836 till the end of the 10th c. It capitulated to the English in 1169, and was subsequently visited by Henry II., who granted its first charter. The English strengthened the fortifications, and erected a castle (1220). Various charters and privileges were received from Henry III., Edward I., and Henry IV. The city, which has been in great part destroyed by fire, was rebuilt and extended from 1316. Many great improvements have been made since the 18th c. The abortive attempt at insurrection planned by Robert Emmet took place in D. in 1803. Pop. parl. bor. 269,716; and civ. city, 245,001; of whom 201,418 are Roman Catholics; 35,125 are Protestant Episcopalians; and 3492 are Presbyterians. There are in Dublin, besides the Dublin University, the R. C. University of Ireland (1854) and the Royal University of Ireland (1880).

Dublin, a maritime county of Leinster, Ireland, having the Irish Sea on the E., and inland the counties of Meath, Kildare and Wicklow. Length, N. and S. 32 miles; breadth, E. and W. 18 miles. The coast is 50 miles in length; its chief features are Dublin Bay (6 miles wide and 7 deep) and the Hill and Head (500 feet high) of Howth. Off the shore are the Skerries, Ireland's Eye and Dalkey Island. The surface is flat, with the Wicklow Hills occupying the S. border. The climate is temperate; the prevailing winds are from the W.; and the soil, for the most part shallow and gravelly, is productive in the districts around the capital and lying along the borders of Meath. The area of D. is 226,821 acres, of which 17,866 are under corn, bean, and pease crops (oats 12,922); 13,429 under green crops (potatoes 7346); 10,570 (for hay) under clover, sainfoin, and grasses in rotation; and 34,799 (for hay) under permanent pasture or grass not broken up. No flax is grown. Fallow and uncropped arable land account for 477 acres, while woods and plantations cover 3706. Marsh and barren mountain occupy 14,983 acres, and 33 acres are turf bog. (For live stock see articles CATTLE, HORSE, PIG, and SHEEP.) The principal river is the Liffey. D., the capital, and Kingstown are the chief towns, and all the manufactures of the county (sewed muslins, cottons, &c.) are carried on in and around the former. Pop. 419,216, of whom 322,822 are Roman Catholics; 77,896 are Protestant Episcopalians; and 7724 are Presbyterians. The county contains two parl. divs., each of which returns one member: North D. 75,009; South D. 74,491.

Dublin University, or **Trinity College, Dublin**, founded by Queen Elizabeth, was incorporated by charter or letters patent on the 3rd March, 1591, under the title of 'The College of the Holy and Undivided Trinity near Dublin.'

History.—In 1591 the city of Dublin presented to it, by free grant, the 'site, ambite, and precincts of the former monastery of All Saints or All Hallowes.' The building was begun on the 13th March, 1591, and was open to receive students on the 9th January, 1593. In 1595 the Queen granted to the College lands to the value of £100 per annum, and in 1610 James also granted to it lands in Armagh, Fermanagh, and Donegal. Since the foundation of the College, charters and Acts of Parliament have been passed, extending the privileges of the University, and making such alterations as were from time to time deemed necessary. In 1613 James I. granted to its Provost, Fellows, and Scholars the right of electing two burgesses to represent the University in Parliament. By the Act of Union (1800) the number of representatives was reduced to one, but the right to elect two members was restored to D. U. in terms of the Irish Reform Bill (2 and 3 Will. IV. c. 88). In 1637, by charter of Charles I., fellowships were made tenable for life; the power of making statutes was taken from the Provost and Fellows, and reserved to the crown, and the crown assumed the privilege of appointing the Provost. The statutes of Charles I. underwent considerable modification between 1637 and the middle of the present century. They were revised in 1855 on the recommendation of a royal commission, but the constitution of D. U. was not thereby materially affected. By enactment the provostship, fellowships, and foundation scholarships could only be held by members of the Church of Ireland, but the Act 36 Vict. c. 21 removed all religious disabilities. An unsuccessful attempt to affiliate D. U. with the Catholic University, Magee College (Belfast), and the Queen's Colleges of Cork and Belfast, led to a defeat of the Gladstone Government, 11th March, 1873. In 1874 it was enacted that a *University Council* should be elected to co-operate in the regulation of the studies, lectures, and examinations, and in the appointments and regulation of the tenure of office and the duties of professors. No new professorship can be created by the Provost and Senior Fellows without the consent of the Council, which consists of the Provost (or, in his absence, the Vice-Provost) and sixteen members of the Senate.

Constitution and Government.—By the charter of foundation Queen Elizabeth appointed one Provost and three Fellows and three Scholars (in name of more) to conduct the business of the corporation, confer degrees, elect officials, &c. The original constitution is still maintained, and the Provost and Senior Fellows form a board of management, whose acts must receive the sanction of the Senate.

Church Patronage.—The right of presentation to a number of livings was vested in the Provost and Senior Fellows in 1610, but all rights of church patronage were swept away by the Irish Church Act, 32 and 33 Vict. c. 42.

The *Senate* consists of the Chancellor and such Doctors or Masters as have their names on the college books.

The *Caput* of the Senate consists of the Chancellor or his official representatives, the Provost or Vice-Provost and the Senior Masters non-regent.

Order of Rank in the College.—The *Provost*, who is appointed by the crown. The *Fellows*, absolved from the obligation to enter into priest's orders by letters patent of 1874, and who become Seniors in the order of seniority, are chosen by examination. They, with the professors, form the examining staff. The Junior Fellows, with the professors, form the lecturing staff. The teaching in the obligatory courses in Arts is chiefly performed by the Junior Fellows, most of whom are tutors. *Noblemen, sons of noblemen*, and *Baronets*, who enjoy special privileges, *Doctors* in the three Faculties, *Bachelors in Divinity*, and *Masters of Arts, Surgery, and Engineering*, and Fellows and Scholars (not purely honorary), are entitled to vote at the election of parliamentary representatives, so long as their names are on the college books. There are now 4506 electors. *Fellow Commoners* have the privilege of dining at the Fellows' table. *Scholars* on the foundation, who number seventy, have free commons, pay only half the usual fees for rooms and tuition, are exempt from college charges or *decrements*, and receive from the college an annual salary (£20 Irish). *Pensioners* form the great majority of the students. *Sizars*, or poor students, have free commons, and are exempted from fees, are admitted by annual examination, and hold their sizarships for four years. The number of Sizars is restricted to thirty.

Entrance is by examination in classics, composition, &c. Each student on entrance places himself under the tuition and guardianship of a Tutor-Fellow. There are seven entrance examinations during the year, and of these the Midsummer and Michaelmas are called *principal*, and at these the candidates are examined in either French or German, in addition to the ordinary subjects and the classical course is reduced.

Terms, Course, &c.—There were formerly four terms; there are now (since 1833) only three—viz., *Michaelmas*, or October Term, beginning 10th October, ending 20th December; *Hilary*, or January Term, beginning 10th January, ending on 25th March; and *Trinity*, or Midsummer Term, beginning 15th April, ending 30th June. Students in the first and second years of their undergraduate course are named Junior and Senior Freshmen; in the third and fourth years, Junior and Senior Sophisters; in the fifth year, Candidate Bachelors; and after graduating B.A., Junior, Middle, and Senior Bachelors. Terms are kept either by residence and attendance on lectures, or by passing the term examinations.

Professors.—There are forty-five professors in Divinity, Law, Arts, and Science, and also assistant professors and lecturers. Of the professorships founded within recent years, the more important are the Professorship of Irish (founded 1840), of Ecclesiastical History (1850), Regius Professorship of Surgery (1852), Civil Engineering (1852), Arabic, Hindustani, and Persian (1856), Latin (1870), and Comparative Anatomy (1872).

Degrees are publicly conferred by the Chancellor or Vice-Chancellor in the senate or congregation of the University. No oath or declaration need be made by any candidate to obtain a degree. To take the degree of B.A. the student must keep the terms, and pass an examination at the end of his second year, and another at the close of his curriculum. A *Master of Arts* must be B.A. of three years' standing; a *Bachelor in Divinity* must be M.A. of seven years' standing; a *Doctor in Divinity* must be B.D. of five years' standing, and in priest's orders. For the degrees of Bachelor in Laws, Medicine, Surgery, and Civil Engineering, candidates must first have graduated B.A.

Studentships.—By letters patent of 1858, fourteen studentships were founded, at a salary not exceeding £100 per annum for each, tenable for seven years, and open to all religious denominations. By the Royal Letters Patent of 20th May, 1889, the studentships were made tenable for a reduced period of not exceeding five years while their number was lowered to ten. Studentships may not be held by Fellows, nor Fellowships by Students. The Senate now consists of 509 members, and there are 70 Scholars of the House, 5 Fellow Commoners, 1012 Pensioners, and 37 Sizars and Ex-sizars.

Dubnit'za, a small town in the S.W. of Bulgaria, about 25 miles E. of Kostendil. The inhabitants are employed in the ironworks and vineyards of the vicinity.

Dub'no (Slav. 'the oak-wood'), a town of European Russia, government of Volhynia, 70 miles N.E. of Lemberg in Austrian Galicia. Here from 1774 till the annexation of Western Poland by Russia the Polish nobility held their annual session. The great fairs formerly held here are now held in Kiev. Pop. 4090.

Du'bois, Guillaume, Cardinal, one of the most successful but least respectable statesmen France has produced, was the son of an Auvergnese apothecary, and was born at Brives-la-Gaillarde, 6th September, 1656. He became tutor to the Duc de Chartres, and maintained his influence by encouraging the vices of his patron. When the latter, as the Duc d'Orleans, became Regent in 1715, D. rose to the first position in France. In 1717 he contributed largely to the negotiation of what is known as the 'triple alliance' between Britain, Holland, and France, which changed, for the time, the traditional policy of his country. In 1720 he became Archbishop of Cambrai; in 1721 a cardinal. D. died at Versailles, 10th August, 1723, a victim to his intemperate mode of living. He was, however, an able statesman, and in a less vicious and sensual age might have proved a blessing to France. The *Mémoires* which appeared under his name (Par. 1829) are not authentic.

Dubov'ka, a market-town and river-port of European Russia, in the extreme S. of the government of Saratov, on the right bank of the Volga. An active trade in corn, fish, and cattle was formerly carried on between D. and Katchalinsk on the Don, but is now somewhat decayed. Pop. 16,860.

Dubuque', a flourishing city of Iowa, on the right bank of the Mississippi, 199 miles W. of Chicago. The principal buildings are the market-house, city-hall, and custom-house. It is a great depot for the Iowa lead-mining, about half a million dollars being exported annually. D. has a trade in flour, timber, shot, &c. It is connected both E. and W. with important railroads, and has a large river traffic by the Mississippi. There is a German Presbyterian Theological School here. Over seven millions of dollars are invested in the manufactories of the town, and the value of the chief annual products are as follows:—Lumber and other mill products from logs or bolts $1\frac{1}{3}$ millions of dollars; slaughtering and meat packing $1\frac{3}{4}$ millions; and carriages and waggons $\frac{2}{3}$ of a million. The town derives its name from a Frenchman who attempted a settlement in 1788, but the first permanent settlement began in 1830. Pop. 30,311.

Ducange'. See DUFRESNE.

Du'cas, Michael, a Byzantine historian, who flourished towards the middle of the 15th c. After the capture of Constantinople in 1453 by the Turks, D. sought a retreat in Lesbos, and was employed by the tributary prince of that island in various diplomatic missions to the Turkish sultans. On the annexation of Lesbos to the Ottoman Empire in 1462, he retired to Italy, and there composed his *Historia Byzantina*, commencing with the creation of the world, and ending with the taking of Lesbos. D.'s history is a valuable authority for the reigns of Joannes Paleologus and his successors Manuel, Joannes, and Constantine. It also contains a reliable account of the siege and sack of Constantinople, and has been largely used by Gibbon, who remarks that D. 'writes with truth and freedom; but the style is a barbarous obscure jargon, full of Turkish words and strange constructions.' A folio edition of the *History* was published in Greek and Latin at Paris (1649). It was also edited by Bekker (1834) for the Bonn series of Byzantine historians, along with an early Italian translation found at Venice by Ranke. It has been translated into French by Cousin.

Duc'at (Ital. *ducato*, from Lat. *dux*, 'a leader' or 'duke'), a coin, generally of gold, but sometimes of silver, first coined in Sicily in the 12th c. The D. was a favourite coin, and was issued from all the German mints, and from most of those in N. Europe. The value of a D. in Austria, Russia, and Hamburg is about 9s. 4d.; the silver D. of Sicily was valued at 3s. 4d.; and the Spanish plate D., now known as hard dollar, is worth 4s. 2d.

Duca'to, Cape (anc. *Leucatas*), the S. extremity of Santa Maura, one of the Ionian Islands (the ancient *Leucas* or *Leucadia*). It still retains the evil reputation it had of old as a promontory dangerous to the mariner. On its W. side is the famous 'Lover's Leap' of Sappho, a rugged white cliff rising 2000 feet perpendicularly from the sea.

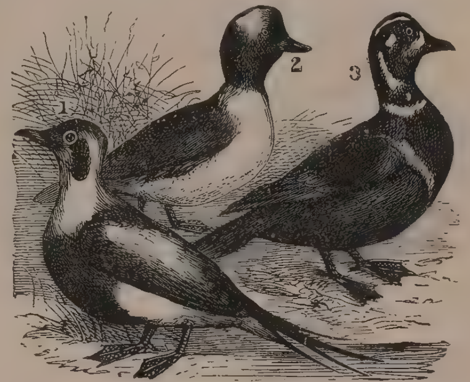
Du'ces Te'cum is the name of a writ in English law commanding a person to appear in court, and to bring with him writings or other proof which may be required in an action. If the document be his title-deed, or one that may criminate himself or his client (where he is a solicitor), he is not forced to produce it, but the excuse of the document belonging to another person, though still in the possession of the person summoned by the writ, will not be accepted by the Court. In Scotch law, a 'diligence against havers' is nearly equivalent to the English writ of D. T. See DILIGENCE, HAVERS.

Duchesne', André, an industrious French historian and genealogist, was born at Ile-Bouchard, Touraine, in 1584, became royal geographer and historiographer, and died 30th May, 1640, being crushed under a cart while on his way from Paris to his country-seat. His labours obtained for him the title of *Père de l'Histoire de France*. Among his most valued works are *Historiæ Normannorum Scriptores Antiqui* (1619), *Histoires Généalogiques des Maisons Célèbres* (1621-31), and *Historiæ Francorum Scriptores* (1636-49).—His son, **François D.**, who was born at Paris in 1616 and died in 1693, followed in his father's footsteps, finished some of his works (the elder D. left upwards of 100 volumes in MS.), and also filled the post of historiographer. He wrote chiefly on ecclesiastical history, and among his best works are a *Histoire des Papes* (1653) and a *Histoire des Cardinaux Français* (1660-66).

Duchobort'zi ('spirit-fighters'), a mystic sect in Russia, in some points resembling the Quakers, and distinguished chiefly by their disregard of the sacraments, and by having neither priests nor churches. They received their name from refusing to take the oath of military service. The first D. appeared in Moscow and other cities about the beginning of the 18th c., and during the reigns of Catharine II. and Paul I. were severely persecuted, but complete toleration was granted them by Alexander I. They then settled in the S. of Russia, on the Molochna, living in peace and order till the appearance of an impostor named Kapustin, whose doctrine of transmigration, and profession of being animated by the soul of Christ, led to dissension and bloodshed. In 1841 the sect was removed to the district of Achalkalaki in Trans-Caucasia. There they still occupy a plateau some 6000 feet above the sea, and live chiefly by cattle-rearing. They are about 3000 in number, and are divided into seven villages.

Duck, a stout linen fabric used for labourers' smockfrocks and workmen's aprons, &c.

Duck, the name applied to numerous genera and species of Natatorial or Swimming-birds, belonging to the section *Lamellirostres*, and to the family *Anatidæ* of that order. The true Ducks (sometimes included to form the sub-family *Anatinæ*, as distinguished from such forms as the *Fuligulinæ*, or pochards, mergansers), and allied birds, are distinguished by the hinder toe being small and rudimentary, by its being provided with a narrow membranous lobe, and by its being unconnected with the other toes by the web or membrane. The *laminæ*, or plate-like structures in the upper bill, are large and projecting; and the *tibiæ*, or shins (as in the pochards), are naked at their extremities. The ducks are gregarious in habits, and usually migrate in large flocks. The males are generally larger than the females, and whilst the former are gaily coloured, the latter are usually of darker tints. They frequent fresh waters, and grope for their food, consisting of insects, larvæ, worms, &c., amongst the mud. They usually moult twice a year, in June and November, and at the former period the males exhibit the less gaudy plumage of the females. The nest is rudely constructed on the ground, usually among the reeds fringing lakes and rivers. The eggs may number fourteen, and the young are markedly active from the moment after quitting the egg.



1, Old Wife Duck; 2, Buffel-headed Duck; 3, Harlequin Duck.

Good examples of this extensive sub-family (in which the *trachea* or windpipe is of curiously twisted conformation, and produces the harsh cry of these birds) are the common D. or mallard, the original stock from which our domestic varieties have been derived. (See MALLARD.) These birds in their wild state select each a single mate, the male attending the female during incubation; whilst, curiously, the ordinary domestic drakes, like the cock, usually mate with numerous partners. Included in the sub-family *Anatinæ*, with the true Ducks, are the Teals, Widgeons, Shoveller Ducks, and Pintails, all of which are described in the special articles of these names.

Duck-Bill. See ORNITHORHYNCHUS.

Duck'ing-Stool, a contrivance consisting of a rude chair fixed on the end of a beam, working on a pivot in the centre, and capable of being lowered or raised at pleasure. This beam extended over a dam or river, and its purpose was the punishment of scolding wives. The culprit was placed in the chair and ducked in the water sufficiently often to cool her temper. The use of the D.-S. began in the latter part of the 15th, and was common until the middle of the 18th c. A D.-S. preserved at Leominster was actually in use as late as 1809.

Duck'weed, a genus of minute floating plants, belonging to the natural order *Araceæ*, or, according to most modern authors, to a separate order, *Lemnaceæ* or *Pistiaceæ*. The green covering of stagnant pools is due to one of the species, the smaller D. Four in all are natives of Britain. The root, surrounded by a sheath or *ampulla*, hangs loosely in the water, while the flowers, which are rarely seen, and are without calyx or corolla, spring out from immediately beneath the little roundish green frond. They increase rapidly, and bud from the margin of the fronds.

Duclos, Charles Pineau, a witty French writer of memoirs, romances, essays, &c., was born at Dinan, 12th February, 1704. In 1746 he was made a member, and afterwards perpetual secretary, of the Academy. He died at Paris, 26th March, 1772. His chief works are his *Considérations sur les Mœurs de ce Siècle* (1750), *Mémoires pour servir à l'Histoire du Dix-huitième Siècle* and *Mémoires Secrets sur le Règne de Louis XIV., la Régence et le Règne de Louis XV.* (1791). See his *Œuvres Complètes* (Par. 1806).

Ducrot, Auguste Alexandre, a French general, was born at Nevers in 1817, served in Algeria, and in the Italian campaign of 1859, and was made general of division in 1865. On the outbreak of the German war he was placed at the head of the first division of the first army corps, under Marshal Macmahon. He fought well at Sedan, and refused to sign the capitulation treaty. Escaping from prison at Pont-à-Mousson, he took an active part in the defence of Paris, and subsequently became a member of the National Assembly (1871), and was appointed commander-in-chief of the eighth corps in 1872. He is author of *La Journée de Sedan* (1871), *De l'État-major et des Différentes Armes* (1871), and *La Vérité sur l'Algérie* (1871), &c.

Duct, an anatomical term signifying the tube which conveys the secretion away from a gland. Thus we have the D. of the liver, the D. of the parotid gland, &c.

Ductil'ity, the property possessed by various solids of being drawn out to a great length without fracture. This property is most marked in metals—gold, silver, and platinum being the most ductile. A grain of gold can be spread over an area of 225 sq. feet, and a platinum wire has been obtained $\frac{1}{30000}$th of an inch in diameter, by drawing it out in the interior of a silver wire, which was then dissolved away by nitric acid. At high temperature glass threads may be drawn of extreme thinness and flexibility. As D. is obviously a property depending upon molecular forces, it must be affected considerably by variation of temperature.

Du Deff'and, Marie de Vichy Chamrond, Marquise, born in 1697, was educated at a convent in Paris, and in 1718 married J. du D., Marquis de la Lande, a union which was shortly dissolved. She then mingled with the gayest and most polished Parisian society, and became the centre of a brilliant literary coterie. Voltaire admired her wit, and corresponded with her in prose and verse. About 1753 she nominally retired to a convent in the Rue St. Dominique, but by means of a secret stair continued to receive the most distinguished literati of the day, and among others Boufflers, Montesquieu, Hume, Walpole, Voltaire, and D'Alembert. She died at Paris, 24th September, 1780. Madame D. was an icy-hearted, dazzling woman, of a type almost peculiar to the 18th c. She left no work except her letters, which D'Alembert pronounced to be models of epistolary style.

Du'devant, Madame. See SAND, GEORGE.

Dud'ley, a town in an isolated part of Worcestershire, surrounded by Staffordshire, 8½ miles W.N.W. of Birmingham, is largely engaged in the iron and glass trades. Overlooking the town is a ruined castle. In 1876 a new church of St. Luke was opened. Pop. parl. bor. 90,252; county bor. and reg. sub-dist. (each) 45,740; and civ. par. 45,724. The parl. bor. of D. returns one member, and comprises the old parl. bor., co-extensive with the par. (in the county of Worcester), the par. of Castle Hill, the chapelries of Pensnett, Brockmoor, Quarry Bank, Brierly Hill, Reddall Hill, and Old Hill, in the parishes of Kingswinford and Rowley Regis, in the county of Stafford.

Dudley Limestone, a limestone of Silurian age, included in the subdivision of that period known as the Wenlock Series, and so named from its rich development near Dudley (q.v.), as at Wren's Nest and Castle Hill. Its chief fossils consist of Crustacea or Trilobites—among which is the famous 'Dudley locust'—corals, polyzoa, mollusca, and echinodermata.

Du'el (Ital. *duello;* Lat. *duellum,* the original form of *bellum,* 'a war between *two* parties'). Duelling, as a judicial trial, had its origin in that primitive state of society in which might is held, not only as the origin of right, but as the principle by which right is transmitted. No doubt a superstitious belief that God would directly interfere in the combat, and guilt be so ascertained, was also at the root of the practice during the Middle Ages. Trial by battle was then a congenial institution, fighting, plundering, and revenge being almost the only serious business of the feudal barons. Ludwig the Pious was the first Frankish king who allowed litigants to decide their disputes by arms. To some extent the practice was introduced into England by William the Conqueror. Females were not called on to submit to the trial, but all males were, between fifteen and sixty years old; ecclesiastics being allowed to fight by proxy. The D. has especially thriven in France. During the first eighteen years of the reign of Henri IV. 4000 gentlemen are said to have been killed in personal combat. It is to the credit of that monarch that he opposed the practice. In 1602 he alluded to it with disapprobation in an edict dated from Blois; and in 1609 he added to penalties already imposed confiscation of goods, imprisonment, and degradation of all concerned in the combat. These measures were probably, however, rather due to the influence of the Duc de Sully than to the feelings of Henri himself; nevertheless the Comte de Boutteville and the Marquis de Beuron were beheaded for fighting in opposition to the royal edict. During the minority of Louis XIV. a series of bloody combats between noblemen took place in France. On one occasion the principals, the Duc de Beaufort and De Nemours, fought with four friends on each side. Nemours and two others were killed. Such events determined the King to do all in his power to stop the practice. In 1679 he issued an edict against it, and the terms of this edict he resolutely enforced, refusing pardon to all offenders. In England the D. was never so much in fashion as in France; eventually the trial by battle was allowed so late as the reign of Elizabeth. It was allowed, indeed, though not resorted to, in the present century. (See BATTEL, TRIAL BY.) In consequence of a D. between the Duke of Hamilton and Lord Mohun in 1712, in which the former was killed by the latter, with circumstances presumptive of murder, a bill was brought into Parliament to restrain the practice, but was rejected. In 1765 a famous D. was fought between Lord Byron and Mr. Chaworth, the subject of quarrel being the quantity of game on their respective manors. Mr. Chaworth was killed. In the D. between Major Campbell and Captain Boyd in 1808, the latter was killed, and the former hanged for murder, on the dying declaration of Boyd that he had been bullied into fighting privately and without seconds. The last fatal D. in England was, we believe, between Colonel Munro and Captain Fawcett, in 1844. The former killed the latter, and fled from the country. He returned a few years afterwards, was tried and found guilty of homicide, and punished by imprisonment.

Duelling, Law Regarding.—To kill any human being with deliberate intention of doing so is, in law, murder; and the act is not palliated by the preface of a challenge, nor by the doer hazarding his own life by the deed. Nor will any provocation lessen the degree of crime. To kill a man in a *deliberate* duel under provocation of calumny, however great, constitutes *murder* against principal and second, and against the second of the deceased. Such is the doctrine of the law, but it is never strictly enforced unless the conduct of the accused has been considered dishonourable. It has been enforced where it was held proved that the man killed was coerced by his opponent into fighting privately and without seconds. To challenge any person to fight, or to cause another person to challenge a third party, or provoke him to send a challenge, is held to be a misdemeanour.

In 1844, in accordance with the spirit of the age, three new articles of war were issued, with the view of abating duelling in the army. Officers in any way concerned in a D., even negatively, by not endeavouring to prevent an intention to fight of which they are aware, are liable to be cashiered or to minor punishment. Approbation is to be given to those who, having given offence, endeavour by explanation or apology to obviate it, and to those who readily accept apology or explanation. Where adjustment is by these means found to be impossible, it is recommended to submit the matter to the arbitration of the commanding officer.

Du'et, or **Duet'to,** a piece of music for two performers. The form *duo* is also sometimes employed.

Duff, Rev. Alexander, D.D., LL.D., a distinguished missionary, was born 25th April, 1806, in the parish of Moulin, Perthshire, educated at the University of St. Andrews, and in 1829 was sent out by the Church of Scotland as its first missionary to India. At Calcutta he threw himself into the work of educating and Christianising the natives of India with great energy; and the institution which he founded in Calcutta for aiding both works became the largest of the kind in India. In 1836 D. visited Scotland, and endeavoured to diffuse a missionary spirit into its Churches; the following year, in recognition of his services, he received the degree of D.D. In 1843, with all the other Scotch missionaries in India, he joined the Free Church, and in 1851, on a second visit to Scotland, was appointed Moderator of the Free Assembly. In December, 1863, ill-health compelled D. to quit India finally. On his return to Scotland he was appointed Professor of Evangelistic Theology in the New College, Edinburgh. In 1873 he was a second time made Moderator of the Free Assembly. He died at Sidmouth, Devonshire, 12th February, 1878, and received the honour of a public funeral in Edinburgh. D.'s chief works are *New Era for the English Language and Literature in India* (Edinb. 1837); *India and Indian Missions*, *Missions the Chief End of the Christian Church*, and *Qualifications, Duties, and Trials of an Indian Missionary* (all in 1839); *The Jesuits, their Origin, &c.* (1850); and *Letters on the Indian Rebellion* (1858). D. established and for a time edited the *Calcutta Review*, and contributed materials for the celebrated India Education Despatch of 1854.

Dufour', Guillaume Henri, a distinguished Swiss general, was born at Constance, 15th September, 1787, studied at the École Polytechnique, in Paris, and became an officer of engineers under Napoleon I. in 1809. In 1831 he was appointed chief of the Swiss general staff, and directed the trigonometrical and general survey of the country, the result of which appeared in a map of Switzerland, twenty-five sheets, 1842-65. He led the Swiss army in 1847, and brought the Sonderbund War to a rapid close by the victories of Freiburg and Lucerne. For these services he received from the Diet a 'sword of honour' and a gift of 40,000 francs. His conservatism, however, alienated the democrats of Geneva, who contrived to deprive him of his public offices in 1848. Nevertheless he still acted frequently as a secret or official embassy between the Diet and the court of the Tuileries, and was returned to the Council of Geneva in 1856. An international conference as to the treatment of wounded in time of war, held at Geneva, was presided over by D. in 1864, and he also presided at the festival of the reunion of Switzerland and Geneva in 1869. D. died at Geneva, 14th July, 1875. He wrote a *Treatise on the Artillery of Ancient and Mediæval Times* (1840), a *Manual of Military Practice* (1842), and *Permanent Fortification* (1850).

Dufresne', Charles, Seigneur Du Cange, a distinguished historian and philologist, born of an ancient and noble family of Picardy, 18th December, 1610, at Amiens, at the Jesuit College of which he received his early education. He afterwards studied law at Orleans, became parliamentary advocate in Paris in 1631, but retired to Amiens to devote himself exclusively to study. D. died at Paris, 23rd October, 1688. He was familiar with the languages, the laws, the archæology, and palæography of antiquity. For erudition, at once wide and deep, he was the most distinguished man of his century. His two greatest works are the *Glossarium ad Scriptores Mediæ et Infimæ Latinitatis* and the *Glossarium ad Scriptores Mediæ et Infimæ Græcitatis*. The former, published in three vols. at Paris in 1678, was extended by the Benedictines of St. Maur to six vols. in 1733, and to 10 vols. (by the addition of a supplement by Carpentier) in 1766. The firm of Didot produced a new edition, edited by Henschel (Par. 1844), and a second supplement was produced by Diefenbach (Frankf. 1857). Of the latter work, originally published in Paris in 1688, a second edition was published by Didot. Among his historical works, the chief are the *Histoire de l'Empire de Constantinople sous les Empereurs Français* (Par. 1657), and the *Historia Byzantina* (Par. 1680). Very valuable also are the following monographs—*Johannes Einnamus* (Par. 1670), *Johannis Zonaræ Annales* (1687), and the *Chronicon Paschale* (1688). D.'s humour and his gracious and sociable disposition won for him as many friends as his vast learning gained him admirers.

Dug'dale, Sir William, one of the first of British archæologists, was born at Shustoke, Warwickshire, 12th September, 1605. Encouraged by his father in historical and antiquarian studies, he became at a comparatively early age a pursuivant-at-arms, and after the accession of Charles II., whom he had always, as a Royalist, supported, was appointed Norroy King-at-arms, and finally Garter King-at-arms, while about the same time he was knighted. He died 10th February, 1686. He bequeathed twenty-seven folio MS. volumes to the University of Oxford, which are now in the Bodleian Library, Ashmolean Museum, and Heralds' College. Among his works are *Antiquities of Warwickshire* (1656), *The Ancient Use of Bearing Arms* (1682, later ed. 1811), *Historical Memoirs of the English Laws* (1666, 3rd ed. 1680), and above all, *Monasticon Anglicanum* (1655-73), of which D. was rather the editor than the author, and of which an enlarged edition was issued by Bandinel, Caley, & Ellis in 1817-30 (later ed. 1846). The autobiography of D. is to be found in the 2nd ed. of his *History of St. Paul's Cathedral* (1658). It was reprinted by Hamper, with his journal and correspondence, in 1827.

Dugong', a genus of Sirenian (q.v.) mammalia, allied in some respects to the Cetacea or Whales, and found on the eastern coast of Africa, on the shores of the Indian Ocean, on the coasts of Ceylon, and of N. Australia. This genus is distinguished by the crescentic form of the tail-fin. The incisor teeth, which the males alone possess, are of large size, and number two in the upper jaw, none existing in the lower jaw, and the only other teeth being ten molars in each jaw. No dorsal fin is present, and the hind limbs are wholly wanting. No outer ear is developed. There is only one set of teeth, and these possess no enamel or roots. The heart in the D. is deeply cleft externally at its apex, so that the ventricles are separated for about half their extent. These animals may attain a length of 26 feet. They are herbivorous, and frequent the shallow waters of coasts and estuaries of rivers. The mammary glands are situated on the breast.

Dugong.

Duguay'-Trouin, René, a French admiral, was born at St. Malo, 10th June, 1673, and early showed a passion for the sea. As commander of a privateer in the war against England and Holland, he gained the notice of Louis XIV., who presented him with a sword, and in 1697 gave him the command of a frigate. His subsequent career was very brilliant: it was affirmed in the letters of nobility granted him that he had taken twenty ships of war and 300 merchant-ships. His fame reached its climax in 1711, when he captured Rio Janeiro, which had to be ransomed for 610,000 crusados. D.'s last achievement was, in 1731, to chastise the pirates of the Levant, who had been injuring French commerce. He died at Paris, 27th September, 1736. The *Mémoires* of D., published by Beauchamps (Par. 1740), show him to have been in private a good and modest man; his ruling passion was devotion to Louis XIV. See also *Histoire de D.* by M. De la Landelle.

Du Gues'clin. See GUESCLIN, BERTRAND DU.

Dui'da, a mountain of Venezuela, S. America, perpendicular in the S. and W., bare at the summit, and clothed where it is less steep with vast forests. It is 8500 feet high, and for hundreds of miles is a landmark to voyagers on the Orinoco.

Du'isburg, a town of Rheinland, Prussia, 15 miles N. of Düsseldorf, and connected by a canal both with the Ruhr and the Rhine. It has important woollen, cotton, hosiery, leather, soap, and glue manufactures, some sugar-refining, and a growing trade in wine and colonial produce. Coal is worked in the neighbourhood. D. is very old, being mentioned in the time of the Frankish kings. It was a member of the Hanseatic League, and came into the possession of Prussia in 1815. Pop. 59,285.

Duke (Lat. *dux*, Fr. *duc*, Span. *duque*) was originally a military title in use in the Roman Empire. It appears to have come into use along with the title of Count (q.v.), on the separation of the military from the civil command, in the reign of Constantine. All provincial generals then became dukes; 'but,' according to Gibbon, 'no more than ten among them were dignified with the rank of counts or companions, a title of honour, or rather of favour, which had been recently invented in the court of Constantine. A gold belt was the ensign which distinguished the office of the counts and dukes, and besides their pay they received a liberal allowance, sufficient to maintain 190 servants and 158 horses. They were strictly prohibited from interfering in any matter which related to the administration of justice or the revenue, and the command which they exercised over the troops of the department was independent of the authority of the magistrate.' On the decay of the Roman Empire, the more purely military rank of D. began to take precedence of that of count. In France, provinces were acquired by the various dukes, who so increased in number and in power as almost totally to eclipse the authority of the crown, the right to dispose of which they arrogated. They assumed the state of princes, coining their own money, and making war in their own name. Towards the close of the 15th c., Charles, surnamed the Bold, D. of Burgundy, was perhaps the richest and most powerful prince of his time. When Count of Charolais, in alliance with the D. of Bretagne, he made war against Louis XI., King of France. They defeated the king at Montlhéry, and threatened to take Paris. The result was a treaty by which the counties of Boulogne, Guines, and Ponthieu, with several towns on the Somme, were ceded to Charolais. With his ultimate defeat, when D. of Burgundy, on 5th January, 1477, may be said to have ended the power of the French dukes as opposed to that of the crown. The Archduke Maximilian marrying the heiress of Charles the Bold, their daughter was by treaty, in 1482, betrothed to the eldest son of Louis XI., afterwards Charles VIII., and the counties of Burgundy and Artois were handed over to France. The Duchy of Bretagne fell to François I. of France by marriage in 1532. The duchies subsequently given to members of the royal family of France, and to other distinguished subjects, were entirely subject to the crown. The holders were of the first rank of the nobility of France; but their power and position were totally different from those of the former dukes.

In England the title of D. was from the first merely a title of honour. The first English D. was the Black Prince, created D. of Cornwall by his father, Edward III., in 1335. In 1350 the same king created his cousin Henry D. of Lancaster, on whose death the king conferred the duchy on John of Gaunt and his heirs for ever, apart from the crown. The oldest extant dukedom in England is that of Norfolk. Sir William Howard was a Chief Justice of the Common Pleas in the reigns of Edward I. and Edward II. Sir John Howard, a grandson of the judge, was Sheriff of Norfolk, and held other important posts. His grandson, Sir Robert Howard, married the co-heiress of the noble house of Mowbray, and was created Lord Howard and D. of Norfolk in 1483.

The English D. ranks after the peers of the royal blood and the two Archbishops of Canterbury and York. There are now twenty-one dukes, other than members of the royal family, in England, namely, Norfolk, whose title was created as early as 1483, Somerset (1547), Richmond (Lennox and Gordon) (1675), Grafton (1675), Beaufort (1682), St. Alban's (1684), Leeds (1694), Bedford (1694), Devonshire (1694), Marlborough (1702), Rutland (1703), Brandon and *Hamilton* (1711), Portland (1716), Manchester (1719), Newcastle (1756), Northumberland (1766), Wellington (1814), Sutherland (1833), Westminster (1874), Fife (1889), and Argyll (1892). There are also four Scottish dukes and two Irish dukes, but these only sit in Parliament as marquesses, earls, viscounts, or barons. With regard to the dukedoms of Brandon and Argyll, it should be noted that the Dukes of Brandon were Dukes of Hamilton in the peerage of Scotland from 1643, and the Dukes of Argyll were Dukes of Argyll in the peerage of Scotland from 1701; neither of these is reckoned among the Scotch dukes. The Dukes of Richmond were also Dukes of Lennox in the peerage of Scotland (1675); the present D. was created D. of Gordon (United Kingdom) in 1876. Both the D. of Richmond and the D. of Hamilton are dukes in the peerage of France; and the D. of Wellington is a D. in the peerage of Spain.

In Scotland, the title of D. of Albany (q.v.)—an ancient name for Gaelic Scotland—was conferred by an Act of the Scotch Council on the brother of King Robert III., then Regent, in June, 1398. The title was forfeited by the son of the first D. Conferred again on Alexander, son of James II. of Scotland, it became extinct in 1536. It was conferred on Lord Darnley, on Charles I., on James II., on Frederick, second son of George III., and on Prince Leopold, fourth son of Queen Victoria, who died at Cannes, in France, on 28th March, 1884. His son, Leopold, born on 19th July, 1884, succeeded at his birth. See ARCHDUKE.

Duke of York's School (properly **The Royal Military Asylum**), an institution for the support and education of the sons of soldiers and non-commissioned officers at Chelsea, was founded by the Duke of York in 1801. It is managed by a board of twenty commissioners, who are appointed by the Queen, and is supported by a parliamentary grant under the Army Estimates. In 1894-95 this amounted to £10,200, or £15 more than in the preceding year. At first both male and female children were on the foundation, but now only males, who must have lost one or both parents, are admitted. Candidates must be 10-12 years of age and *likely to be fit for the army*, although the boys are under no obligation to enter the army after completing the course of education, but nearly all of them do become soldiers, and many of them enter the regimental bands. Those who are not fit for the army on leaving the school are apprenticed to trades. The boys leave the school at 14 years of age, unless they happen to be in the band, when they are allowed to remain one year longer. In 1893 the number of boys in the school was 550, and of these 151 passed out during the year. The Normal School for the training of army schoolmasters forms a branch of this institution.

Du'kinfield, a town in Cheshire, England, 7 miles N.N.E. of Stockport, has extensive collieries, cotton-factories, and fire-clay works. Pop. civ. par. 29,239.

Dulcign'o (Turk. *Olgun*, Slav. *Mkronich*, near the ancient *Olcinium*), a seaport of the principality of Montenegro, not far from the mouth of the Bojana, on the Adriatic, 18 miles S.W. of Scutari. D. was formerly included in the vilayet of Scutari, Turkey; but, together with Antivari, it was handed over to Montenegro by the Turks in 1878-1881. It is the seat of a Catholic bishop, and has a fort, and an active trade in oil and timber. Pop. 4890.

Dul'cimer, an ancient stringed instrument (probably the psaltery of the Old Testament), in which the sounds were produced by striking wires with hammers held in the hands. It was named from the sweetness (Lat. *dulcis*, 'sweet') of its sounds.

Dul'cite, or **Dul'cose,** is a sweet crystalline substance contained in several plants, in *Melanopyrum nemorum*, *Scrophularia nodosa*, *Rhinanthus crista galli*, &c.

D. is isomeric with Mannite (q.v.). They are nearly related to the sugar and starches.

Dulse, or **Dill'isk** (the first name being the form now used in Scotland, the second the pure Gaelic, employed in Ireland), denotes one of the red seaweeds very common on the British coasts and other parts of the northern hemisphere, and in the Grecian Archipelago. It is eaten either raw, roasted between hot tongs, or with vinegar, by the poorer classes. At one time it was regularly sold about the streets, and in Edinburgh, a few years ago, no cry was more familiar than, 'Wha'll buy ma dulse and tang?' Sheep are fond of it, and in Kamtchatka a kind of fermented liquor is made from it. In Iceland, where it forms an important article of food, it is sometimes boiled with milk. The name D. is also given in England to *Iridæa edulis*, while pepper-D. is *Laurentia pinnatifida*. Both are seaweeds, and are edible.

Dul'wich, a picturesque village of Surrey, 4½ miles S.S.E. of St. Paul's, London, now practically within the bounds of the metropolis.

The College of God's Gift, or D. College, founded and endowed by Edward Alleyn in 1619, consisted originally of three sides of a quadrangle, but was considerably enlarged in 1869. Originally it maintained a headmaster, under-masters, chaplain, six poor brethren, six poor sisters, and twelve poor scholars. It is now an important educational institution (700 boys) with upper and lower schools, and maintains 32 almspeople who receive £1 per week and lodging. In the picture gallery is a fine collection of old works. Pop. parl. div. of borough (Camberwell) 83,320; reg. sub-dist. 6809.

Duman'gas, a prosperous town in the island of Panay, Philippines, province of Iloilo, has a pop. of 16,860. It exports exquisite piña fabrics, and has some fisheries of trepang (sea-slug) and tortoises.

Dumas', Alexandre Davy, one of the most popular French novelists, was born at Villers-Cotterets, in Picardy, 24th July, 1803. His father, who bore the same name, was the son of the Marquis Davy de la Pailleterie by a negress, and D.'s negro descent showed itself strongly in his personal appearance, character, and even the style of his fictions. D. seems to have had a poor education, owing to the death of his father while he was a child, and little that is definite is known of him until in 1826 he is found in the household of the Duc d'Orleans. His first work was a volume of *Nouvelles*. The production, three years later, of an historic drama, *Henri III. et sa Cour*, pleasing the Parisian mania for Romanticism, made D.'s reputation. From that date onward he poured forth a prodigious number of dramas and fictions, all of which, though disfigured by a bombastic style and by egotism and licentiousness, were successful; nor was his popularity appreciably diminished when several writers, including Alphonse Karr and Eugène de Mirecourt, proved in 1844 and 1845 that a number of the works that bore his name were written by hacks in his pay. The best known of his countless works are perhaps his *Les Trois Mousquetaires* (1844), and *Le Comte de Monte-Cristo* (1841-45). The latter has gone through innumerable editions, and has probably been read by more people than any other work of the same class. D. lived a brilliant, restless, extravagant life. He began to write his own *Mémoires* in 1852, and died at Puys, near Dieppe, 5th December, 1870. See his Life by Percy Fitzgerald (Lond. 1873).—**Alexandre D.,** popularly known as *D. fils*, son of the preceding, was born at Paris, 28th July, 1824, was educated at the Collége Bourbon, and at the age of seventeen published a volume of poems, *Les Péches de Jeunesse*, which, however, had but a scant success, and D. became, like his father, a writer of dramas and novels, all of them dealing with the worst side of French life. His first essay in this direction, *La Dame aux Camélias* (1848), was interdicted when first produced, but the interdict was withdrawn in 1852. Among D.'s subsequent works are the dramas of *Visite de Noces* and *La Princesse Georges* (1871), and a pamphlet, *L'Homme Femme*, produced in 1872, and dramatised under the title *La Femme de Claude* in 1873, in which he attacks the French marriage system, *L'Etrangère* (1875), and *Entr' Actes* (1878). D. was installed as a member of the French Academy, 11th February, 1875. As a writer of French fiction he has a reputation which appears grotesquely disproportionate to his genius and literary power.

Dumb. See DEAF AND DUMB.

Dumbar'ton (Gael. *Dun-Breatun*, 'the hill-fort of the Britons'), a seaport, and the capital of Dumbartonshire, on the left bank of the Leven, close to its junction with the Clyde. It is 15¾ miles W.N.W. of Glasgow, and 58 miles W. of Edinburgh. D. has extensive shipbuilding yards, marine-engine works, iron-forges, brass-foundries, and roperies. In 1874 a pier on the Clyde was constructed, 768 feet long. D. unites with Kilmarnock, Renfrew, Rutherglen, and Port-Glasgow, in forming the Kilmarnock District, which returns one member to Parliament. At the confluence of the Leven and Clyde stands the famous rock of D., with its castle, one of the four stipulated to be kept in repair by the Articles of Union. The rock, which is of basalt, is 560 feet high, a mile in circuit at the base, and at high water is almost completely insulated. D. is, according to some, the Latin *Theodosia*, and was for a time capital of the British kingdom of Strathclyde. Pop. entire town 17,626, and parl. bor. 16,908.

Dumbartonshire, or the **Lennox,** a county in the W. of Scotland, consisting of two detached portions, the smaller of which is enclosed by Stirling and Lanark, and the larger bounded on the N. by Perth, on the E. by Loch Lomond and Stirling, and the S. by the Clyde, and on the W. by Loch Long and Argyll. Length, 35 miles; average breadth, 7½ miles. The northern part is mountainous, Ben Voirlich being 3092 feet high; the southern part is in general low, and is fertile and well cultivated. D. has nine fresh-water lakes, the largest of which is Ben Lomond. The chief river is the Leven, which falls into the Clyde. The formation consists of mica-slate in the N., with dykes of whinstone and greenstone; Lower Silurian towards the S., and Old Red Sandstone along the Clyde estuary. The principal grain crop is oats, but barley and wheat are grown, and turnips and potatoes yield large crops. The hills and high grounds furnish pasture for black cattle and blackfaced sheep. The total area of D., not including tidal water, is 170,762 acres, and of these 8774 are under corn crops (oats 7602); 3997 under green crops (potatoes 2149); 14,760 under clover, sainfoin, and grasses in rotation; and 23,024 under permanent pasture and grass not broken up—of these two latter numbers of acres 8683 are for hay. Bare fallow and uncropped arable land cover 95 acres, and small fruit is cultivated over 57. Mountain and heath occupy 73,649 acres, and woods and plantations 8553. Nursery grounds cover 21 acres. (For live stock see articles CATTLE, HORSE, PIG, and SHEEP.) The chief industries are shipbuilding and machine-making at Dumbarton, bleaching and calico-printing in the Vale of the Leven; and there are besides iron-foundries, breweries, and tanneries. Coal, freestone, limestone, ironstone, and slates are produced. D. returns one member to Parliament. Pop. civ. county 94,495; and parl. county 77,446.

Dum-Dum (Dam Damá), a town of British India, province of Bengal, in one of the twenty-four Pergannas, 8 miles N.E. of Calcutta. It has large cantonments. D.-D. was the headquarters of the Bengal Artillery from 1783 till 1853, when that branch of the service, with the exception of one brigade, was removed to Meerut. At D.-D. the Sepoys first openly resisted the use of greased cartridges (1857). The Valley of D.-D. leads to the Pir Panjal, one of the passes into Cashmere. Here the church contains monuments erected in memory of the officers and men of the Horse Artillery who were slain in the retreat from Cabul in 1841. Pop. of North D.-D. (with cantonment) 10,396; of South D.-D. (with cantonment) 11,037.

Dumfries' (Gael. *Dun-Phris*, 'the fort of the bush'), the county town of Dumfriesshire, and the chief place in the S. of Scotland, stands on a slight rising on the left bank of the Nith, 33 miles N.W. of Carlisle, and 70 S. of Glasgow by railway. It is a picturesque town, partly encircled by hills, is built mostly of dark freestone, and is clean, well lighted, and paved. Among the principal buildings are the Town Council Chamber, the Trades Hall, the County Courthouse, the County Buildings, the National Bank, and the D. and Maxwelltown Mechanics' Institute. One of the bridges, which span the Nith, was built in the 13th c. The chief manufactures are leather, hosiery, hats, and glue. The trade consists mainly in wool, freestone, wheat, oats, potatoes. By the high tides of the Solway vessels of over sixty tons can reach the quays. There are markets during the week, and four large fairs during the year. Burns was exciseman here. D. probably dates from the 8th c., and its possession was long contested between the Scottish and English kings. In the Minorite Convent at D. Bruce slew the Red Comyn in 1305. The town was plundered and burnt by the Highlanders in the Rebellion of 1745. Here Burns died in 1796. D., along with Annan, Sanquhar, Lochmaben, and Kircudbright, forms the D. district, which sends one member to Parliament. Pop. entire town and parl. bor. (each) 17,821. See Macdowall's *History of Dumfriesshire.*

Dumfries'shire, a county in the S. of Scotland, bounded S. by the Solway Firth and Cumberland, N. by Lanarkshire, Peebleshire, Selkirkshire, and Roxburghshire, E. by Roxburghshire, and W. by Kirkcudbrightshire and Ayrshire. The surface is diversified; there are high ranges on the N., W., and E., the chief peaks being Hartfell (2651), Lowther Hill (2377), and Black Larg (2231). The largest rivers are the Nith, Annan, and Esk, which divide the county into the three districts, Nithsdale, Annandale, and Eskdale. These rivers all rise in the N., and flow S. into the Solway. The geological formation is mainly Lower Silurian, with New Red Sandstone in the S. and carboniferous limestone in the S.E. The soil is fertile in the lowlands, and the high districts afford good pasture. The area of D., not including tidal water, is 688,057 acres, and of these 48,197 are under corn crops (oats 47,553); 25,040 under green crops (potatoes 3723); 83,055 under clover, sainfoin, and grasses in rotation; and 103,271 under permanent pasture and grass not broken up—of these two latter amounts 36,518 acres are for hay. Small fruit is cultivated on 84 acres, and 138 are occupied by bare fallow or uncropped arable land. Mountain and heath account for 368,993 acres and 174 are laid out as nursery grounds. Woods and plantations occupy 31,808 acres. (For live stock see articles CATTLE, HORSE, PIG, and SHEEP.) The principal minerals are coal and lead, and limestone and red sandstone are quarried. Sheep and cattle rearing is largely carried on, but the manufactures are not extensive, the chief being cotton-spinning, hosiery-making, tanning, and brewing. D. is traversed by the Caledonian and Glasgow and South-Western railways. The most important towns are Dumfries with its suburb Maxwelltown, Annan, Lockerbie, and Moffat. D. returns one member to parliament. Pop. civ. county 74,221; and parl. county 55,290.

Dummow', Dumoh, or **Damoh,** a town of British India, and capital of a district of the same name, in the Jabalpur division of the Central Provinces, 130 miles S.W. of Rewah. It is not well supplied with water, in spite of a fine tank, as the soil consists mostly of porous sandstone. D. has an extensive bazaar. The place was at one time rich in Hindu temples, but these the Mohammedans destroyed and made the stones into a fort, which since then has been demolished. Pop. 11,753.—The *district* has an area of 2831 sq. miles, and a pop. of 325,613, of whom 293,818 are Hindus, 10,231 are Mohammedans, 18 are Christians, 7167 are Jains, and 14,375 are Animistic. On the S. rises a range of lofty sandstone hills; on the E. and W. there are also hills. Much of the country consists of fertile plains where the chief crops grown are wheat, rice, and oil-seeds; some cotton is also grown. At first D. was held by the Rajputs, but towards the end of the 16th c. the Mohammedans subjugated the whole country except that portion occupied by the Gonds and other wild tribes who never submitted. In the 18th c. the Mahrattas took it and held it till 1818, when the British acquired it by treaty.

Du'mont, Pierre Étienne Louis, celebrated as the literary assistant of Mirabeau and the elucidator of Bentham, was born at Geneva, 18th July, 1759. He was trained for the ministry of the French Protestant Church, and officiated both in Geneva and in St. Petersburg. The tenor of his life was changed by his coming to England, first as reader to Colonel Barré, and next as librarian and tutor in the house of Lord Shelburne, afterwards Marquess of Lansdowne. This brought him the acquaintance of the leading English Whigs, Fox, Sheridan, and particularly of Sir Samuel Romilly. The outbreak of the French Revolution took D. to Paris, where he became the friend of Mirabeau, whom he aided in the preparation of his political writings and speeches. In 1791, on his return to England, he came in contact with Bentham, and adopted enthusiastically that philosopher's views of legislation. Bentham gave D. his manuscripts, and the latter, by translating his ideas into lucid French, made Bentham known to the civilised world. The chief are *Traités de Législation Civile et Pénale* (Gen. 1802); *Théorie des Peines et des Récompenses* (Gen. 1810); *Tactique des Assemblées Législatives* (Gen. 1815); *Preuves Judiciaires* (Gen. 1823). D. returned to Geneva in 1814, where he became a member of the Representative Council, and tried to reduce Benthamism to practice. He died at Milan, 29th September, 1829. In 1832 J. L. Duval published from D.'s MSS. *Souvenirs sur Mirabeau et sur les deux Premières Assemblées Législatives*, a book of considerable historical value. See Candolle's *Notice sur la Vie et les Écrits de M. D.* (1829).

Dumou'riez, Charles François, a French general, was born at Cambrai, 25th January, 1739, entered the army at an early age, and first saw service in the Seven Years' War. After a few years of restless wandering and varied employment, D. rose into favour at the time of the French Revolution, and attaching himself to the Jacobin Club, became first Minister of Foreign Affairs, and next general of the army against the Allies. His skilful military movements in 1792, when he won the victory of Jemapes, drove the invaders from the soil of France, saved the Republic, and made him the idol of Paris. He next overran and almost conquered the Netherlands, and would have been the first man in France had he not entered into negotiations with the enemy for the re-establishment of constitutional monarchy. The Convention denounced him as a traitor; his army refused to listen to his scheme; and he had to seek shelter in the Austrian lines. After this D.'s life was one of exile and pamphleteering. He died at Turville Park, Henley-upon-Thames, 14th March, 1823. Wellington is said to have utilised some of his hints regarding an invasion of France. The *Mémoires du Général D.*, by himself, appeared at Hamburg in 1796, and *La Vie et les Mémoires du Général D.*, at Paris (1822-24). An admirable portrait of D. is given in Carlyle's *History of the French Revolution.*

Dun, a word found both in the Celtic and Teutonic family of languages, but probably belonging to the former, and signifying in both cases a hill or fort. It is often modified into *dum* and *don*, and appears in Dunedin (Edinburgh), Dunfermline, Dundee, Dunblane, Dumbarton, Dumfries, Dunstable, Dundalk, Donegal; probably also in London, Huntingdon. The same root appears in the Ger. *dünen*, Fr. *dunes*, Eng. *downs.*

Dü'na (Lithuanian, *Dangava ;* Russ. 'W. Dvina'), one of the most important rivers in the W. of Russia, rises in the government of Tver, near the head-waters of the Volga, flows through a thickly-wooded country, first in a S.W. and then in a N.W. direction, and enters the Gulf of Riga, on the Baltic, after a course of some 650 miles. It receives the Lutschössa, Ullar, and Disna, and passes the towns Velij, Vitebsk, Poloczk, Disna, Dünaburg, and Riga, while its right bank is traversed by the Moscow and Riga Railway. The D. is navigable to ocean vessels only as far as Riga, where it is 2400 feet broad, but river craft ascend to Velij, a distance of 400 miles. Much timber is floated down the river. The Ulla is connected with the Dnieper by the Beresina Canal, thus linking together the Baltic and the Black Sea.

Dü'naburg (Russ. *Dvinsk*), a fortified town in the government of Vitebsk, Russia, on the Düna, and 100 miles S.E. of Riga by railway. It has an arsenal, a strong fortress, and a *tête-de-pont*, considered a masterpiece. Its trade is growing. D. was included in Livonia in 1277, and was destroyed by the Czar Ivan IV. in 1576. It finally became Russian in 1656. D. resisted an attack by Oudinot in 1812, but was taken by a combined French and Prussian force, under Macdonald, in the same year. Pop. 72,518.

Dunbar', a seaport in Haddingtonshire, 29 miles E. by N. of Edinburgh, with which it is connected by railway. The old harbour being difficult of access from sunken rocks at its entrance, a new harbour, the Victoria, was constructed in 1844, which is well fitted for fishermen. There are valuable herring-fisheries here. It is an ancient town, and grew up under the shelter of the castle of D., the chief seat of the Earls of D. and March, the ruins of which crown a rock near the harbour. The castle of D. played an important part in the War of Independence. It was taken by Edward I., and sheltered Edward II. after Bannockburn. In 1338 Black Agnes, Countess of D., defended it successfully for nineteen weeks against the Earl of Salisbury, in the absence of her husband. The battle of D., in which Cromwell defeated the Scots under Leslie, was fought 3rd September, 1650. Of this a graphic account is given in Carlyle's *Oliver Cromwell's Letters and Speeches*. Pop. entire town 3645.

Dunbar, William, next to Burns the greatest Scottish poet, was born in Lothian, about 1460. He took the degree of M.A. at St. Andrews University in 1479, and having wandered as a Franciscan friar through England and Picardy, seems, after 1488, to have served as a clerk to foreign embassies, and in 1500 received an annual pension of £10. Henceforth he lived chiefly at court. In 1501 he visited England, and in 1503 celebrated the marriage of James IV. with Margaret Tudor in his poem of *The Thrissill and the Rois*. A royal favourite, he obtained frequent gratuities in addition to his pension—which was raised to £80 a year—but sought a benefice, in numerous metrical petitions, in vain. After Flodden his name vanishes from the royal accounts, and he probably died about 1520. D. is a powerful and versatile writer. His works comprise picturesque elaborate allegories—such as the *Goldyn Targe* and *The Thrissill and the Rois*—and ludicrous and satirical pieces, full of a madcap, riotous humour, and a wealth of language reminding us of Rabelais. His imagination luxuriates in brilliant descriptions, or plays whimsical freaks with the most venerable and terrible themes. He paints with equal felicity the fresh beauties of a May morning and the grotesque horrors of a carnival of fiends. There is grim satiric earnestness in his *Dance of the Sevin Deidly Synnis*, deep pathos in his *Lament for the Makaris*, and an astonishing command of coarse vituperation in his *Flyting* with his friend and brother-poet, Walter Kennedy. He wrote also *The Fenyeit Freir of Tungland*, *The Twa Maryit Wemen and the Wedo*, *The Justis betuix the Tailyeouris and the Sowtaris*, *The Visitation of St. Francis*, *Dunbar's Dream*, &c. See Laing's ed. of D. (Edinb. 1834).

Dunblane', a town, but formerly an episcopal city, in Perthshire, Scotland, on the Allan, 6 miles N.W. of Stirling. Its old cathedral, said to have been founded by David I. in 1141, was rebuilt about 1240, and part of it is now used as the parish church. Leighton, Bishop of D. from 1661 till 1672, bequeathed his library to the clergy of the diocese. The building in which it is deposited bears the inscription 'Bibliotheca Leightoniana.' D. was anciently the seat of a Culdee convent. Pop. civ. town 2186.

Dun'can, Adam, Viscount D. of Camperdown, a famous British admiral, was born in Dundee, 1st July, 1731. He entered the navy as midshipman in 1746, was promoted to a post-captaincy in 1761, distinguished himself greatly under Keppel in his attack upon Havana, and under Rodney off Cape St. Vincent, became Rear-admiral of the Blue in 1789, and Vice-admiral of the Blue in 1793. In 1795 he was appointed to the command of the British fleet in the North Sea, and on 17th October, 1797, won a brilliant victory over the Dutch fleet off Camperdown. D. received a pension of £2000 a year, the thanks of Parliament, and a sword of honour from the City of London, and was created Viscount D. of Camperdown. For a time he served against the Batavian Republic, and in 1799 obtained the rank of Admiral of the White. He died near Edinburgh, 4th August, 1804.

Duncan, Thomas, a Scottish artist, was born at Kinclaven, Perthshire, 24th May, 1807. He was a distinguished pupil of Sir William Allan at the Trustee's Academy, and succeeded him as its head. His industry and ability enabled him at an early age to attain the distinctions of R.S.A. and A.R.A., and the position of Professor of Colouring and Drawing in the Academy of Edinburgh, and he seemed to be entering on an exceptionally brilliant career when he was cut off by sudden illness at Edinburgh, 25th May, 1845. D. had few rivals during his short but active life as a portrait and historical painter and a depicter of Scotch character, more especially its humorous side. Among his larger works may be noticed 'Prince Charles's Entry into Edinburgh after the Battle of Prestonpans,' exhibited in London; 'Mary Queen of Scots Signing her Abdication'; 'Martyrdom of John Brown of Priesthill, 1685'; and 'Wishart Dispensing the Sacrament on the Day of his Martyrdom, 1st March, 1548.'

Dun'cansby Head (anc. *Berubium*), the N.E. headland of Scotland, in Caithness, 1½ mile E. of John o' Groat's House. It is a wild promontory, of Old Red Sandstone, about 100 feet high, worn by the sea into deep gullies (*ghoes*), and standing out into the Pentland Firth in caverned ledges. Duncansby Stacks are two insulated columns, the haunts of myriads of aquatic birds. Near D. H. is a small village, the ferry to the Orkneys.

Dundalk' (Irish Gael. *Dun-Dealgan*, 'the fort of Delga,' a Firbolg chief in the mythic history of Ireland), a seaport of Ireland, capital of the county of Louth, at the head of D. Bay, and at the mouth of the Castleton River, 50 miles N. of Dublin by railway. The port and harbour have been much improved in recent years, and steam-vessels ply regularly to Liverpool, exporting thence cattle, grain, butter, and eggs. It returned one member to Parliament until 1885. D. was the residence of Edward Bruce during his brief tenure of Northern Ireland (1315-18). Pop. of township 12,449.—**D. Bay,** 8 miles broad, extends 7 miles inland, and is from 1 to 6 fathoms deep.

Dundas', a town in Wentworth District, province of Ontario, Dominion of Canada, on Burlington Bay, at the W. end of Lake Ontario, 40 miles S.W. of Toronto. It is situated at the head of the Desjardins Canal, on the Great Western Railway, has extensive mills and factories wrought by water-power, and a trade in agricultural produce. Pop. 3546.—A district of the province of Ontario, on the western side of the island formed by the rivers St. Lawrence and Ottawa, on the canal which connects them. Pop. 20,132. Chief village Morrisburg, pop. 1859.—A British island of the same name lies in the Pacific, off the coast of British Columbia, to the S.E. of Queen Charlotte Island, and has an area of 280 sq. miles.—**D. Strait,** in N. Australia, separates Melville Island and Coburg Peninsula, is the N. inlet of Van Diemen Gulf, and has a breadth of 20 miles.

Dundas of Arniston, the name of a Scotch family celebrated for the number of its members distinguished in the political and legal history of the country. Among the most eminent of the earlier of these are **Sir James D.,** governor of Berwick in the reign of James VI., from whom he received the honour of knighthood; **Sir James D.,** son of the preceding, who became a judge of the Court of Session in 1662, under the title—derived from the family estate—of Lord Arniston, but who lost his office because he refused to abjure the 'Solemn League and Covenant'; and **Robert D.,** grandson of the preceding (and son of Sir Robert D., who, like his father, obtained a seat on the bench), who was born 9th

December, 1685, rose to fill the posts of Solicitor-General and Lord Advocate, was returned for the county of Midlothian in the British Parliament in 1722, and in 1737 was raised to the bench under what may be considered the family title of Lord Arniston. Finally in 1748 he became Lord President. He died in 1753. His son, **Robert D.,** born 18th July, 1713, also attained to the positions of Lord Advocate and Lord President (1760). His death took place at Edinburgh, 13th December, 1787. The most notable member of the family, however, was **Henry D., Viscount Melville and Baron Dunira,** brother of the preceding. He was born in 1741, and educated for the Scotch bar, to which he was called in 1763. D. by his talents and industry won a high position, while, as a member of the General Assembly, he gave indications of that eloquence which subsequently gained him a position in Parliament. In 1774 D. was returned as member for the county of Edinburgh; in 1775 he was made Lord Advocate. His political career was more remarkable for brilliancy than for consistency. He managed to serve under Lord North, Lord Rockingham, and Lord Shelburne, and became finally the right-hand man of the second Pitt, under whom he held various offices, including those of President of the Board of Control, Treasurer of the Navy, and chief Home (or in reality War) Secretary. D. was a clever and industrious politician, if not a great statesman; and he will always be associated with the measures under the Pitt administration for enrolling volunteers to oppose a French descent, and for restoring the estates in Scotland forfeited on account of the rebellion of 1745. Under the Addington administration he was raised (in 1802) to the peerage as Viscount Melville and Baron Dunira. Four years later he was tried for 'malversation,' in his capacity of treasurer of the navy, but was finally acquitted. After this, however, he lived chiefly in retirement in Edinburgh, where he died, 27th May, 1811.

Dundee' (Gael. *Dun-Diadhaidh,* 'sacred dune or hill,' Lat. *Taodunum*), a royal burgh and flourishing seaport in the S. of Forfarshire, situated on the N. side of the Firth of Tay, 50 miles N.N.E. of Edinburgh, and 20 E.N.E. of Perth by railway. It is the third largest town in Scotland, and the chief seat of its linen manufactures, being indeed 'the maker of the sacking, the bagging, and the wrapping of the world.' It lies pleasantly between D. Law (571 feet high) and Balgay Hill, and stretches some three miles along the Tay, which has here a breadth of two miles. Its chief public buildings are the Albert Institute and Free Library, erected at a cost of £30,000; a Town-hall, in Roman Ionic, with a spire 140 feet high; the Royal Exchange, in the Flemish pointed style of the 15th c.; the Kinnaird Hall, a massive Italian edifice, capable of accommodating 2000 persons; the Infirmary, in the Tudor style, forming three sides of a square; the High School, an elegant Grecian building; handsome court buildings; and the Morgan Hospital, for the education and upbringing of 100 boys, erected at a cost of £80,000 (1867-68). To the E. of the town is the Baxter Park, a splendid expanse of 37 acres, gifted to D. by the late Sir David Baxter; to the W. on Balgay Hill there is another public park, some 60 acres in extent, and ornamented with fine woods. In 1876 swimming baths were opened which cost £5500. The prosperity of D. is in great part owing to its magnificent docks, which have been constructed since 1851, at a cost of over £700,000. There are five wet docks, a graving dock, a large tidal harbour, besides extensive sea-walls and quays, a pier, and great shipbuilding yards. The chief industries are the manufacture of flax-yarns and linen fabrics (Osnaburgs, ducks, canvas, sheetings, &c.), silks, cottons, jute, cordage, iron, machinery, kid-gloves, confections (the famous D. marmalade), &c. D. has also establishments for shoemaking by machinery, breweries, and considerable shipbuilding. The linen industry employs over fifty steam spinning-mills, several power-loom factories, besides numerous hand-labour works, and produces goods to the annual value of about £2,000,000. The value of the flax, hemp, and jute manufactures exceeds £5,500,000 yearly. D. imports directly the great bulk of the jute brought from India, and has of late years become the centre of the seal and whale-fishing trade. The success of the latter fluctuates, but over a series of years the fishing is found a remunerative industry. The other imports are timber, coal, iron, lime, tar, &c. D. has regular steam communication with London, Newcastle, Liverpool, Stockton, Glasgow, &c., and is easily accessible by railway. One of the largest iron bridges in the world was completed to cross the Tay by the North British Railway, 1877. It was only in use for a short time when the central portion of it was blown down, a passenger train being at the same time thrown into the river, by the force of a violent storm. A new bridge with a double line of rails has since been constructed in its place. The town returns two members to Parliament. D. was formerly walled, and was twice in great part burned by Edward I. (1296 and 1303). It shared a like fate at the hands of the Duke of Lancaster in 1385. In the 16th c. D. was the first Scottish town to renounce Popery, chiefly through the influence of James Haliburton. It was pillaged by Montrose in 1645, and by General Monk in 1651. Pop. civ. town 153,587; and parl. bor. 153,051.

Dundon'ald, Thomas Cochrane, Earl of, and one of the greatest of British sailors, was born at Culross, Perthshire, 14th December, 1775. At the age of seventeen he entered the navy, taking service under his uncle, Sir Alexander Cochrane, and his services as commander of the little sloop *Speedy,* particularly in the daring exploit of capturing the Spanish frigate *El Gamo* off Barcelona, gained him a post-captaincy in 1801. As commander first of the *Pallas,* and subsequently of *L'Impérieuse,* D. did great damage to Spanish commerce, and distinguished himself in European and in African waters by successful actions against the French. For leading five ships against a French fleet in the Basque Roads in 1809 he was made a Knight of the Bath, but having offended the ministry by bringing Lord Gambier, his superior officer, to a court-martial for incompetency, he was not allowed further naval service. In 1814, on the charge of originating, for stock-exchange swindling, a false rumour that Napoleon had abdicated, he was expelled from Parliament, in which he had sat since 1807 as the Radical member for Westminster, deprived of all his honours, fined £1000, and ordered to stand in the pillory. The last part of the sentence was not enforced; his constituents, who believed in his innocence, which has since been established, paid his fine, and afterwards re-elected him. From 1818 to 1828 his exploits at sea greatly furthered the national independence of Chili, Brazil, and Greece. In 1830, on the advent to power of Earl Grey's administration, D. returned to England, and was reinstated in all his honours, became commander on the N. American and W. Indian stations, and rose to the rank of Rear-admiral of the United Kingdom. He succeeded to the Earldom in 1831, and gave up his later years to naval improvements, to the invention of 'infernal machines' for the wholesale destruction of an enemy, and to writing the story of his life, which appeared in 1859 under the title of *The Autobiography of a Seaman.* He died 31st October, 1860, and was interred in Westminster Abbey. Among D.'s other works are *Observations on Rural Affairs* (1847), and *Narrative of Services in the Liberation of Chili, Peru, and Brazil* (1858).

Dun'drum Bay (Irish Gael. *Dundroma,* 'the fort on the ridge'), an inlet of the Irish Sea, County Down, 5 miles S. of Downpatrick, 10 miles wide at its mouth, and stretching 3 miles inland. The *Great Britain* was stranded here in 1846.

Dune'din, the capital of the province of Otago, New Zealand, is picturesquely situated at the head of Otago Harbour, an arm of the S. Pacific 14 miles long, and at the base and on the slopes of hills. D. was founded in 1848, and until 1861 was a small and unimportant place. The discovery of rich gold-deposits at Gabriel's Gully in that year caused a great influx of population, and D. rapidly rose to the position, which it still holds, of being the foremost commercial town in New Zealand. In spite of numerous natural difficulties it is well laid out, containing numerous streets, each 66 feet broad, and paved and lighted with gas. It is also well supplied with water from a reservoir. D. is a see of the Anglican and Roman Catholic Churches. It contains a number of fine public and private buildings, and possesses a rising university. Pop. borough 22,376; and suburbs 23,493.

Dunes, the name given to the sandhills which occur along the seaboard of Holland and Belgium as far as the frontier of France. They have been produced by the action, through an indefinite period of time, of strong winds from the German Ocean, and they serve as a natural barrier to protect the country from the destructive encroachments of the sea. In certain places they are covered with grass or heath, and pine-trees have been planted here and there. Though not available even for pasturage, they are yet invaluable as bulwarks of the rich lowlands of the interior. They occasionally attain so great an elevation as to hide the view of the sea from the steeples of the towns.

Dunferm′line (Gael. *Dun-Pharlain*, 'the fort of *Pharlain* or *Farlane*,' the legendary founder of the city), a royal burgh of Scotland, in the W. of Fifeshire, 3 miles N. of the Firth of Forth, and 16 W.N.W. of Edinburgh. It has many handsome modern structures. D. is noted for its damask linen-weaving; other industries are flax-spinning, bleaching, iron-founding, brewing, &c., and in the vicinity are large coal-mines. Along with Stirling, Inverkeithing, Queensferry, and Culross, D. sends one member to Parliament. D. was already a place of some importance in the 11th c. Malcolm Canmore and his queen Margaret founded a Benedictine Abbey here, 1070-93. The refectory, an arched gateway, and a tower still remain, but the rare old choir (1250), gave place to the present parish church in 1818-21. The latter building has a square tower 100 feet high, round the turret of which runs the inscription 'King Robert the Bruce' in open stonework. Edward I. passed the winter of 1303-4 at D., which was made a royal burgh by James VI. in 1588. D. was the birthplace of David II., James I. of Scotland, and Charles I., and its abbey is the resting-place of Malcolm Canmore, St. Margaret, Edgar, Alexander I., David I., Malcolm the Maiden, Alexander III., Robert Bruce, his queen Elizabeth and nephew Randolf, Annabella, queen of Robert III., and Robert Duke of Albany, governor of Scotland. The skeleton of Robert the Bruce was disinterred and a cast taken of the royal cranium in 1821. Pop. civ. town and parl. bor. (each) 19,647. See Dr. Henderson's *Annals of D.* (Glasg. 1878).

Dungann′on (Irish Gael. *Dun-Geanainn*, 'Geanan's fort'), a town in the county of Tyrone, province of Ulster, Ireland, 11 miles N.W. of Armagh, with manufactures of linen, coarse pottery, fire-brick, and tiles, and having in the neighbourhood the largest lime-quarries and collieries in Ulster. In 1876 a new Roman Catholic church was erected capable of holding 4000 persons. Till 1885 D. returned one member to Parliament. Pop. town 1431.

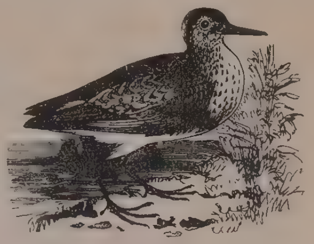
Dungar′van (Irish Gael. *Dun-Garbhain*, 'Garvan's fortress'), a seaport in the county of Waterford, province of Munster, Ireland, 40 miles E.N.E. of Cork. The inhabitants are chiefly engaged in the hake and herring fisheries, and fish, grain, butter, and cattle are exported. D. returned one member to Parliament until 1885. It is a favourite sea-bathing resort in summer. Pop. township 1408.

Dung-Beetle, a name given to several species of *Coleoptera* or beetles, belonging to the division of the Lamellicornes, distinguished by its members having the antennæ terminated by a club, formed of several flat leaf-like appendages. The popular name of these beetles has been derived from their habit of depositing their eggs amongst manure, whilst a few feed upon decaying matters of like kind. The family *Geotrupidæ*, for example, includes a familiar example of D.-B., the *Geotrupes stercorarius*, 'dor' or 'shard-borne' beetle, sometimes also named the 'watchman' beetle. This species attains a length of about an inch. It is of black colour, and infests fields for the purpose of depositing its eggs amid cow-dung. Nearly allied is the famous *Scarabæus sacer*, or sacred beetle of the Egyptians, which also deposits its eggs in manure. A North American species of D.-B. appears to roll the pellets of manure to the place where they are to be buried in the ground.

Dun′geon. See DONJON.

Dunkeld′ (Gael. *Dun-Chailliam;* in the Pictish Chronicle *Duncalden*, possibly 'hazel hill'), a village and burgh of barony, formerly a city, in Perthshire, on the left bank of the Tay, 15 miles N.N.W. of Perth, and situated amidst the most romantic scenery. The ancient cathedral, 120 feet long by 60 broad, built about 1230, is now included within the grounds of the Duke of Athole, which contain 20 sq. miles of larch-wood, together with the first larches planted in Britain. These were brought from the Tyrol in 1737, and at first treated as greenhouse plants. D. was a bishop's see from 1127 to 1688, but its ancient abbey, whose Culdees composed the cathedral chapter, was famous in the ecclesiastical annals of the kingdom at a much earlier date, and may perhaps date from the time of Kenneth MacAlpin. Pop. of entire village 613. See Skene's *Celtic Scotland*, vol. i.

Dunkirk′ (Fr. *Dunkerque*, 'the kirk of the dunes or downs'), a seaport in the department of Nord, France, on the Strait of Dover, 152 miles N. of Paris, with which it is connected by railway. It is a fortified town of the third rank, and has a tribunal of the first instance, a government navigation school, a communal college, a public library, and picture gallery. Its principal squares are the Champ de Mars, and the Place Jean Bart, in which there is a statue of the naval hero, erected in 1806. The most notable buildings are the town-hall (1644), the Gothic church of St. Eloi (1560), with a tower 280 feet high, and a fine peal of bells (since 1853), the barracks for 2000 men, an exchange, a military hospital, and a theatre. D. is the entrepot of the N., a railway centre, and the key to an extensive system of canals. It has regular steamboat communication with London, Hull, Rotterdam, St. Petersburg, &c. Its manufactures are chiefly sailcloth, fishing-nets, leather, soap, sugar, spirits, &c.; there are also valuable cod, herring, and oyster fisheries. The imports include all kinds of colonial produce. Although far from picturesque, D. annually attracts many visitors for sea-bathing. D. was founded near the church of St. Eloi by Count Baldwin of Flanders, 960, but was burned by the English in 1388. About 1400 it was fortified, and it long continued an object of contention between France, Spain, and England. In 1540 it was taken from the Spaniards by the English, in 1558 captured by the French, and in terms of peace restored to Spain. It was seized by the great Condé in 1646, but was again regained by the Spaniards. In 1658 Turenne captured D., which, according to treaty with Cromwell, was made over to England; four years later Charles II. sold it to Louis XIV. for five million livres. After the Peace of Utrecht (1713), the fortifications were razed and the harbour filled up, but their restoration was allowed by the Peace of Paris, 1783. The allies besieged D. in 1793, but were forced to retire. Pop. town 39,478; arrond. 138,292.


Dunlin.

Dun′lin, or **Purre,** a species of *Tringinæ* (or sub-family, including the sandpipers and other allies) found in Britain and other parts of Europe in winter, but more commonly on the eastern coasts of N. America. The average length is 8 or 9 inches. The plumage varies greatly with the seasons of the year, but brown hues predominate generally.

Dun′mow and Flitch of Bacon. D., Great and Little, are two villages of Essex, 9 miles E. of Bishop Stortford by railway, and 35 miles N.N.E. of London. Of Great D. the pop. is, for civ. par., 2781; of Little D., 2 miles E. of the larger village, the pop. is, for civ. par., 286. A richly-endowed priory, founded in 1104 by Lady Juga, sister of Ralph Baynard, formerly existed at Little D., and here the ancient custom of the D. Flitch had its origin during the reign of Henry III. This custom consists in presenting a F. of B. to 'whatever married couple will go to the priory, and kneeling on two sharp-pointed stones, will swear that they have not quarrelled nor repented of their marriage within a year and a day after its celebration.' From the chartulary of the monastery, now in the British Museum, it is proved that the bacon was claimed and won three times before the dissolution of religious houses. It was last awarded legitimately at the Priory Church in 1751. Since that time the custom remained in abeyance till 1851, when it was revived at Great D. The trials now take place annually before a jury of six maidens and six bachelors, and the prizes are awarded to the deserving couples. These interesting revivals of a commendable custom took place under the superintendence of J. W. Savill of D., to whom all 'claims' on the part of constant and even-tempered couples were sent.

Dunn'et Head (Gael. *Dun-Nivet*, 'the fort of the bright or open place'), the most northerly point of Scotland, in Caithness, 13 miles W. by N. of Duncansby Head, lat. 58° 40′ N., long. 3° 21′ W. It is of Devonian formation, much corrugated; has a height of from 100 to 600 feet, and supports a lighthouse.

Dunnott'ar Castle (Gael. *Dun-Oitir*, 'the fort of the low promontory'), on the coast of Kincardineshire, 73½ miles N.E. of Perth, and 1½ mile S. by E. of Stonehaven, on a rock 160 feet above the sea. It was once the seat of the Earls Marischal of Scotland, but is now a ruin. After a six months' siege it capitulated to Cromwell's troops in 1651. Many of the Covenanters were imprisoned in D. C. during the troubled times of Charles II. and James II.

Dunois, Jean, Comte de Dunois et Longueville, popularly known as the Bastard of Orleans, was the illegitimate son of Louis Duc d'Orleans, the brother of Charles VI., and was born about 1403. Aided by the great enthusiasm which Jeanne d'Arc had kindled in France, he drove back the English from Orleans and won the battle of Patay in 1429. After the death of the Maid of Orleans, D. carried on with uninterrupted success the war for French freedom, driving the English from all their conquests except Calais, and at the last even from Normandy and Guienne. He became the idol of France, was popularly styled *Le Libérateur de la France*, and deserved the admiration he inspired. Charles VII. made him his Grand Chamberlain. Louis XI., on ascending the throne, showed his dislike to D., as to the other favourites of his predecessor, by depriving him of his offices and honours. D., greatly incensed, joined the confederation of discontented nobles known as *La Ligue du Bien Public*, which brought the king to his senses and led to the Peace of Conflans (1465). By it D. was restored to his honours and posts. He died 24th November, 1468. D. had a reputation for gallantry, and in the *Mémoires Secrètes de la Cour de Charles VII.* is described as the lover of Queen Marie of Anjou. He was twice married. His first wife was the daughter of the President Lannet, and his second Marie d'Harcourt, daughter of the Comte de Montgomery. From this second marriage is descended the French family of Longueville.

Dunoon', a favourite sea-bathing village in Argyllshire, on the Firth of Clyde, 25 miles N. by W. of Glasgow. Numerous well-built villas extend along the shore both N. and S. of D., and the ruins of an ancient castle, formerly a residence of the Argyll family, crown a green conical knoll near the pier. New burgh buildings were erected in 1874. The name may be *Dun-Nodha*, 'the new fort,' or *Dun-Aoiahean*, 'the fort of guests,' or more probably *Dun-Omhain*, 'the fort of foam.' Pop. civ. town 5283.

Duns (perhaps Gael. *Dun-sith*, changed into *Dun-se*, 'fairy hill' or 'hill of peace'), a burgh of barony and market-town, Berwickshire, Scotland, 35 miles S.E. of Edinburgh, on the Whitadder, at the foot of D. Law, which is 630 feet high, and on the summit of which are traces of the camp formed by General Leslie and the Covenanters in 1639. The town is well built. D. is the birthplace of Boston (q.v.), author of the *Fourfold State*. Pop. civ. par. 3137; civ. town 2198.

Dunsinn'ane, a sub-range of the Sidlaw Hills, about 7 miles N.E. of Perth, crowned with a hill-fort of concentric ramparts. It overlooks a vast district, including Birnam Hill (q.v.).

Duns Scotus, John, one of the greatest of the schoolmen, was born about 1265, most probably at Dunse in Berwickshire, though some assert Dunston in England, and others Down in Ireland, to have been his birthplace. When a boy, he entered the Franciscan institution in Newcastle, and afterwards studied at Oxford, where he distinguished himself by knowledge of logic, law, mathematics, and scholastic theology, and where, in 1301, he was made theological professor. His lectures were listened to by crowds, there being then, we are told, 30,000 students at Oxford. In 1304 he removed to Paris, and amazed his hearers by his dialectic subtlety, which earned for him the title of the 'Subtle Doctor.' He was appointed Professor of Theology in Paris, and taught with brilliant success until 1308, when he visited Cologne, being commissioned by his order to oppose the Beguines, and found a university there. He was received at Cologne with extraordinary enthusiasm, but shortly after his arrival was cut off by apoplexy, 8th November, 1308. A legend clings to D. as to most of the great schoolmen. He is said to have been buried alive, and to have dashed out his brains against the coffin. D. holds a very important place in the history of mediæval thought. He gained an immense number of followers, known as *Scotists*, in opposition to the *Thomists*, or adherents of Thomas Aquinas, with whom D. was in utter antagonism in regard to divine grace, free-will, and especially the immaculate conception of the Virgin, a doctrine which he seems to have originated. (See NOMINALISTS and REALISTS.) His skill in starting new definitions and new themes for discussion was especially valued in an age when speculation was confined to a novel setting of orthodox doctrine. It has been said that D. sometimes anticipates Spinoza, but in such cases he probably did not see whither his dialectic tended. From the opposition shown by his followers to the revival of letters, *Dunsman*, and hence *dunce*, came to mean one stupid or slow at learning. Most of D.'s voluminous works were edited, with Life, by L. Wadding (Lyon, 1639).

Dun'stable ('the market-place of the hill'), a town in Bedfordshire, at the base of the D. chalk-downs. The principal industry is the manufacture of strawplait and bonnets. In winter great numbers of larks are captured here for the London market. The parish church, on the restoration of which £10,000 had been expended in 1876, is part of the priory founded here by Henry I. A town-hall, plait-market, and corn-exchange were erected in 1874. Pop. reg. sub-dist. 8738; and mun. bor., civ. par., and ecc. par. (each), 4513.

Dun'stan, St., was born in A.D. 925, near Glastonbury, Somersetshire. His father, Heorstan, was a wealthy thane, and his uncles were bishops of Wells and Winchester. As a youth he was remarkable for learning and skill in painting, music, and metallurgy, and quickly became a favourite of King Æthelstan, but was driven by jealous enemies from the court. He then became a monk, but by no means an austere recluse. On the contrary, he studied literature and music, gathered many pupils about him, and won the affections of a rich lady, who placed her fortune at his disposal. About this time he is said to have had a grotesque adventure with Satan, whom, according to Robert of Gloucester, he seized by the nose with his red-hot tongs for peeping into his cell at Glastonbury. On the death of his rich patroness he returned to court, which envious intriguers again forced him to quit, but King Eadmund appointed him Abbot of Glastonbury, according to the *English Chronicle*, in 943. This would render his birth in 925 very dubious, as he could scarcely be an abbot when only eighteen. According to others, he was chosen abbot in 947. On Eadred's accession in 946, D. began to shine forth as a clear-sighted, adroit, unscrupulous statesman, advocating broad and conciliatory measures. He secured the alliance of the Scottish king against the Northumbrians by ceding the country between the Forth and Tweed, but Eadwig's succession in 955 interrupted his wise schemes of consolidation. Enraged by an insult which D. offered the queen, the new king stripped him of his offices, and forced him to seek safety in Flanders; whereupon Mercia and Northumbria proclaimed Eadgar king, and recalled D., who, after Eadwig's death in 958, was elected Archbishop of

Canterbury, and during Eadgar's reign was virtually the secular as well as the ecclesiastic head of England. Instead of labouring blindly for the aggrandisement of Wessex, he endeavoured to consolidate the entire realm, and to pursue a truly national policy. Through his influence Northumbria was split into three parts, but their old rights were fully reserved to its Danish inhabitants. He enforced justice, promoted education, reformed the mint, and strove to restore purer morals among the laity and stricter discipline in the Church. Aided by the Bishops of York and Winchester, he laboured with fanatical energy to institute a celibate clergy, and expelled from the Church such priests and dignitaries as refused to separate from their wives. On Eadgar's death in 975, he procured the coronation of that king's son Eadward, and in a Witenagemot held shortly afterwards at Calne, in Wiltshire, is said to have confounded his enemies by a 'miracle.' The part of the floor on which his opponents were placed was made to give way suddenly, while D. and his party remained unhurt. But his influence fell on Eadward's assassination. The S. country proclaimed Æthelred king, the N. seceded, and D.'s long-cherished project of a united England was shivered for a time. In grief and defeat he retired to Canterbury, where he died in 988. D. possessed abundant and versatile talents, which he strenuously cultivated and applied. In Church questions he was narrow and intolerant, but as a statesman he was shrewd, liberal, and even patriotic. The ends which he inflexibly pursued were to unite England into a compact monarchy, to extend the influence of the English Church in civil affairs at home, while rendering it entirely plastic to the papal sway. D. wrote an adaptation of Benedict's *Rule of a Monastic Life*, and a *Commentary on the Benedictine Rule*. See Robert of Gloucester's *Life of D.*, *English Chronicle*, Mabillon's *Acta Sanctorum*, Kemble's *Saxons in England*, and Freeman's *History of the Norman Conquest of England*, vol. i.

Duode'cimal Scale (Lat. *duodecim*, 'twelve') is the division of unity into twelve parts, each of these again into twelve, and so on. Though it has the advantage of being divisible by 2, 3, 4, and 6, yet the decimal scale is now recognised as more convenient for our Notation (q.v.).

Duode'cimo (Lat. *duodecim*, 'twelve'), a term applied to a volume on account of the size of its page. A page D. is the 12th part of a page folio, the latter being the large sheet called a broadside once folded; just as a *quarto* is its 4th part, and an *octavo* its 8th. The well-known contractions for the three words are 4to, 8vo, 12mo.

Duode'num. The small intestine is divided into three parts: the first, 10 or 12 inches in length, immediately succeeding the stomach, is the D.; the upper two-fifths of the remainder is the *jejunum*, and the lower three-fifths the *ileum*. The D. is the shortest and widest part of the intestine. It describes in its course a curve somewhat like that of a horseshoe, in the concavity of which we find the head of the pancreas.

Dupan'loup, Felix Antoine Philibert, a French churchman, was born at St. Felix, Savoy, 3rd January, 1802. He studied theology at Paris, became a priest, and won notice as an excellent preacher and catechist. After refusing various charges in Paris, he was appointed Professor of Sacred Eloquence in the Sorbonne in 1841, and Bishop of Orleans in 1849. In 1848 he attended the deathbed of Talleyrand. In 1854 he was made a member of the Academy, and after 1850 he took part with considerable energy and keenness in politics, arguing for the rights of the Pope as a temporal sovereign against Edm. About. He was returned to the National Assembly in 1871, and voted with the Right. He died 11th October, 1878. Among his most important works are *Manuel des Catéchismes* and *Œuvres Oratories.*

Dupin', André Marie Jean Jacques, a French jurist and politician, was born 1st February, 1783, at Varzy, in the department of Nièvre. Educated at Paris, D. took the Orleanist side in French politics, opposed in 1815 in the Chamber of Representatives the proposal to proclaim Napoleon's son as his successor, defended, along with Berryer, Marshal Ney, and subsequently acted as counsel for the English officers who aided the escape of Lavalette, for Béranger in 1821, and for the *Journal des Débats* in 1830. When Louis Philippe ascended the throne after the revolution of that year, D. was made Procureur-Général in the Court of Cassation. In 1832 he was elected President of the Chamber of Deputies, and held the office for eight years. The *coup d'état* of 1851, followed by the confiscation of the Orleans estates, caused D. to retire from public life, but in 1854 he resumed his former post in the Court of Cassation. His last public act was in 1865 to protest in the Senate against the growth of Parisian luxury. He died 10th November, 1865. D. was the author of a number of valuable works, particularly on law. Among these are his treatise *Sur la Libre Défense des Accusés* (1815), which made his reputation as a Liberal advocate. See *Mémoires de M. D.* (1855-60).—**François Pierrè Charles, Baron D.,** a French geometer and statistician, the brother of the preceding, was born at Varzy, 6th October, 1784, entered the navy as an engineer, and was much employed as such in France and the Ionian Islands. In 1814 he visited Great Britain, and examined its financial, commercial, industrial, naval, and military resources, the result being his *Voyages dans la Grande Bretagne* (Par. 1820-24), and *Force Commerciale de la Grande Bretagne* (1826). D. threw himself heartily into the work of teaching artisans science, established a *Conservatoire des Arts et Métiers* at Paris, and became its Professor of Geometry. In 1824 he obtained the honour of a barony. D., who through the revolutions of 1830 and 1848 had been a Liberal, was elected a senator after the *coup d'état* of 1851. He died January, 1873. D. published numerous works, chiefly on statistical, industrial, scientific, and educational subjects.

Dupin, Louis Ellies, a French historian, born of an old Norman family, at Paris, 17th June, 1657. He studied at the Collége d'Harcourt, entered the Church, and was through life persecuted for his liberal opinions, being accused of treating the Virgin and the Fathers with disrespect. His favourite scheme was to unite the Roman Catholic, Greek, and English Churches. He died at Paris, 6th June, 1719. See Niceron's *Mémoires*.

Dup'licate, Ra'tio. See PROPORTION.

Duplica'tion of the Cube, a celebrated problem of antiquity, also known as the 'Delian problem,' from the legend that when the island of Delos was being ravaged by a pestilence, the oracular response was that the pestilence would cease if the altar of Apollo were doubled, still retaining its cubical shape. Being a case of the solution of a cubic equation, it could not be solved merely with the aid of the circle and straight line. Hippocrates of Chios reduced it to the problem of inserting two mean proportionals between two given lines, which was solved by Archimedes, Eutocius, Pappus, Nicomedes, and others, by means of higher curves.

Dupon't, Jacques Charles, a representative French Liberal politician of the early part of the 19th c., was born 27th February, 1767, at Neubourg in Normandy, and came into prominence in 1813, after the fall of Napoleon, when he acted as Vice-President of the Corps Législatif. Returned to the Chamber of Representatives for the department of Eure, and generally known as De l'Eure, D. continued a parliamentary Liberal in opposition till the revolution which drove Charles X. from the throne in 1830, when he was appointed to the Ministry of Justice, an office which he threw up in six months on account of what he considered the retrograde tendencies of the king. When the revolution of 1848 took place, D. again came to the front, being made President of the Provisional Government. In the Legislative Assembly, however, which succeeded the Constituent Assembly, D., whose opinions were too moderate, did not find a place. He died at his estate of Rougepierre in Normandy, 3rd March, 1855. By his friends he was titled *L'Aristide de la Tribune Française.*

Düpp'el, or **Dybb'öl,** a village of Slesvig, in the Sundevitt peninsula, opposite Sonderburg, noted in the Germano-Danish war for its entrenchments (*Düppeler Schanze*), built by the Danes, and taken by the Prussians after a month's fighting, 18th April, 1864.

Dupois, Charles François, the son of a village schoolmaster, was born at Trie-le-Château, 16th October, 1742. He studied law and metaphysics at Lisieux, where he was also a Professor of Rhetoric. An enthusiasm for astronomy, derived from Lalande, suggested to him that the zodiac was a kind of national calendar for agriculture and other matters, and that the explanation of the various religious myths was to be found in the constellations, interpreted by reference to the pursuits of each nation. His first publications brought him an invitation from Friedrich II. to Berlin. His chief work, *L'Origine de tous les Cultes, ou la Religion Universelle,* with atlas, appeared in 1795. As a member of the National Convention, the Council of Five Hundred, and the Legislative body, he showed moderation, and a desire for liberty based on education. As a member of the Institute (in the departments of literature and fine arts, and history and ancient literature) he advocated the claims of the Pelasgi to be considered the universal parent stock—he considered them to have come from Ethiopia—and discussed the results of the commission to Egypt, which he had helped to arrange. D. died near Dijon, 29th September, 1809. See *Notice Historique sur la Vie de D.*, by his widow (Par. 1813).

Dupuy'tren, Guillaume, a famous French surgeon and anatomist, was born at Pierre Buffière, 6th October, 1777. In 1801 he became *Chef des Travaux Anatomiques* in the Collége de la Marche, Paris. Here he made important vivisections with reference to the functions of the sympathetic and to the consequences of tying the thoracic duct; and followed Bichat into pathological anatomy, his autopsis of cases of organic lesion numbering more than 1000. D. successively became assistant, head-surgeon, and Professor of Clinical Surgery at the Hôtel-Dieu. He was made a baron by Louis XVIII. Patronised by Charles X., he wished to rival the political career of Cuvier, but failed in his candidature for a seat in Parliament. He died 8th February, 1835. D. excelled as a teacher in the class-room and in the ward, and as a brilliant surgeon; he was without extensive or accurate scientific range, and has been accused of dishonest plagiarism and of making false reports of the success of his own operations. His most important memoirs are scattered through the *Journal* of Corvisart, the *Bulletin* of the Medical Faculty, the *Medical Library* and *General Repertory of Anatomy.* See *Biographie de D.* (Par. 1855).

Duquesne', Abraham, Marquis, a famous French naval officer, born at Dieppe in 1610, first attracted public notice for gallantry in an engagement with the Spaniards near the Lerin Islands (off the coast of Alpes Maritimes department) in 1637, and afterwards successively at Coruña, Tarragona, Barcelona, &c. After the death of Richelieu, D. entered the service of Sweden, then at war with the Danes, defeated the Danish fleet (1643), was promoted to the rank of vice-admiral, but soon returned to the service of France, took part against the Frondeurs, and reduced Bordeaux. He was next engaged in chastising the Barbary pirates in the Western Mediterranean, destroyed the combined fleets of Spain and Holland under De Ruyter off the coast of Sicily in 1676, and was rewarded by Louis XIV. with the rank of Marquis. His last exploit was the successful bombardment of Genoa in 1684. D. was the only Protestant exempted from banishment on the revocation of the Edict of Nantes in 1685. He died in 1688.

Du'ra Ma'ter, a strong fibrous membrane which closely lines the interior of the skull, and forms a loose sheath in the spinal canal. The two other membranes protecting the brain are the Arachnoid and Pia Mater (q.v.)

Dura'men, or **Heart-Wood,** the innermost or oldest-formed wood in an exogenous stem. It is generally darker in colour than the external wood. See STEM.

Durance', an impetuous river of France, rises in the Hautes-Alpes, near Mont Genèvre, flows S. through the Basses-Alpes, then W., forming the boundary-line between Vaucluse and Bouches-du-Rhône, and joins the Rhône between Avignon and Tarascon, 50 miles from the sea. It is 180 miles long, but owing to its rapid current no part of its course is navigable. Much timber is floated down from the upland forests. An aqueduct has been constructed from the D. to Marseille, 51 miles long.

Duran'go, the capital of a state of the same name, Mexico, is situated 6500 feet above the level of the sea. It has a handsome square, a cathedral, four monasteries, and a Jesuit college. The climate is healthy and cool, and there are rich mines of gold, silver, and iron in the vicinity. D. has a trade in horses, cattle, and leather. The state is traversed by the Sierra Madre. The surface is rocky and the soil poor, but there are valuable mines of gold, silver, and iron. Area, 38,009 sq. miles. Pop. of town 25,626; of *state* 255,652.

Duraz'zo (the *Dyrrachium* of the Romans, whence D., as well as the *Dratch* of the Turks and the *Durtz* of the Slavs), a fortified town and seaport in the vilayet of Scutari, Albania, Turkey in Europe, on the Adriatic, exports grain, oil, and tobacco, and imports Manchester and Birmingham goods and colonial produce. D. is the Greek *Epidamnus*, which, from its favourable position on the Adriatic and fertile territory, soon became rich and powerful. The expulsion of the oligarchs ultimately led to the Peloponnesian War (q.v.). Dyrrachium did not occupy the exact site of Epidamnus, but a high and rocky peninsula near it, and received its name from the *ruggedness* of the situation. Pop. 4080.

Dür'en (the *Marcodurum* of Tacitus, meaning 'the frontier-place on the river,' from *mark*, 'a frontier,' and *dur*, 'water'), a walled town on the Roer, in the province of Rheinland, Prussia, 18 miles E. by N. of Aix-la-Chapelle. D. has manufactures of woollen cloths, paper, leather, cast-iron and steel ware, and numerous distilleries of brandy. It was besieged by Charles V. in 1543. Pop. town 21,731; district 58,463.

Dür'er, Albrecht, a great German painter, was the son of a Hungarian goldsmith, and was born in Nürnberg, 21st May, 1471. In 1486 he left his father's trade and became an apprentice of Wohlgemuth, the leading painter in Nürnberg. After his 'wanderjähre,' he executed as his masterpiece the drawing of Orpheus. He then made the unfortunate marriage with Agnes Frey which has been so touchingly described in Leopold Schefer's novel, *The Artist's Married Life* (Eng. transl., Chapman, 1848). His friends Hartman and Pirkheimer have told how unhappy this selfish woman made him. We have also the artist's journal of his travels in the Netherlands with his wife and the maid Susanna, and his letters to Pirkheimer, chiefly from Venice (published in *Relics of A. D.*, by Friedrich Campe, 1828), but these contain no complaint of his wife, whom he treated with great kindness. On his travels he was fêted by the Emperors Maximilian and Karl V., the King of Denmark, Margaret, Governess of the Netherlands, and by the painters of Brüges and Antwerp. When in Italy he met Raphael, with whom he exchanged portraits. Two portraits of D., painted by himself, still remain at the Florence and Munich galleries. He died broken-hearted, 6th April, 1528. D. was a designer, painter, architect, sculptor, and engraver on wood as well as metal. Among his pictures may be mentioned 'Marius on the Ruins of Carthage;' the 'Martyrdom of St. Bartholomew,' which the Emperor Rudolph placed in Prague; the 'Martyrdom of the Ten Thousand Saints,' which is at Vienna. Prague has also his 'Adam and Eve,' and Nürnberg has the 'Twelve Apostles.' He is considered to have thrown imaginative expression and fidelity to nature into the school of Van Eyck. Among his engravings proper may be mentioned the 'Knight and Death,' the 'Four Naked Women,' &c. D. is said to have been the first to use nitric acid. His cuts on wood and leather of the 'Passion of Jesus Christ' are well known through the cheap reprint issued by Smith & Elder; his 'Life of Mary' and 'St. Eustatius Kneeling before a Stag' are perhaps the finest of the woodcuts. Among his portraits may be mentioned 'Erasmus,' 'Melancthon,' and his friend 'Pirkheimer.' D. also published works on *Human Proportion, Fortification*, and the *Use of the Compass and Square* (edition published at Arnheim, 1603). Wonderful stories are told of his manual precision. There is in his work a fantastic element strange to the modern eye. D. was a Protestant, and the finish and truthfulness of his works evince a deep, almost austere, religious feeling.

Du′ress, in English law, is the plea of Compulsion by imprisonment or by threats (causing fear of loss of liberty, life, or member) by one who has failed in an obligation or who has committed a misdemeanour. If proved, the plea is effective. But D. is held to be no excuse for a person committing such a crime as the murder of an innocent person, though he may kill the person offering the D.

D'Ur′fey, Thomas, a writer of trifling anacreontics, &c., was born at Exeter about 1630. He was intended for the law, but took to play-writing, and became a favourite with Charles II., and a well-known author of songs, odes, and licentious comedies. Like Moore, he used to sing his own songs at his 'dinings out.' He led a jovial, careless life, and died during the reign of George I., in 1723. His songs were collected under the title *Pills to Purge Melancholy*. He wrote a satire called *Butler's Ghost, or Hudibras, the Fourth Part.*

Durham Cathedral, north side.

Dur′ham (Old Eng. *Dun-Holm*, 'the hill on the holm' or 'meadow'), an ancient episcopal city of England, and capital of the county of the same name, on the Wear, 13 miles S. of Newcastle, and 256 N.W. of London by railway. It is nearly encircled by the river, has the remains of old walls, and is mainly built on the steep sides of a hill, surmounted by an ancient cathedral and a castle. The banks of the Wear are now occupied by sloping gardens and beautiful public walks, and the river is spanned by fine bridges (two of date 1120 and one of 1170), and by a railway viaduct of eleven arches. The majority of the houses have a quaint, picturesque appearance, in harmony with the natural beauty of the spot and with the grandeur of the cathedral. In a form nearly resembling a Latin cross, the cathedral comprises bold specimens of Norman and of the various English styles, covering an area of 55,700 feet, and having a nave 81 feet wide. Its length inside is 473 feet, and its chief features are three richly ornamented towers, the highest of which (216 feet) was built in the 13th c. The Chapel of the Nine Altars, at the E. end, is in pure and elegant Early English. In the same end there is an immense circular light of fine stained glass, while the interior pillars and the screen are festooned with rare carving. Cardinal Wolsey was for some time prelate of D., and the cathedral contains the tombs of St. Cuthbert and Bede. The castle, which is in Romanesque, was founded by William the Conqueror about 1072, and contains a splendid dormitory. It was formerly the residence of the bishop, but is now appropriated to the University of D., incorporated in 1837, with power to grant degrees in arts, classics, and mathematics, in theology, and in physical science, &c. The University, which possesses a revenue of £3000 a year, has 14 professorships (30 lecturers also assist in the education) and is attended by 608 undergraduate students. It has 6 fellowships and upwards of 40 scholarships and exhibitions. There are four colleges, besides those of medicine and science. Students also are allowed to attend who are not attached to any college. Besides the cathedral, D. has six parish churches, also a county infirmary, public libraries, assembly-rooms, mechanics' institute, &c. A large reservoir has been constructed. The chief manufactures are woollens, carpets, paper, and iron and brass wares. Near D. are collieries and mineral springs. About the year 995 Bishop Ealdhun brought hither from Chester-le-Street the remains of St. Cuthbert, and built for their reception a church or shrine, and thus finally fixed the seat of the old Bernician bishopric. The cathedral, however, was first begun by Bishop William de Carilepho about 1093, and was not completed till near the end of the 15th c. In 1290 the prior and convent of D. founded a college, which was abolished on the dissolution of monasteries (1539), revived by Cromwell during the Commonwealth, and again suppressed at the Restoration. The parl. bor., consisting of the ancient city of D. and the bor. of Framwellgate, returns one member. Pop. parl. bor. 15,287; mun. bor. 14,863; and diocese 1,017,047.

Durham, a county in the N.E. of England, bounded N. by Northumberland, E. by the German Ocean, S. by Yorkshire, and W. by Cumberland and Westmoreland, has an area of 1011 sq. miles. It lies between the Tyne and the Tees, and in the W. its surface is hilly and heathy, while it has a coast-line of 32 miles, chiefly consisting of magnesian limestone cliffs. The formation throughout is mainly millstone grit, coal measures, permian, and trias. D. is famous alike for its rich coal deposits and for its Teeswater breed of short-horned cattle. It is intersected by the river Wear, and has a good soil of dry loam and clay. There are considerable dairy-farming and cattle-rearing. The chief industry, however, is coal-mining, there being over 240 collieries. Several of the pits reach to a depth of 100 fathoms, and extend horizontally for many miles. The other minerals are limestone, freestone, black marble, ironstone, slate, lead, &c.; and the manufactures include iron, chemicals, glass, pottery, and alkalies. There is also much iron-smelting and shipbuilding. D. is the capital, and the other towns are Sunderland, Gateshead, Hartlepool, S. Shields, Darlington, and Stockton. D. was included (547-827) in the Anglian kingdom of Northumbria. It was endowed at a later period with palatine privileges vested in the bishop, having the power to hold parliaments, coin money, raise taxes, &c. These privileges, which D. enjoyed in common with the counties Chester and Lancaster, were resumed by the crown in 1836. D. possesses many British and Roman antiquities, and several fine castles. D. has eight parl. divs. each of which returns one member: Barnard Castle, pop. 59,459; Bishop Auckland, 61,833; Chester-le-Street, 70,202; Houghton-le-Spring, 69,047; Jarrow, 80,607; Mid D., 67,639; N. W. D., 65,957; and S. E. D., 64,047. Pop. anc. co. 1,016,559; adm. co. 721,461; and reg. co. 1,024,369. Corn crops cover 70,294 acres; green crops, 33,183; clover, &c., 53,353; permanent pasture, &c., 272,541; small fruit and flax, 395 and 2, respectively; and 8368 acres are bare fallow. Grazing, mountain and heath occupy 42,053; nursery grounds, 61; and woods, &c., 29,294.

Durham, John George Lambton, Earl of, an English Liberal politician, was born 12th April, 1792, at Lambton Hall, in the county of Durham, and the seat of his father, a gentleman of small estate but ancient family. He was educated at Eton, served for a short time in a hussar regiment, and was returned in 1813 for his native county. D. soon showed himself an advanced Liberal, opposed the Corn-Law Bill of 1815, the Alien Acts of the Castlereagh ministry in 1816, the measures to repress public meetings after the 'Manchester massacre' of 1819, and endeavoured to pass a scheme of parliamentary reform. In 1828 he was created Baron D. Two years later he became Lord Privy Seal in the Grey administration, aided in drawing up, and was almost the sole defender in the House of Lords of, the Reform Bill of 1832. Ill-health compelled him to retire from the government, when he was made an earl, and in 1833 was sent on a special mission to Russia. During the insurrection in Canada of 1837-38, D. was sent out as Governor-General, but excited the ill-will of the Canadians, and was censured by the Home Parliament for transporting the leaders of the rebellion to Bermudas, and resigned the office. He died at Cowes, Isle of Wight, 28th July, 1840.

Durham, Simeon of, an English chronicler of the 12th c., who taught at Oxford, and wrote Latin annals of England to the reign of Henry I. His book is specially valuable for the history of the N. of England, and was continued by John of Hexham.

Du′rian, or **Durion,** a fruit-tree of the Malay Archipelago, belonging to the natural order *Sterculiaceæ*. Though it has a most offensive odour, it is one of the most delicious of fruits. 'A rich custard,' says Alfred Wallace, 'highly flavoured with almonds, gives the best general idea of it.' The unripe durians are cooked as a potherb, the pulp is salted and preserved, and the seeds, as large as pigeon's eggs, are roasted and eaten like chestnuts. It is successfully cultivated in Malaya and India, where it commands a high price. One tree will yield about 200 durians in a year. The rich creamy interior is protected by a thick, though rather soft, shell, which is armed with numerous hard spikes. The Malays are particularly fond of the fruit of the D., and, while it is approaching maturity, will always post some one to watch the trees in case of theft.

Dürk′heim, one of the prettiest towns in the government district of Rheinpfalz, Bavaria, on the Isenach, 10 miles N. of Neustad by railway. It has a famous sausage-market (since 1494), and a considerable wine trade. Many visitors are attracted by the grape-cure, and by the neighbouring salt-baths of Philippshall. D., the old *Thurnigheim*, was the residence of the Frankish dukes of the Salian branch. It was rebuilt after the destruction of the castle of the counts of Leiningen by the Elector Palatine Friedrich in 1471, and again after its devastation by the French in 1689. About a mile S.W. of D. are the beautiful ruins of the Benedictine abbey of Limburg, founded by Konrad II. in 1030. Near the abbey, and on the summit of Kastanienberg, is the *Heidenmauer* ('heathens' wall'), a rampart supposed to be of Roman origin, and enclosing an area of 2 sq. miles. Pop. 6070.

Dur′lach, a town in the Grand Duchy of Baden, Germany, on the Pfinz, 3 miles E. of Karlsruhe by railway. It lies at the foot of a vine-covered hill (the Thurmberg), and is further linked to Carlsruhe by a canal and an avenue of poplars. Its manufactures are delf-ware, tobacco, beer, vinegar, &c., and it has a well-known fruit-market. D. was the capital of Baden before Karlsruhe was founded in 1715. Pop. 8016.

Du′roc, Géraud Christophe Michel, Duc de Friuli, was born at Pont-à-Mousson, 25th October, 1772. He served as aide-de-camp to Bonaparte in the Italian and Egyptian campaigns. His services to the Consul in 1799 procured him a generalship, several important embassies, and the post of Grand Marshal of the Palace. He carried through the peace with Saxony (1806), the cession by Charles IV. of his rights to the throne of Spain, and the armistice of Znaim (1808). The scene between the Emperor and D. on the field of Markersdorf (where the latter was killed, 22nd May, 1813) is well known.

Durr′a, Dour′a, Durra Mill′et, or **In′dian Millet.** See SORGHO GRASS.

Dürr′enberg ('barren mount'), a village in the province of Sachsen, Prussia, 6 miles S.S.E. of Merseburg, with important saltworks, established in 1763, which annually produce over 20,000 tons of salt by evaporation.

Durr′enstein ('barren rock'), a village on the left bank of the Danube, Lower Austria, 44 miles W.N.W. of Vienna, with the ruins of the fortress in which Leopold Duke of Austria imprisoned Richard Cœur-de-Lion on his return from Palestine, 1191.

Dur′sley (Welsh *dwr*, 'water,' and Old Eng. *ley*, 'meadow,' *i.e.*, 'the water-meadow,' from the Broadwell spring in the vicinity), a market-town in Gloucestershire, near the Cotswold Hills, 14 miles S. by W. of Gloucester, with fulling-mills and breweries. Pop. reg. sub-dist. 5242; ecc. par. 2273; and civ. par. 2269.

Duruy, Victor, a French historian, born at Paris, 11th September, 1811, for many years Professor of History at Reims and afterwards at the École Polytechnique, especially devoted himself to historical geography. This subject he treated in several works dealing with the Roman Republic and Empire (Par. 1838), the Middle Ages (1839), France to the year 1453. In 1863 he became Minister of Public Instruction under the Second Empire. His programmes and circulars excited much criticism among both Catholics and Liberals, and his *Histoire Contemporaine*, for use in the Lyceum, was written for the purpose of political propagandism. On his resignation in 1869 the grateful Emperor made him a Senator with a 'dotation' of 30,000 francs.

Dusic′yon, a genus of *Canidæ*, or Dogs (q.v.), inhabiting S. American flat-lands, and living gregariously in burrows in a wild state. They appear to be susceptible of domestication, and possess elongated bodies, sharp muzzles, and bushy tails.

Düss′eldorf, the capital of a district of the same name, in the province of Rheinland, Prussia, on the right bank of the Rhine, where it is joined by the Düsselbach, 21 miles N.N.W. of Cologne by railway. It is a handsome town, with wide regular streets, numerous squares, fine gardens, and promenades. Its main divisions are the Altstadt, on the right bank of the Düsselbach; the Neustadt, on the Rhine (built 1690-1716); the Karlstadt, on the left bank of the Düsselbach, founded by the Elector Karl Theodor in 1787; and the modern Friedrichstadt, forming the S. side. The principal buildings are the Collegiate Church, containing the tombs of the Dukes of Jülich and Berg; the beautiful Church of St. Andrea; the old electoral palace; the governor's palace; the townhall (1567); the observatory; a public library of 62,000 vols.; and a good theatre capable of holding 1500 persons. The old castle of D., which was partly destroyed by the French in 1795, has been restored, and now contains the art academy and a collection of some 14,500 original drawings (by Lessing, Achenbach, Knaus, Schirmer, &c.), and 24,000 copperplate engravings. D. had formerly a splendid art gallery (founded in 1690, and removed to Munich in 1805), containing the most perfect collection of the works of Rubens and the other masters of the Flemish and Dutch schools. The celebrated art academy was established by Karl Theodor in 1767, was nurtured by Cornelius and Schadow, and was placed under the care of Bendemann in 1859. D. is also one of the musical centres on the Lower Rhine. Its industries are rapidly increasing, and it enjoys every advantage of position, and complete communication by river and railway. Among the manufactures are cottons, colours, leather, tobacco, chemicals, carriages, and tapestry, and there is considerable trade in books and articles of virtu. D. was a town as early as 1288, and was the residence of the Dukes of Jülich, Kleve, Berg. It was taken by the French in 1795, restored to Bavaria at the Peace of Luneville, 1801, and to the Duchy of Berg in 1806, along with which it came to Prussia in 1815. Pop. town 144,642; district (exclusive of town) 65,950.

Dust-Ball, a disease in horses, provoked by too much food composed of corn and barley-dust. The disorder affects chiefly the intestinal canal. Its presence is made known by a haggard countenance, a distressed eye, distended belly, and hurried respiration. The ball is sometimes about four inches in diameter, and as hard as iron.

Dust-Brand. See SMUT.

Dutch Gold is a very ductile and malleable alloy of copper and zinc, containing nearly 85 per cent. of the former. It can be beaten out into extremely thin leaves, resembling gold-leaf, for which it is a chief substitute. When triturated, it forms a 'bronze powder.'

Dutch Liquid was discovered in 1795 by the Dutch chemists Diemen, Paets van Trooskiyk, Bond, and Lauwerenburg. It is a compound of olefiant gas or Ethylene (q.v.) with chlorine. D. L. is readily obtained by allowing chlorine and ethylene to come in contact. It is a colourless oily liquid, having a peculiar chloroform-like odour, and a sweet aromatic taste. It is heavier than water, and boils at 82·5° C.

Dutch Rushes. See EQUISETACEÆ.

Du'tens, Louis, a French philologist and author, was born at Tours, 16th January, 1730, of a Protestant family. At the age of eighteen he wrote a tragedy, *Le Retour d'Ulysse à Ithaque*, which was acted with success at Orleans. About 1750 he came to England, where he applied himself to Oriental languages and mathematics. While chaplain and secretary to Mackenzie, the English minister at Turin, he undertook a complete edition of Leibnitz, which appeared in 1769. The latter part of his life was passed at Elsdon, Northumberland, where he had obtained a living. He belonged to the Académie des Inscriptions of Paris, the Royal Society of London, and was royal historiographer to George III. D. died 23rd May, 1812. His chief work, *Recherches sur l'Origine des Découvertes attribuées aux Modernes*, appeared in 1766. Its learning is great and curious, but it had become D.'s craze that the ancients knew everything. He is more trustworthy as a numismatist, and published valuable dissertations on Greek and Phœnician medals and on precious stones.—**Joseph Michel D.**, nephew of the above, born at Tours, 15th October, 1765, was an engineer and economist. He published, in 1804, an analysis of the fundamental principles of political economy, and in 1819, as the result of a government mission to England, his *Mémoires sur les Travaux Publics de l'Angleterre* (especially the canals). This was followed by his elaborate *Histoire de la Navigation Intérieure de la France* (1829). But his chief book is *Philosophie de l'Économie Politique* (1835). He died 6th August, 1848.

Dutro'chet, René Joachim Henri, born 14th November, 1776, at his father's country-house in Poitou. After serving in the royalist army of La Vendée, he adopted medicine as a profession, acted for a short time as military medical officer to Joseph Bonaparte, King of Spain, but latterly devoted himself to the study of physics and physiology. He entered the Académie des Sciences in 1831, and died at Paris, 4th February, 1847. His specialty was the study of the movements of fluids in plants and animals, as connected with their growth, including, of course, the embryonic structure of plants, &c. He first used the terms *endosmosis* and *exosmosis*. His experiments on the results of artificially impressing motion upon growing seeds and plants are very curious. All his theories and discoveries are to be found in his *Mémoires pour servir à l'Histoire Anatomique et Physiologique des Végetaux et des Animaux* (Par. 1837).

Dutt'eeah, or **Da'tia,** the capital of a protected state of the same name, Central India, in the agency of Bundelcand, 125 miles S.E. of Agra. It stands in a rocky district, is surrounded by walls, and has several massive buildings. The houses are somewhat packed together. In the centre of the town are the Rajah's palace and grounds, in which stands a splendid fountain from which four marble elephants spout water from their trunks. A plentiful supply of game is obtainable in the neighbourhood. Some interesting Jain temples exist at a spot about 4 miles distant from the town. Pop. 27,566. The *native state* of D., which is free of tribute, yields its rajah a revenue of £100,000, and has an army of 700 cavalry, 3040 infantry, and 160 artillery with 96 guns. Area 912·5 sq. miles; pop. 186,440, of whom 172,759 are Hindus, 8043 are Mohammedans, 20 are Jains, 5617 are Aboriginal (so described in the Census), and 1 is Christian. The state became a protectorate of the British in 1804. The Rajah, in 1817, received additional territory from the British as a reward for his loyal conduct. On his death Bijai Bahadur, his adopted son, succeeded, and he in his turn was succeeded by Bhawani Singh in 1883.

Duval', Alexandre Vincent Pineu, was born at Rennes, 6th April, 1767. He was from 1792 to 1815 one of the leading dramatic authors in France in comedy, legitimate drama, and opera-comique. His works show skill in plot, effective dialogue, and comic situations. His most successful piece was *Édouard en Écosse, ou la Nuit d'un Proscrit.* He had a bitter controversy with Victor Hugo and the Romantic School, whom he accused of ruining the stage. He died at Paris, January, 1842.

Duvau'cel, Alfred, a French savant, born in 1793, was the son-in-law of Cuvier, who instructed him in natural history. In 1817, as royal naturalist, D. undertook an expedition to Chundernagore, Sumatra, Malacca, and the valleys of the Ganges and the Brahmapootra. He made large collections, which were transmitted to Paris. He was a constant correspondent of the Asiatic Society of Paris. He describes his travels in a graphic style, without losing scientific precision. His visit to the King of Cossya and the 'Cavern of the Devil' is of especial interest. He died at Madras in August, 1824.

Duy'se, Prudens Van, a Belgian author, born at Dendermonde, 28th September, 1804, became Archivist of Ghent, and Professor of National History at the Athenæum, and died 13th November, 1859. His *History of the Poetry of the Netherlands from the 15th c.*, and his own lyrical and dramatic pieces, contributed to the revival of Flemish literature.

Dwarfs. See GIANTS AND DWARFS.

Dwell'ing-House. The legal theory in England and in Scotland is that a man's D.-H. is a sanctuary inviolable by legal execution, but there are so many exceptions to the rule that its force in law is not great. It gives no protection to one charged with a crime, nor against debt to the crown. In England the sheriff, in virtue of a writ called a Capias utlegatum (*that you arrest the outlaw*) could break into a D.-H., and seize the person against whom the writ was directed; but, outlawry in civil matters having been abolished, the writ is obsolete. In Scotland the same end is attained by letters of

Caption and their modern substitute, in virtue of which the debtor is by legal fiction seized as a rebel.

By 24 and 25 Vict. c. 96, stealing anything from a D.-H., with menace to an inmate, is felony. (See BURGLARY.) It is sometimes a considerable aggravation of the offence or crime of assault, if committed within a D.-H.

Dwight, Timothy, D.D., an American divine, was born at Northampton, Massachusetts, 14th May, 1752. His father was Colonel Timothy D., and his mother was Mary, a daughter of Jonathan Edwards (q.v.). D. graduated at Yale College, 1769. After serving as chaplain in the revolutionary army, he was ordained over the Congregational Church, Greenfield, Connecticut, 1783, and in 1795 was elected President of Yale College and Professor of Theology. Here he powerfully opposed infidelity, and gave a fresh religious life to the college. His regular sermons formed the basis of his *Theology* (1818), a work which has made his name a household word both in England and America. D. died 11th January, 1817. Among his other works are *The Conquest of Canaan, an Epic Poem* (1785); and *Travels in New England and New York* (1821).

Dwi'na, or **Dzvina** ('the double river,' comp. Sansk. *Doab*), a river of Russia, and the largest navigable stream in the N. of Europe. It is formed by the Suchona from Vologda in the W., and the Vitchegda from near the sources of the Petchora in the E., which unite below Ustiug-Veliki, their joint stream then receiving the name D., and flowing N.W. to the White Sea. The Suchona, which is regarded as the head stream, rises to the N.E. of the Bielo Lake, and receives the Jug (250 miles) and the Luza before joining the Vitchegda, which has a previous course of 600 miles. It is thereafter increased by the waters of the Vaga (290 miles) on the left, and the Pinega (320 miles) on the right side. It has a total length of 1000 miles, and a basin of some 123,900 sq. miles. Near its mouth, at Archangel, it is 4 miles broad, and about 50 miles up it has a breadth of one mile, while it is navigable as far as the Suchona. Expanding into the D. Bay, it enters the sea through four deeply-furrowed courses. These again are enclosed by a bar, over which men-of-war can only pass at flood-tide. The D. is frozen from the middle of October to the end of April. The Jekaterinen Canal (1807) and the Alexander of Würtemberg Canal connect it with the Volga.

Dyak', **Dayak**, or **Djak**, the name of the aboriginal inhabitants of Borneo (q.v.), a people of Malayan origin still numbering some 1,800,000. They are divided into five principal groups—(1) the wild nomad Mankettas of the interior; (2) the Pari or Kajan in the E.; (3) the Bijadshu in the S.; (4) the tribes of the N.W. in Sambas, Landak, Sarawak, &c.; and (5) those of N. and Central Borneo, chiefly in Brunei and the river district of Kapuas, to which belong the pirate tribes Seribas and Batangulpar. In appearance the D. is robust and muscular, of a complexion varying from the lightest to the deepest brown, with a round face and long black hair. The average height of the men is 5 feet 2 inches. Several of the coast tribes have embraced Mohammedanism, but there is gross superstition everywhere, while polygamy, and even cannibalism, at no very distant time were practised, so it is said, although there seems to be no real foundation for the report as regards the latter. Perhaps, what may have given rise to the statements, vague and unsatisfactory as they are, was the custom of 'head hunting and feasting.' A Dyak in his vengeful spirit would track down his enemy, and, if successful in his attack, would behead his stricken foe. Then hastily returning to his home, he would summon his friends to a feast, at which the ghastly object would certainly occupy a prominent position on the floor of the house in the midst of the party. But for the strictest vigilance of the authorities, 'head hunting' would again be one of the pastimes of the Dyak *brave*. The Dyaks, who are yet but little civilised, are chiefly engaged in cultivating rice, and in bartering gold-dust, diamonds, rattans, gutta-percha, &c., with the Chinese. They are slightly clad, and occupy wooden houses which are often large enough to accommodate 100 persons.

Dyce, Alexander, an English author and editor, was born at Edinburgh, 30th June, 1798. Educated at the High School of that city and at Exeter College, Oxford, D. took orders, and for a time officiated as a curate; but in 1827 settled down to literary work in London. This work consists chiefly of editions, with notes and biographies, of the English dramatists who were predecessors or contemporaries of Shakespeare, such as Peele, Greene, Webster, Middleton, Beaumont and Fletcher, Marlowe, and Shirley; editions of the poems of Shakespeare, Pope, Beattie, and Akenside, for Pickering's *Aldine Poets*, with biographies of the poets; his discovery and publication of two old plays, *Timon* and *Sir Thomas More*; *Recollections of the Table-Talk of Samuel Rogers* (1856); and above all, his *Complete Edition of the Works of Shakespeare, the Text Revised, with Account of the Life, Plays, and Editions of Shakespeare, Notes, &c.*, (1853-58). D., who was also one of the founders of the Percy Society, for the publication of old English ballads, plays, and poems, died 15th May, 1869.

Dyce, William, R.A., painter, was born at Aberdeen, in 1806, and after an education at Aberdeen University, studied art at Rome. His first work was exhibited at Edinburgh in 1827, and three or four years later he exhibited in the Royal Academy, London. His 'King Joash Shooting the Arrow of Deliverance' made him an Associate of the Royal Academy (1844), and he was appointed Professor of Painting in London University. D. was very successful as a fresco-painter, and was employed to decorate Buckingham Palace, Osborne House, the Palace of Westminster, and the House of Lords. His fresco 'The Baptism of Ethelbert,' in the last-named edifice, is much admired. Among his pictures are 'Christabel' (1855), 'The Good Shepherd' (1856), and 'The Man of Sorrows' (1860). D. was elected R.A. in 1848, and died at Streatham, 14th February, 1864.

Dyck, Sir Anthony Van, who divides with Titian the foremost rank in portrait-painting, was born at Antwerp, 22nd March, 1599, commenced to study art under Van Balen at the age of ten, and at the age of fifteen entered the studio of Rubens. The genius that manifested itself thus early was rapid in development; and on the 11th February, 1618, when still a youth of only nineteen, he was admitted a Master by the Guild of Painters at Antwerp. Two years afterwards Rubens engaged him as his assistant, and in 1621, his fame having already spread to England, James I. took him into his service. In 1623 we find him in Venice, painting portraits and studying Titian by making copies of his works. He afterwards visited Rome, where he won the patronage of Cardinal Bentivoglio, and afterwards he removed to Genoa. During his Italian tour he laboured with great assiduity, and as he painted rapidly, he produced an immense number of works, chiefly portraits. On the 4th July, 1625, he landed at Marseille, visited Paris, and thence returned to Antwerp. There he remained from 1626 to 1632, during which period he produced his finest historical pictures and many of his noblest portraits. In the latter year he repaired to England, and entered the service of Charles I., who appointed him chief court-painter, with a salary of £200 a year, and soon after conferred on him the honour of knighthood. The English nobility following the example of the king, Van D. soon found himself practically the portrait-painter for the aristocracy of England. But even when his income was princely, and his state and equipage often surpassed those of the lords who sat to him, he was haunted by ambition, and desired to devote himself to some great historical work. With this view he proposed to decorate the walls of the Banqueting Hall, Whitehall; but the king would not accede to his terms. D., who had married Mary Ruthven, grand-daughter of the Earl of Gowrie, died at Blackfriars, 9th December, 1641. He was buried with great pomp in St. Paul's. Inferior in power of colour and in dramatic instinct to Rubens, he surpassed him in the intensity and elevation with which he expressed emotion. Ease, refinement, and high chivalric sentiment are the chief characteristics of his portraits. Of his historical works the chief is the 'Crucifixion' (1627) in the cathedral at Mechlin. 'This picture,' says Reynolds, 'may be considered as one of the first pictures in the world.' His 'Sampson betrayed by Delilah,' in the Vienna Gallery, is considered by Waagen to be, in a dramatic sense, his finest work. His 'Virgin and Child Enthroned,' in the same gallery, is unsurpassed for elevation of feeling and Titianesque glow of colour. D.'s portraits are to be found in all great galleries, and many splendid specimens adorn the collections of famous English families. The grandest of all his family pictures is that of Johann Duke of Nassau, with his duchess and children, now at Panshanger. He painted a number of portraits of Charles I., one of the finest of which is in the Vienna Gallery. The finest equestrian portrait painted by Van D. is that of Francesco de Monçada, Marquis of Aytona, in the Louvre. See Carpenter's admirable *Pictorial Notices*, &c. (Lond. 1848); *Lectures on Painting by the Royal Academicians*, with introductory essay and notes by R. Wornum, Esq. (Bohn's Scientific Library); *The German, Flemish, and Dutch Schools*, based on the *Handbook* of Kugler, remodelled by Dr. Waagen, and revised by J. A. Crowe.

Dye'ing (Old Eng. *deag*, 'a dye or colour') is the art of imparting fixed and permanent colours to textile substances. The art of D. is one of great antiquity, and of vast extent and importance. The substances to which dyes are imparted are very numerous, and varied in their character and in their behaviour towards D. materials, and the dyes (see DYE-STUFFS) are in their turn equally numerous and different in their composition, properties, and tinctorial effect. There is abundant evidence that the art of D. has been practised from the most remote antiquity. The Jewish patriarch Jacob gave to his favourite son Joseph a coat of many colours, and from the Mosaic narrative we find that the art of D. had attained great perfection in Egypt during the period of the Israelitish sojourn in that land. The fame of ancient Phœnicia, and the supreme commercial position of its capital, Tyre, were largely due to the purple dye of that city. On account of its brilliancy, beauty, and costliness, cloth dyed in this colour became the badge of royalty, and to this day the phrase 'imperial purple' is still employed. The purple of Tyre was obtained from certain molluscs of the genus *Murex*, two different shell-fish, according to Pliny, distinguished as the *Buccinum* and the *Purpura* being its source. It is supposed that the brilliant D. material, murexide, obtained from guano and other sources of uric acid, is identical with the Tyrian purple of the ancients. From very ancient times the population of Hindustan has occupied a foremost position in the knowledge of the art of imparting rich and permanent colours to textiles, and been famous for the skill and artistic effect with which it combined and harmonised the richest colours in woven and printed patterns; and not a little of the knowledge of D. enjoyed by Western nations at the present time has its source among Eastern peoples.

Any texture can only be said to be dyed when the colouring material is so incorporated with or attached to it that it is not affected by washing in hot water, and when it will bear a reasonable amount of exposure to light and moisture without sensibly bleaching or fading. The affinities of the various animal and vegetable substances for the colouring principle of dyes vary greatly. As a general rule it may be said that the animal fibres—silk and wool—take up colours much more readily, and assume more brilliant hues, than either linen or cotton. Silk and wool, moreover, are in many cases dyed permanent colours by preparations which, without the aid of mordants or chemical agents, only give a fleeting stain or discolourment to vegetable fibres. Most of the red colours derived from aniline, for example, attach themselves permanently to woollen textures on a simple immersion of the substance in the beck of prepared dye, no mordant being used. But in order to dye cotton with any of the aniline reds, the goods must first be prepared in a mordant, that generally used for dyeing magenta being the stannate of soda, tannin liquor, and alum. Such mordants are intermediate agents, which have at once an affinity for the fibre to be dyed and the D. material to be employed, and by the use of different mordants a variety of shades and effects are produced with the same D. material. Colouring matters become thus divisible into two classes—(1) Dyes which are fixed, and become permanent without the intervention of any mordant. These receive the name of *substantive* colours. (2) Dyes which require for their fixation the agency of a mordant, which class is known as *adjective* colours. A large proportion of dyes belong to the second class, and in many cases the brilliancy of substances of the first class (substantive colours) is greatly increased by the use of mordants.

Dyes are communicated to textile fabrics either by a process of mechanical fixation, or by a chemical combination between the fibre and the dye. Similarly the action of a certain class of mordants, which comprises salts of tin, iron, &c., is explained by a chemical combination between the mordant and the fibre on the one hand, and the colour and mordant on the other; and a second class of mordants act by mechanically glueing or fixing the colour to the fibre. The operations of D. may be generally summarised under the following heads:—(1) Dyes mechanically fixed. This class includes the dyes known as pigment colours, which are insoluble powders in a state of minute subdivision. They are fixed by means of albumen and similar substances, which, on the application of heat, become solid and insoluble, so that the dye and fibre are in a fashion glued to each other. (2) Dyes which unite directly with the fibre. In the case of such dyes a chemical attraction is set up between the dye and the fibre on the immersion of the fabric in the dye-bath, and the colouring matter is drawn to and permanently fixed on the texture. It is only animal fibres which can be thus dyed, and aniline reds, picric acid, and archil dyes on wools are examples of this style. (3) Dyes fixed to the fibre by means of a mordant. To this class allusion has already been made, and it embraces the most important and extensively-employed substances in the D. series. (4) Dyes fixed by oxidation, in which the dye is communicated to the fibre in a state of solution, and which on exposure to the air, or by other means of oxidation, develop their colour and become permanently fixed on the fibre. Indigo blue forms the best example of this class, it being applied to the substance to be dyed as a colourless solution of white indigo (or indigo which has taken up a proportion of hydrogen into its composition) and which, on exposure to air, rapidly absorbs oxygen and again assumes its blue colour. These classes include the principal means by which dyes are united to fabrics, but there are others which cannot be referred to any of them, and which are due to a variety of special chemical or mechanical agencies. The operations of D., as carried on in manufacturing establishments, are so varied and complex that no general outline of the industry can be given.

In practice, certain preliminary operations are necessary for the preparation of textile materials for D. In order that any material may take up a uniform colour it must be in a state of chemical and mechanical uniformity. Cotton and linen fabrics go through a prolonged and tedious series of operations in Bleaching (q.v.), and similarly silk and woollen fabrics are 'scoured' to extract grease and incrusting substances. Wool and silk are very frequently dyed in the yarn before weaving, cotton is more generally operated on in the web, and linen is not very often submitted to the process of D. at all. A considerable quantity of cotton is dyed Turkey-red in the yarn, and other colours used in gingham-weaving must also of course be yarn-dyed. After D., goods are prepared for the market by washing, starching, and calendering or beetling in the case of woven cotton fabrics, and by a variety of processes in the case of silk and woollen textures, according to the nature of the cloth.

Dy'er, George, an English author, was born in London, 15th March, 1755, educated at Christ Hospital and Emmanuel College, Cambridge, and after 1792 settled in London as a writer. He died 2nd March, 1841. D. was a good scholar, and a most industrious and useful author. He took a large share in the production of Valpy's edition of the classics (141 vols.), and wrote the *History of the University of Cambridge* (Lond. 1814), *The Privileges of the University of Cambridge*, &c. (Lond. 1824), and numerous other works.

Dyer, John, an English poet, was born at Aberglasney, Caermarthenshire, in 1700, educated at Westminster School, gave up law for painting, travelled in Italy, finally settled in

England, took orders, and became rector of Coningsby in Lincolnshire, where he died 24th July, 1758. He was a pleasing and natural poet. His works consist of *Grongar Hill* (1726), an excellent descriptive poem; *Ruins of Rome* (1740), a more ambitious and less successful effort; and *The Fleece*, a Georgic in praise of sheep-shearing and the wool trade. D. had considerable poetic power, which was recognised by Gray and Wordsworth.

Dye-Stuffs, the materials used by dyers for producing colours upon textiles and other substances. D.-S. which produce their tinctorial effect directly, without the intervention of any adjunct, are termed *substantive* dyes, while others which require a secondary agent or mordant are known as *adjective* colours. On this account a variety of substances which act as mordants ought to be included in the list of necessary D.-S., although of themselves they have no tinctorial virtues. The chief mordants used in dying are various salts of tin and iron, and to a less extent of other metals, aluminous compounds, sartrates, and tannic acid. D.-S. proper are very numerous; they are drawn from the mineral, vegetable, and animal kingdoms, and an increasing number of the most important and valuable D.-S. are obtained by chemical reactions from various products of coal-tar. The chief D.-S. will be noticed under their proper headings, and here they are only briefly named and classified according to their various sources.

Animal Substances.—Carmine and other lakes, the most brilliant and valuable of all red dyes, are obtained from cochineal, the female insect of *Coccus cacti*. Kermes is a red dye produced from a closely allied insect, *Coccus infectorius*. Lac dye is an E. Indian product, extracted from a resinous exudation produced on various trees by another species of *Coccus*. Galls also are produced by the puncture of insects, chiefly of the genus *Cynips*, on various species of oak and other trees. The purple of Tyre was a product of the molluscan genus *Murex;* and the murexide dyes of modern times are prepared chiefly from guano.

Vegetable D.-S.—The vegetable kingdom is the source of by far the largest number of the tinctorial agents used in industrial processes. The most important and extensively used vegetable D.-S. is madder, the roots of *Rubia tinctoria*, widely cultivated throughout the S. of Europe. With various mordants, it yields many shades of red, purple, brown, and black, and it is the material employed for dyeing the well-known Turkey-red. It contains two chief colouring principles, alizarin and purpurin, which are now largely prepared from a product of coal-tar, this being the first instance of the artificial production of natural organic D.-S. Munjeet is the roots of a closely allied plant, *Rubia munjista*, grown in the E. Indies, and possessed of properties similar to madder. The wood of several trees yields red colouring matters, the chief of which are logwood, obtained from *Hæmatoxylon Campechianum;* Brazil wood, yielded by *Cæsalpinia Brasiliensis;* peachwood, from *Cæsalpinia echinata;* and there are one or two other species of *Cæsalpinia*, all of which, with logwood, grow in the W. Indies and tropical America. From the E. Indies two red dye-woods are obtained, sappan wood from *Cæsalpinia sappan*, and red sanders, the wood of *Pterocarpus santalinus;* and camwood or barwood, the produce of *Baphia nitida*, is imported from the W. coast of Africa. Two varieties of wood yield yellow dyes of commerce: (1) Fustic, the wood of *Maclura tinctoria*, a tree growing in the W. Indies and Central America; and (2) Zante or young fustic, the wood of *Rhus cotinus*, found in Eastern Europe and Asia Minor, the leaves of which form the sumach used in dyeing and tanning. Among other vegetable D.-S., none is of greater importance than indigo, the well-known blue dye prepared from *Indigofera tinctoria* and *I. anil*, originally natives of the E. Indies, but now also cultivated in the W. Indies and tropical America. Closely allied to indigo in its properties is woad, a preparation from our native plant the weld or woad, *Isatis tinctoria*, which in remote times was used for staining the skins of our ancestors. Safflower, which yields a fine pink dye, is the flower-heads of a composite plant, *Carthamus tinctoria*, cultivated in the S. of Europe. Alkanet, a red dye-stuff, not now much used, is the roots of *Alkanna tinctoria*. A valuable series of purple dyes, known as archil, cudbear, and litmus, are yielded by various species of lichen, chiefly *Roccella tinctoria*, found wide-spread on the coasts of warm seas. Among materials yielding various shades of orange and yellow are quercitron, the bark of *Quercus tinctoria*, a N. American oak; yellow or Persian berries, the fruit of *Rhamnus tinctoria*, which grows in Asia Minor; annatto, a substance covering the seeds of *Bixa orallana*, the al or ak root, yielded by various species of *Morinda* in E. India, and saffron, which is the pistils of a variety of *Crocus*, a substance, however, more used in pharmacy than in dyeing. Catechu and various other substances containing tannin are used for browns and blacks in dyeing.

Mineral Pigments.—The most important of these for the use of the dyer is ultramarine, a rich blue colour which primarily was obtained from lapis-lazuli, but now is artificially prepared. Artificial ultramarine is a complex substance, varying in its constitution. (See ULTRAMARINE.) Prussian blue is obtained by mixing a solution of ferro-cyanide of potassium (prussiate of potash) with a solution of a salt of iron, such as the chloride. Other mineral blues are obtained from cobalt; greens are yielded by arsenical compounds; and preparations of chromium give both yellow and green pigments. Vermilion is to some extent used as a red pigment colour by dyers.

Artificial Organic Dye-Stuffs.—The whole of the colouring-matters we include in this group are derived from one or other of the numerous products obtained from the treatment of coal-tar, but chiefly from aniline. Although the industries connected with the production of aniline dyes may be said to be still in their infancy, they have already overshadowed all others connected with the production of D.-S. in extent and importance. All colours, and almost every shade of colour, have been produced in aniline colours, and a simple enumeration of the commercial varieties which have been brought into the market would occupy columns, while to detail the variety of processes employed would require many pages. Mauve, or Perkin's violet, was the first colour introduced, the process for obtaining which having been patented by Perkin in 1856; but the subsequently discovered Hofmann red (magenta or rosaline), while itself a much more important dye-stuff, is the starting-point for obtaining nearly all the endless aniline dies now in use. Carbolic acid or phenol, naphthalin, and anthracin, all derivatives of coal-tar, are also sources of several important D.-S., the latter being the source of artificial alizarin, to which allusion has already been made.

Dyke, or **Dike** (Old Eng. *dic*, Dutch, *dyk;* lit. 'the earth dug out and thrown up'), in engineering, a mound or embankment to protect low-lying land from inundation by the sea or a river. In the Netherlands, where much of the land is below the sea-level, the art of D.-building has been carried to great perfection. The character that the Dutch bear for indefatigable industry has been due mainly to their extraordinary and successful efforts to prevent the encroachment of the sea, and to reclaim the land through extensive systems of drainage by means of dykes and other engineering resources. Dykes may be seen along the coast of Holland and the courses of the principal rivers, especially at the mouths of the Scheldt, Maas, and Rhine. They also traverse the country in every direction, being of sufficient width at the summit to carry canals and roadways alongside. These mounds are formed of clay, earth, and sand, and slope gradually from the base. On the sea or river side the gradients are easy, and to prevent the earth being washed away, a protection of reed or willow matting is laid on and secured by stakes. On the land side they are strengthened by piles and planking, the interstices being filled in with stones, and the whole covered with earth and turfed. A height of 30 or 40 feet is frequently attained by such dykes. Those of the Helder, in N. Holland, furnish an example of D.-building on a stupendous scale. In Scotland, the term D. is applied to any stone wall which serves as a fence.

Dyke, in geology, the name given to extensive masses of volcanic or igneous rocks, forming wall-like partitions, which separate the edges of otherwise continuous strata or beds. Dykes generally occur in volcanic districts, and as seen in the neighbourhood of recent or active volcanoes, they may be traced abundantly branching out in every direction. Sometimes they may be traced continuously for long distances (as in a D. 50 feet thick extending across the Yorkshire coast N.W. for 10 miles), and they may be found either to occupy the place of dislocations or fissures, or to have cut their own way through continuous strata. Dykes are usually vertical or wall-like in form, and are hence distinguished from *veins*, which may be at any angle, and even run between horizontal strata. They vary in thickness from a few inches to 60 or 70 feet. If our means of tracing dykes were at all perfect, we should probably find that they could be in almost every case traced into the parent mass of igneous rock from which they had originally flowed. In the case of 'trap-dykes,' the sides present a remarkable evenness and uniformity; and this regularity of thickness and formation often tends to show that the dykes have merely filled up previously existent fissures, and have not themselves been the original cause of the solution of continuity between strata. They are common near coal-fields, and frequently perplex mining operations from opposing a barrier, often of great and indefinite extent, to the continuous nature of the coal-seams. See COAL. Dykes are interesting objects to the geologists from the effects they have had in altering the surrounding strata—coal, limestone, and other rocks having had their texture widely altered from the intrusion of these igneous formations.

Dynactinom'eter (Gr. *dunamis*, 'power'; *actis*, 'a sunbeam'; and *metron*, 'a measure'), an instrument for measuring the intensity of the light-rays of the sun and comparing the powers of object-glasses. See Claudet's paper in the *Philosophical Magazine* for June, 1851, and Hunt's *Photography*.

Dynam'ics (Gr. *dunamis*, 'force,' or 'power') is the science which investigates the action of force; or, more correctly, the effects produced upon a given material system by a given transformation of Energy (q.v.) in a given time. In its more restricted sense, it treats of the *motions* and *equilibrium* of particles and rigid bodies under the action of moving forces, thus naturally splitting up into *Kinetics* (q.v.) and *Statics* (q.v.). When used in connection with other departments of natural philosophy, it is qualified by a prefix, as, for instance, Aërodynamics, Electrodynamics, Hydrodynamics, Thermodynamics, to each of which the reader is referred for further information. The foundation of all dynamical science is Newton's Laws of Motion, containing as they do a clear philosophical conception of the three fundamental units of space, time, and mass, without a true knowledge of which advance is impossible. The progress or history of D. is inseparably connected with the names of Archimedes, Galileo, Kepler, Newton, Bernoulli, Huyghens, D'Alembert, Euler, Clairaut, Lagrange, Laplace, Hamilton, &c. The wonderful generalised theorems of Lagrange, whose mathematical insight has perhaps never been equalled, deserve especial notice; while the new and powerful Hamiltonian analysis, Quaternions, has in the hands of its originator and others yielded such striking results already, that it seems destined to extend and strengthen the science to a degree never before dreamt of, especially in the departments of electricity and light.

Dyna'mite, a name applied to several mechanical mixtures of the explosive liquid nitro-glycerine and absorbent matter, as infusorial earth, silica, Tripoli powder, mineral ash, &c., and the name is also given to other compounds which contain, in addition to the nitro-glycerine and an absorbent, substances semi-explosive, or decomposable on explosion, as resin, charcoal, sulphur, nitrate of potash, soda, and ammonia, &c. The disastrous explosions, often without assignable cause, which accompanied the employment and transport of nitro-glycerine after its discovery, and the great danger at all times attending its use, led A. Nobel, a chemist, to experiment upon its behaviour and explosive force when absorbed by inert substances. In 1867 he announced his discovery of a preparation, to which he gave the name D., which robs nitro-glycerine of its treacherous character, while it retains its high explosive power, thereby rendering this compound one of the safest, most useful, and most powerful explosives known. In the following year Nobel read a paper on D. before the British Association at Norwich. D. is manufactured in large quantities in Germany, France, and elsewhere on the Continent of Europe, in America, and in Great Britain. Its manufacture and circulation for industrial purposes in Great Britain began with the establishment of the British D. Company's factory at the Arde Hills, in Ayrshire, towards the end of 1872. This company manufactures on a large scale two kinds of D., respectively called No. 1 and No. 2. The operations of manufacture are briefly as follow: For D. No. 1, *kieselgühr*, a porous siliceous earth, obtained in Germany, capable of absorbing three times its own weight of nitro-glycerine, is resorted to. After being calcined to oxidise the iron in it, crushed to a fine powder, and sifted, 25 parts by weight of *kieselgühr* and 75 parts by weight of nitro-glycerine are kneaded into a paste and passed through a sieve. D. No. 1, so prepared, is a loose plastic powder, with a reddish-buff colour, due to peroxide of iron. In D. No. 2, nitrate of potash and carbon take the place of siliceous earth. The proper ingredients and proportions are —71 parts by weight of nitrate of potash, 10 parts by weight of powdered charcoal, 1 part by weight of paraffin, and 18 parts by weight of nitro-glycerine. The ingredients being thoroughly incorporated, form a black moist powder, drier than D. No. 1. Both descriptions of D. are put up into paper-cased cartridges, weighing from 1 to 4 oz., for storage or use. During storage the chief danger attending the use of these cartridges arises, for if the D. is not carefully prepared, any excess of nitro-glycerine exudes through the paper wrappers, and accidental explosion might result from slight friction or concussion. Parchment, however, is said to be impervious to nitro-glycerine, and in that case, it is manifestly a great advantage to use it for cartridges. D., unlike nitro-glycerine, cannot be exploded by heat, a spark, friction, or concussion, and if ignited in any other way than by violent percussion in the open air, and in *moderate quantity*, it burns quietly away. A special committee, appointed by the British Government, carried out extensive experiments with D., and it was shown that a box containing 50 lbs. did not explode when ignited by a light, but that a violent explosion followed in similar circumstances with a large quantity. D. explodes with a force ten times greater than its weight of gunpowder, if ignited by the detonation of a fulminating capsule or fuse. Roux and Sarran, in experimenting with Vouges D. No. 2, containing 50 per cent. of nitro-glycerine, found that ignition otherwise than by fulminating powder was followed, when the material was confined, by an explosion the effect of which was only equal to twice the weight of gunpowder, whatever the temperature or pressure. It seems, therefore, that an explosion of two orders can be excited in D., one exerting a force five times greater than the other.

D., like nitro-glycerine, congeals in cold weather, in which state it is less explosive, and does not exert the same power as when plastic; heat, however, restores it to its ordinary condition. In Great Britain the industrial applications of this valuable explosive agent are confined chiefly to mining and blasting. Its efficiency in detaching large masses of rock, in removing substantial obstructions in rivers, and in breaking up large masses of cast-iron, has been amply proved. As compared with gunpowder and gun-cotton, the amount of work performed by D. is greater, with a saving of time and cost. In Germany, France, and elsewhere, it is used for artillery purposes. A penalty of £100, besides 2s. per lb. of material landed, is attached to the importation of D. into Great Britain without a license, and all, or any part, of the D., whether actually landed or remaining in any ship or boat in connection with the breach of the law, may be forfeited.

The following is a list of kindred explosives licensed for manufacture, storage, and use in Great Britain:—

Horsley's Blasting Powder, A and B, consisting of nitro-glycerine (25 per cent.) and an absorbent powder, composed of chlorate of potash, nutgalls, and charcoal.

Brain's Blasting Powder, consisting of nitro-glycerine (40 per cent.) and a pulverised preparation of fine charcoal, sawdust, and mixed chlorate and nitrate of potash.

Lithofracteur, which chiefly differs from British D. No. 2 in containing all the elements of gunpowder. An analysis by Professor Able gives the typical composition as nitro-glycerine, 42 parts; sulphur, 4; nitrate of soda, 25; sand, sawdust, charcoal, &c., 29. See also CORDITE.

Dynam'ometer, an instrument for measuring the effort exerted or the work done by a machine. There are three classes of dynamometers, viz.—(1) Those which merely indicate the effort exerted, leaving the distance and time through which it is exerted to be separately noted. Some machines of this class record the effort on paper by self-acting mechanism, as well as indicate it. (2) Those which record both effort and distance, generally in the form of a curve, of which the ordinates represent the magnitudes of the efforts exerted or resistances overcome, and the abscissæ the distances moved through,—the area consequently giving the product of these two, *i.e.*, the work done. (3) Those which, by means of suitable apparatus, record the work done; the product, that is, of the effort (or resistance), and the distance through which it is exerted. These are called integrating dynamometers. In Class 1 the ordinary friction brake and some kinds of spring balances are used for the purpose of measuring effort; to Class 2 most dynamometers used for measuring traction belong, and the steam-engine indicator; to Class 3, Ashton and Storey's power meter, &c.

Dyoor ('men of the woods'), a race of Central Africa, in the region of the Upper Nile. The Dyoors are of a noble negro race, with small development of jaw and graceful slimness of limb. They occupy a small territory, and are not over 20,000 in number. Occupying a ferruginous district, they are famed for their skill in ironwork, and provide the coin which circulates in the whole Upper Nile region—*i.e.*, spades and spear-heads. Like the Shillooks of the N., from whom they are derived, and whose dialect they use, the Dyoors can gain a livelihood in various ways. Besides working in iron, they farm, hunt, and fish, and are quick and ingenious in constructing wickerwork and pottery. The Nubian slave-dealer has greatly injured the prosperity of the Dyoors. The river D. traverses the country of the same name, and is a large tributary of the Ghazal, which it joins about 150 miles S.W. of the confluence of the latter with the Nile.

Dy'sart (Lat. *desertum*, in ecclesiastical Latin, 'a religious solitude'), a seaport and royal burgh in Fifeshire, Scotland, on the Firth of Forth, 12 miles N.N.E. of Edinburgh, has some ship-building, flax-spinning, damask-weaving, coal and iron-stone mining, fishing, &c. It is quaintly built, on a rocky site, and attracts summer visitors. Along with Kirkcaldy, Burntisland, and Kinghorn, D. forms the Kirkcaldy District, which sends one member to Parliament. D. was formerly connected with the monastery of Culross or Kirkcaldy, and near to it is the cave of St. Serf. Pop. parl. burgh 12,849; town 3022.

Dys'entery (Gr. *dus*, and *enteron*, 'the intestine') is a severe inflammation of the large intestine, accompanied with much fever and great prostration. D. is rare in temperate climates, but common in the tropics, and is one of the most fatal diseases to armies in the camp. Its origin is often ascribed to low, damp, malarious districts. The treatment consists in a change of air and the use of astringents, especially gallic acid and opium. Ipecacuanha in scruple or drachm doses is very beneficial, and is much used in India.

Dyspep'sia (Gr. 'difficult digestion') is a term used by medical writers for Indigestion (q.v.).

Dyspnœ'a (Gr. 'difficulty of breathing') is a shortness of breath that accompanies all thoracic diseases.

Dytis'cus (from Gr. *dutēs*, 'a diver'), a genus of *Coleoptera* (q.v.) or Beetles included in the section *Hydradephaga* or Water-beetles, in which the legs are adapted for swimming, the two hinder pairs being flat and fringed with hairs. The body is oval and flattened, and the mandibles or larger jaws of strong make. In D. the front legs are short, and the antennæ elongated. The tarsi of the males are wide and flattened. *D. marginalis* and *D. dimidiatus* are two familiar species, common in our brooks and ponds. The spinacles or breathing apertures in these animals are set high on the body, and are covered by the elytra or wing-cases, beneath which a supply of air for respiration is carried. These beetles are carnivorous in habits, as also are their larvæ. *D. marginalis*—the great water-beetle—is about 1¼ inch in length.

Dyv'eké, or **Duveké** (Dutch, 'a dove'), the mistress of Christian II. of Denmark, was the daughter of Sigbrit Wylms, an innkeeper, and was born at Amsterdam, 1488. She first met her royal lover at Bergen in 1507, followed him to Copenhagen (1513), and there the guilty relation was renewed notwithstanding his marriage with Isabella, daughter of the Emperor Karl V. The subsequent interference of the ambitious Sigbrit Wylms with public affairs seems to have stirred the hatred of the nobles, and either to this cause or to the baffled passion of Torben Oxe, governor of the palace, is ascribed a plot to poison D., which was successfully carried out in 1516. Among the many works of fiction founded on this story are *Dyveké*, a well-known tragedy by Samsöe, a Dane (Ger. transl. Leipz. 1810); *Täubchen von Amsterdam*, a tragedy by Marggraff (Leipz. 1839); and *Sybrecht Willms*, a romance by Ida Frick (Dresd. 1843).

Dy'vour (from the Fr. *devoir*, 'to owe'), and **Dyvour's Habit,** are terms of Scotch law. According to Skene, a D. is a bankrupt 'who, being involved and drowned in debts, and not able to pay or satisfy the same, for eschewing of prison and other pains, makes cession and assignation of all his goods and gear in favour of his creditors, and does his dyvour and duty to them, proclaiming himself bairman and indigent, and becoming debt-bound to them of all he has.' During the 17th c. dyvours were appointed by orders of the Court of Session to sit on a pillory at stated times near the market-cross of Edinburgh, in a coat or upper garment, half yellow half brown, with a particoloured cap or hood on the head. In granting the Cessio Bonorum (q.v.) it was the practice, until the passing of the Act 6 and 7 Will. IV. c. 56, to dispense with the habit, and by that statute it is abolished.

Dzigg'ethai, or **Koulan,** a species or *Equidæ* or *Solidungula* forming one of the species of wild asses inhabiting Persia, India, Mesopotamia, &c. This animal is somewhat mule-like in appearance. Its colour is reddish-brown in summer, the tints becoming greyer in winter, while a black stripe runs along the spine. The D. is a wonderfully swift and agile animal, and is hunted in Persia and India.

E.

E the second vowel and the fifth letter of the English alphabet. It exactly corresponds to the Semitic *He*, except that all the derivative alphabets have followed the Greek, which turned it to face the right, instead of the left, E instead of Ǝ. In its origin it is properly a weakened form of *a*; and many languages, especially those of India, are almost able to dispense with its use. It is particularly liable to be interchanged with the stronger vowel *a*, in passing from one cognate language to another, and consequently its philological value is small. The Greek alphabet in its later days possessed two forms of E—*epsilon*, or short E, the original letter borrowed from the Phœnician; and *ēta*, or long E, the form of which as a capital was H, the Semitic *Cheth*, or hard aspirate.

The pronunciation of E is very irregular, especially so in English. Its normal phonetic value is that of an open or long *a* or *ay*, which is hardly heard at all in English, unless in such exceptional words as 'where,' 'grey,' 'vein,' but may be universally found in Italian and French. The sound may be either short, as in French *et*, or long, as in *père*. By far the most common sound of E in English is that which is really the appropriate value of the stronger vowel *i*, which is often expressed in transliteration from foreign languages by a double E. This may be exemplified by 'me' and 'see.' This sound is also maintained for most of the diphthongs formed with E, as 'read,' 'siege,' 'receive.' But the English usage is too variable to allow of any universal rules. In Modern Greek, both the short and long E, the vowels *i* and *u*, and the diphthongs *ei* and *oi*, are all pronounced like the short English E. It must also be noticed that this letter has a strong tendency to become mute at the end of words, *i.e.*, to lose its own sound altogether; while it commonly lengthens the vowel of the preceding syllable, as in English 'cane' or French *mère*. At the same time it softens *c* or *g*, if those be the immediately preceding letters, as in 'face' and 'cage.' In some words adopted from French or Latin, as 'examine,' 'preterite,' the final E is simply useless. As an abbreviation, E most generally stands for East. It is also found in *e.g.*, for *exempli gratiâ*; and *i.e.*, for *id est*.

E, in music, a note a major third above C. The vibration ratio E : C is equal to $\frac{5}{4}$.

Ead'gar (mod. *Edgar*), an English king, the second son of King Eadmund, was born about 940, and in 956 was chosen king of Mercia and Northumberland in place of his brother Eadwig, who had enraged the churchmen, and especially Dunstan (q.v.), by an uncanonical marriage. In 960 Wessex yielded to his rule. Under E., whose policy was solely moulded by Dunstan, civil strife and the Danish descents ceased, and the English kingdom was consolidated. Among his titles was *Anglorum Basileus*, and it is said that once eight kings rowed his barge on the Dee. He is reported to have freed Wales from wolves by imposing an annual tribute of 300 wolves' heads on the Welsh. See DUNSTAN.

Eadgar the Ætheling, a grandson of Eadmund Ironside, chosen king by the English in 1066, after the battle of Hastings. His chief supporters, Eadwine and Morkere, Earls of Mercia and Northumbria, being forced to retreat before the Duke of Normandy, E. headed the deputation which offered William the crown, but afterwards fled to Scotland, where his sister Margaret married Malcolm Canmore. The Northumbrians, in league with Sweyn of Denmark, proclaimed E. king of England, but were unable to cope with William, and E. again sought refuge with Malcolm. He was afterwards a dependent at William's court, and became a friend of Robert Duke of Normandy. On Malcolm's death, in 1097, he drove Donald Bain from the Scottish throne, on which he placed his nephew Edward as an English feudatory. He is said to have accompanied Duke Robert to the Holy Land, and in the struggle between Robert and Henry I. was taken prisoner, but shortly freed by Henry. William of Malmesbury says he lived to an old age, but the date and manner of his death are unknown.

Ead'mer of Cant'erbury, a figure of some note in English history and literature, flourished in the early part of the 12th c. He became prominent in the struggle between the sees of Canterbury and York for supremacy over the Scottish Church. When King Alexander I. desired a bishop for the vacant see of St. Andrews, E. was sent by Archbishop Ralph in 1120. He was elected; but the king, wishing to have an independent Scotch bishop, would not permit his return to Canterbury for consecration. E. accordingly went back to his monastery; but repenting afterwards of this step, wrote to the king expressing his willingness to return. Alexander, however, declined; and the see of St. Andrews remained vacant till E.'s death, which took place in 1123 or 1124. His chief literary works are the *Vita Anselmi* (Life of St. Anselm), and *Historia Novorum* (history of his own times). In the *Vita* we see the dim reviving of a national spirit in our literature. The *Historia* is in the main reliable, and contains facts of interest not to be found elsewhere. A selection of E.'s writings, edited by the monks of St. Maur, is published at the end of Father Gerberon's edition of Anselm's works (Paris, 1675 and 1724). E. was a voluminous ecclesiastical biographer. Among his lives of saints are those of St. Dunstan, St. Wilfrid, and St. Oswald. These are published by Wharton in the *Anglia Sacra*, part ii. (Lond. 1691). An account of E.'s relation to Scotch church history is contained in Grub's *Ecclesiastical History of Scotland*, vol. i.

Ead'mund (mod. *Edmund*) **Ironside**, son of Æthelred the Unready, was born in 989. When Cnut invaded England on Æthelred's death in 1016, E. was chosen king by the citizens of London, and opposed the Danes with great bravery and energy. After defeating Cnut at Gillingham, Sherston, Oxford, and Brentford, he was signally beaten at Assandun, Essex, and agreed to resign Mercia and Northumbria to Cnut, himself retaining the rest of the country. Shortly after, E. was poisoned at Oxford, through the agency of Cnut or of Eadric of Mercia, in 1016, and Cnut became sole king of England. The great-granddaughter of E., Matilda, was married to Henry I.

Ead'ward (mod. *Edward*) **the Confessor**, son of Æthelred the Unready and Emma, daughter of Richard Duke of Normandy, was born in 1004, and lived in exile at the Norman court until 1042, when he became king of England on Harthacnut's death. His accession was largely due to the adroit Godwine, Earl of Wessex, whose daughter Eadgyth was married to E., and who became for a time virtual ruler of the country. E. greatly favoured the Normans frequenting his court, promoting them to high posts in the church and state. One of these unpopular strangers—Eustace, Count of Boulogne—had an affray with the men of Dover, whom E. ordered Godwine to punish. He refused, levied an army, and demanded the dismissal of the Normans; but being unable to resist the king, withdrew to Flanders, whence he was recalled in 1052 to allay the indignation of the people. Godwine died shortly afterwards, and his son Harold became actual ruler of England until E.'s death in 1066. In this reign the *Danegelt* was repealed, a digest of the laws formed, and a certain polish communicated to the English through intercourse with Normandy, while the growing influence of a Norman party prepared the way for the Norman conquest. Under E. the country was prosperous; two wars were carried on against the Welsh, and a successful expedition was sent into Scotland to support Malcolm Canmore against the usurper Macbeth. See Freeman's *History of the Norman Conquest* (Lond. 1876), and Luard's *Life of Edward the Confessor* (Lond. 1858).

Eadwi'ne (mod. *Edwin*), an English king whose history forms one of the most beautiful and romantic tales in Bede. He was the son of Ælla, king of Deira, and was born in 586. On Ælla's death in 589, E.'s uncle, Æthelfrith, seized the crown of Deira, and E. spent his youth as a homeless outlaw, until Rædwald, king of E. Anglia, espoused his cause, defeated Æthelfrith, and made him monarch of all Northumbria. According to Bede, whose account of E. is clearly inwoven with fiction, E. was at Rædwald's court visited one night by a mysterious man, who foretold his greatness if he should espouse a new faith, and bade him remember a certain sign. E. was soon the most powerful king in England, became overlord of the country from the English Channel to the Forth, where he founded Edinburgh (' Edwin's burgh ') and for eight years ruled so sternly and justly that it was said 'a woman with her babe might walk scatheless from sea to sea in E.'s day.' In 625 he married Æthelburh, a Christian princess, sister of Eadred, king of Kent. She brought with her to Northumbria various churchmen, the chief being Paulinus (q.v.), the great missionary of the N. of England. After a narrow escape from an assassin sent by Ceawlin, king of Wessex, whom he forthwith defeated, and, according to Bede, a second appearance of the mysterious man, E. was baptized at Eoforwic (York) in 627, and strongly forwarded the spread of Christianity in England. Penda of Mercia, however, a fierce pagan, bent on shaking off the Northumbrian overlordship, defeated and slew E. at Hatfield in 633, a battle which delayed the conversion of the North and Midlands. E.'s reign, from its connection with the Christianising of England, is one of the most important in English history. See Freeman's *History of the Norman Conquest*, vol. i.

Eagle (Fr. *aigle*, Lat. *aquila*, from the root *ac*, ' sharp, swift '), a genus of Raptorial birds, forming the type of the sub-family *Aquilinæ*, which group in its turn is included in the family *Falconidæ* As a sub-family, the *Aquilinæ* are recognised by their bill being straight at the base, and acutely arched towards the tip; the edges being wavy, and the nostrils being situated in front of the Cere (q.v.). The tail and tarsi are elongated, and the inner toe is of stronger make than the other three toes. The genus Aquila, including the most typical eagles, is recognised specially by the large oblique nostrils, by the wings having the fourth and fifth quills longest and of equal length, and by the tarsi being feathered to the bases of the toes. The tail is broad and rounded. The E., known popularly as the 'king of birds,' has been held to represent all that is graceful and powerful in the bird creation. It is eminently rapacious, carrying off for prey many small animals, and even attacking man himself when it is roused or irritated. The nest, or *eyrie*, is built in an exposed situation, and is rudely constructed of sticks and other materials loosely aggregated together. The eggs usually number two, and are of a whitish colour. The most celebrated and typical of the eagles is the golden E., found in both Old and New Worlds. This bird may attain a size of 3½ feet in length, the expanse of wings measuring 9 feet. The females are larger than the males. The colour is a general blackish brown, the head and neck feathers being tinted of a golden-red hue. The legs and thighs are greyish brown, and the tail a deep grey with brown bars; the feet and cere are yellow. In England the E. is extinct, but it occurs in the N. of Scotland and N. of Ireland. Other species of true eagles are the imperial E. of Asia and S. Europe, the bold E. of Australia, the former known by a white patch on the scapular feathers, and the latter by the reddish hue on the back of the neck. The reptile E. occurs only in S. America, where it lives in the dense forests and hunts for its food, consisting of birds and reptiles. The booted E. is found in Asia and Central Europe, and is of a dark-brown colour. To the allied genus *Spizaëtus* belongs the martial E. of S. Africa; while the crested or harpy E. is also included in a different group. The Sea-Eagles and Bald Eagles (q.v.), belong to the genus *Haliaëtus*. The length of these is about 3 feet, and the spread of the wings over 7 feet; the female bird being larger than the male. These species are to be found around the American coasts, and in most parts of the Eastern Tropics. They feed chiefly upon fish. The name E. is also applied to birds belonging to widely different genera from the above. Of the latter, examples are found in the E.-Hawks (q.v.); the New Holland White E., and other forms.

Reptile Eagle.

Bald Eagle.

Eagle, in heraldry, is one of the earliest charges, and holds the same position among birds as the lion among beasts. It was the emblem of St. John, of regal power, and of courage and magnanimity, and was generally borne *Displayed* (q.v.). When represented as double-headed, it is sometimes spoken of as the *imperial*; when single-headed, as the *royal* E.

Eagle, as a military standard, is first mentioned in Xenophon, who states that it was customary in Persia to have a golden E. with outspread wings borne on a spear in front of the army. This custom of the Persians was adopted in Egypt under Ptolemy Soter. The emblem of the Republic, as well as that of the Empire of Rome, was the E. armed with lightnings—the symbol of Jupiter. This device was adopted as the Roman military standard in the second consulship of Marius (B.C. 104). The E. of the Roman legions was fixed upon a long shaft or spear, with outspread wings, as about to soar into the sky, grasping the thunderbolts in its talons, and, in later times, surrounded with laurels. The eagles were first made of wood, afterwards of silver, and later of gold. On the march they were always carried by the cohorts of the van; in camp they stood in the Prætorium, fixed in the earth. Desertion or loss of E. was punished with death. As a military standard during the Middle Ages the E. had no more than an heraldic importance. Napoleon I. (1804) revived its use in the army as a fitting symbol of imperial France. The French E. is the Golden E. of Zeus plumed for flight, and bearing the lightnings in its claws. Under the Bourbons it was superseded by the tricolor, but it was restored under Napoleon III. by decree 1st January, 1852. The E. has also been adopted as their national military ensign by Russia, Germany, Austria, and the United States of America. The black double-headed E. of the Latino-German empire is represented with a head and neck looking to the right, and another head and neck looking to the left; holding the sceptre in the right talon, and the imperial globe in the left. This E. was originally single-headed, and is said to have been adopted by Karl the Great, at his coronation in Rome, as a symbol of the empire he had founded. To indicate the E. and W. Roman Empires, or the union of the imperial and kingly office, the double-headed E. first occurs on an imperial coin struck in 1325 by Ludwig of Bavaria.

Eagle, an American gold coin of the value of ten dollars, and weighs 258 grains, and contains 232·2 grains of fine gold. The half-eagle is worth five dollars.

Eagle Hawk, a borough in Victoria, $4\frac{1}{2}$ miles from Sandhurst (q.v.), and 105 miles N.W. of Melbourne (q.v.). It is in the heart of a very important gold-mining district. Pop. 7315, of whom most are engaged in mining.

Eagle-Hawk, a name given to certain species of Raptorial birds of the genus *Spizaëtus*, nearly allied to the *Aquilæ* or Eagles (q.v.). In this group the tarsi are long and slender, and the toes are long and powerful. These birds otherwise resemble the eagles, and inhabit Asia, S. America, and Africa. A good example of the group is the crested E.-H. of Guiana.

Eagle, Order of the Black, a renowned Prussian order of knighthood, was founded in 1701 by the elector of Brandenburg, on his coronation as King of Prussia. Excluding the royal family, the number of knights was at first restricted to thirty, but is now undetermined. The insignia are a blue cross and a B. E. between each of the eight arms of the cross. Knights of this order are also knights of the **Order of the Red Eagle,** founded by the Markgraf of Bayreuth in 1734, incorporated with the order of the B. E. in 1791, and reorganised in 1810.

Eagle-Owl.

Eagle-Owl, or **Great Owl,** a species of Raptorial birds belonging to the sub-family *Buboninæ* or 'eared' owls, and to the family *Strigidæ*. The genus *Bubo* is distinguished by the moderately-sized bill; by the wings having their second, third, and fourth quills longest; the tail being of moderate size and rounded, and the tarsi thickly feathered. The E. O. is found in N. Europe, and also occurs in Italy and Turkey. It is rare in Britain. Its average length is 2 feet, and its usual colour is a yellow tinged with brown, and marked on the upper parts with black or dark-brown bars and spots. The beak and claws are black. The Virginian Eared Owl is the E.-O. of America. The throat in the latter is pure white in colour.

Eagle-Wood, or **Aloes-Wood,** the wood of plants belonging to the natural order *Aquilariaceæ*, in which the trees have exstipulate leaves and exalbuminous seeds. They are natives of tropical Asia. The wood above named affords a fragrant resin, which, as a remedy for gout, has some repute in India. It is probably the *Ahalim* or *Ahaloth* of the Old Testament, and the 'aloe' of the New Testament, translated 'aloes.'

Ear (Old Eng. *edre*, Ger. *ohr*; comp. Lat. *aur-is*). The organ of hearing is usually divided by anatomists into three parts—the external ear, the tympanum or middle ear, and the internal ear or labyrinth. The first two are not essential to hearing, the mechanism of which is, strictly speaking, in the third portion or labyrinth. The external ear consists of that part of the outer ear projecting from the head called the *pinna*, which is apparently for the purpose of collecting and reflecting waves of sound into the external auditory passage or *meatus*, which, in turn, conducts the sound to the membrane of the tympanum. This external auditory canal is $1\frac{1}{4}$ inch in length, and is formed partly of cartilage and partly of bone. It is lined by an infolding of the skin, in which are numerous glands, which secrete the 'wax of the ear.' The middle ear, or tympanum (or drum), is a small cavity in the temporal bone, shut off from the external auditory canal by the membrane of the drum, but communicating with the air in the pharnyx, or throat, by means of a channel called the *Eustachian tube*. In this little chamber we find a chain of small bones, which communicate the movements or vibrations of the membrane of the drum to the labyrinth. This chain consists of three bones, namely, the *malleus*, or mallet (*a*, Fig. 2), which is attached to the membrane of the drum; the *incus*, or anvil-bone (*b*); and the *stapes*, or stirrup (*c*), the base of which is fixed into an oval opening in the labyrinth, termed the *fenestra ovalis*, or oval window, immediately below *m* in Fig. 1. Between the bones there are well-formed joints, and this arrangement has been proved by Helmholtz to form a lever which communicates to the internal ear the oscillations of the *membrana tympani* in such a manner as to diminish their extent or amplitude, while it increases their intensity.

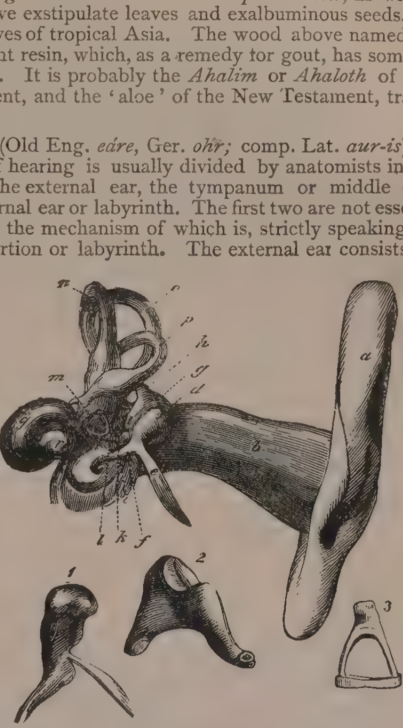


Fig. 1.—The parts of the Auditory Apparatus.

a, external ear; *b*, auditory meatus; *c*, membrane of the tympanum; *d*, head of the malleus; *e*, bony process, and *f*, handle, of the malleus; *g*, incus; *h*, and *i*, short and long processes of the incus; *k*, and *l*, articulation of incus and stapes; *m*, stapes; *n*, *o*, *p*, semicircular canals; *q*, cochlea; *r*, apex of the cochlea; 1, 2, 3, malleus, incus, and stapes, separated from each other and highly magnified.

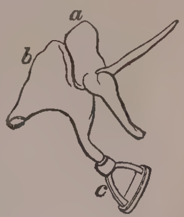


Fig. 2.

The internal ear is placed in the petrous portion of the

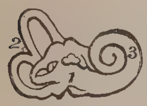


Fig. 3.

temporal bone, and on account of its complicated structure it is usually called the *labyrinth*. It consists of a cavity hollowed out of the bone, called the *osseous* labyrinth, in which there is a membranous structure of the same form, called the *membranous* labyrinth. Between the membranous and osseous labyrinths we find a fluid called *perilymph*, while in the interior of the membranous tube there is another fluid known as the *endolymph*. The osseous labyrinth is divided by anatomists into three portions, namely, a central part called the *vestibule* (1) (Fig. 3), with three canals, called from their form the *semicircular canals* (2), on the one side, and a complicated coiled part on the other side, named, from its resemblance to a snail-shell, the *cochlea* (3). In the interior of the osseous labyrinth (Fig. 3, natural size) we find corresponding portions of the membranous labyrinth, which supports ramifications of the auditory nerve. The ultimate structure consists of minute hairs immersed in the endolymph, and connected by the medium of cells, with the terminations of the auditory nerves. These hairs are believed to take up the vibrations communicated to the endolymph by the chain of bones or through the bones of the head, and to vibrate so as to affect the terminations of the nerves. The nerve filaments convey the impression to the brain, and the effect is a consciousness of sound. By most authorities the vestibule is believed to be the part of the ear by which we appreciate sound merely as sound, without reference to pitch or direction. In this part of the ear we find small masses of crystals of carbonate of lime called *otoliths*, which, lying in the endolymph, may be supposed to touch the hair-like bodies already referred to, and thus through them excite the nerves. The vestibule is the first part of the internal ear met with in the animal kingdom. The functions of the semicircular canals are not understood. Some have supposed that as they are placed in the three directions of space, they may assist in the comprehension of the *direction* of sound; others that they have to do with the sense of rotation; while a third class of physiologists suppose they assist us in the sense of equilibrium in different positions. It may be safely asserted that no good and sufficient proof has been offered for any of these views, but the balance of evidence shows that they are really connected with hearing, and not with a mere sense of equilibrium or of rotation. The cochlea is by far the most complicated part of the internal ear. The membranous portion consists of a tube called the *ductus cochlearis*, so placed in the osseous cochlea as to have a space on each side of it, the one commencing at the vestibule being called the *scala vestibuli*, or vestibular staircase, and the other termed the *scala tympani*, as it terminates at a round opening closed by a membrane known as the *fenestra rotunda*, or round window, on the other side of which is the cavity of the tympanum. In the *ductus cochlearis* we find a remarkable structure known as the *organ of Corti*, far too complicated and minute to be fully described here. It was first discovered by the Marquise di Corti, an Italian nobleman, who devoted much of his time to microscopical research. Its intimate structure is not fully understood, but suffice it to say that in it we have an apparatus specially fitted for the appreciation of sounds of different *pitch*, and of different *quality* or *timbre*. The modern theory, propounded by Helmholtz, is that in the cochlea there are numerous delicate structures tuned to vibrate to notes of a particular pitch. For further details regarding the anatomy of the E., see *Quain's Anatomy*, vol. ii., and *Sensations of Tone*, by Helmholtz, translated by Alexander J. Ellis.

Ear, Comparative Anatomy of.—In the lower animals organs of hearing are probably represented for the first time, as we proceed from lower to higher forms, in the cœlenterate *Medusidæ*, or jellyfishes, and allied forms. In these animals we meet with sacs containing fluid, with calcareous or living particles, named *otoliths*, therein suspended. This simple apparatus is evidently intended, when placed in communication with a nerve filament or its equivalent, to intensify the vibrations of sound, and to convey an auditory impression to the animal. These *auditory vesicles*, as they are called, exist, for example, around the margin of the bell-shaped disk in the jellyfishes. This simple form of sensory apparatus persists with little modification through invertebrate forms. Thus, in many Rotifera (q.v.) or 'wheel-animalcules,' a similar sac exists near the nervous ganglion. In *Annelidæ* or worms similar vesicles occur, as seen in the *otocysts* or hearing-sacs of *Arenicolæ* or lob-worms, which are placed on the nerve-cords which surround the œsophagus or gullet. In *Anthropoda*, such as crustaceans, ears may be represented (as in the lobster) by sacs containing otoliths, and also stiff hairs or bristles (*acoustic bristles*), which latter may be attached to the otoliths. The auditory organ in the lobster exists as an open sac at the base of the lesser antennæ or 'feelers,' and is supplied by a branch of the internal antennary nerve. Some nearly allied forms (*e.g.*, shrimp, *Crangon*) want organs of hearing, and in others (*Mysis* or opossum shrimps) the ear-sac is closed. In spiders and their allies (*Arachnidæ*) no specialised organs of hearing have been discovered, but in some few insects (crickets, locusts, &c.) they have been demonstrated. In the former of these insects auditory vesicles, with acoustic hairs, exist under the 'knee' joints of the front pair of legs, and in locusts on the same pair of legs. Some flies possess allied organs, whilst in many other insects the function of hearing has been ascribed to rod-like bodies borne on the antennæ or feelers. In *Myriapoda* (q.v.) (centipedes, &c.), no ear-vesicles apparently exist. In mollusca, organs of hearing are generally developed. In Lamellibranchiates (q.v.) they exist on the pedal nerve-ganglia, and appear as sacs or vesicles filled with fluid, lined with epithelium, and containing otoliths which rotate rapidly during life. In Gasteropods (q.v.) paired ear-vesicles exist behind the eye, and close to the pedal ganglia. As many as a hundred otoliths are found in *Pleurobrachiæ*, and forty in *Doridæ* or sea-lemons. In the river snails (*Paludinæ*) the ear-sac can be moved by special muscles, and an outer ear-passage is imitated in some snails. In cephalopods or cuttlefishes ear-sacs exist as rounded vesicles, usually placed near the head cartilage. It contains one or more otoliths. The organ of hearing in the various groups of vertebrates will be found to be noticed under such heads as ORNITHOLOGY, ICHTHYOLOGY, REPTILIA, &c.

Ear, Diseases of. The external E. is occasionally the seat of special affections, such as fibrous tumours, gouty concretions in gouty subjects, hypertrophy in the case of idiots, and sanguineous tumours following or accompanying attacks of acute mania. Inflammation of the external E., *otitis* or *earache*, is usually a rheumatic affection, characterised by intense pain, and generally associated with hemicrania. In *otorrhœa* there is a fetid muco-purulent discharge, owing to inflammation of the mucous surfaces or necrosis of the petrous portion of the temporal bone. The E. is also occasionally the seat of polypi. For diseases of the internal E., see DEAFNESS.

Ear-Cockles, also designated **Purples** or **Peppercorn**, a disease in wheat, produced by the *Vibrio tritici*, a species of Infusoria, in form like a worm, only more attenuated at both extremities, and of light-yellow colour. Its eggs deposited in the kernel turn at first into an unhealthy dark-green, which changes into black, and the shape becomes like that of a peppercorn. A white cottony substance fills the grain, and this dissolved in water sets the *vibriones* free in thousands. As many as 50,000, Henslow estimated, may exist in one grain, but this calculation is made at random. Farmers are much troubled with these *vibriones*, as their vitality, in dry wheat, lasts seven years, and in sowing there is nothing to indicate the presence of the animalcula, which, developed by the germination of the grain, blackens the fields in harvest.

Earl. According to Cruise (*On Dignities*, p. 53) there were three kinds of E.—(1) Where the dignity was annexed to the seisin of an entire county with *jura regalia*, including jurisdiction and the right to all royal services and estreats; this was a Palatine (q.v.); (2) where only the title was taken from a county, but no land was held, the revenue (*tertium denarium*) being derived from the profits of the pleas in the county court; (3) where the crown granted land to be held *per servitium unius comitatus*. *Comes* is the Norman equivalent of E., and is of course used in all the charters after the

Conquest. Earls are now created by letters patent, and the title is often derived from names of private estates or family names. An earldom, like a barony, was held *in capite*, the principal mansion, or, where there was none, a royal castle, of which the E. was governor, being *caput comitatus*. The 'relief' of an earldom generally consisted of arms and horses. The possessions of an E. were often called *honours;* hence the honour or estate of Richmond, Arundel, &c. Earldoms were held by the tenure of grand-serjeantry, or attendance on the *curia regis* and *magnum concilium*. In dignity the E. is after the marquess, and before the viscount. He is addressed as 'Right Honourable,' and by the crown as 'our right trusty and well-beloved cousin.' His coronet contains a circle of gold, chased and jewelled, on which are eight small golden pyramids, each with a large silver ball, and a gold strawberry-leaf on the rim between each pair of pyramids; the cap is crimson velvet, turned up with ermine, with a golden tassel.

The Old English *ealdorman* answers to the *princeps* of Tacitus, the *satrapa* and *subregulus* of Bede, the German *graf*, and the *dux* of the Latin chroniclers. He was originally elected by the national assembly, but the office came afterwards to be hereditary, though down to the Conquest the consent of king and Witenagemot seems to have been required. During the annexations the families of the sub-kings continued to act as ealdormen. Thus the ealdordom was not necessarily co-extensive with the later shire, and the ealdor was sometimes superseded by a high reeve. Generally, however, each shire had its ealdorman, who sat with sheriff and bishop in the folc-gemot, receiving one-third of the court-fees (the same as the Karoling *comes* took under capitulary, A.D. 783). As a military commander he was called *heretoga*. Where the relation of ealdorman and king has arisen out of commendation, not conquest, the hereditary descent would be sooner recognised. Cnut divided England into four earldoms, and in the time of Æthelred the term E. began to be used instead of ealdorman, a use suggested by the Danish *jarl*. Before this, the English *eorl* and *æthel* had a wider meaning, equivalent to the Latin *nobilis*, the primitive class of noble blood. *Ætheling* was gradually restricted to the king's kin. The *North People's* Law of the 8th c. puts the wer-gild of the eorl 2000 thrymsas higher than that of the ealdorman, but this is attributed to Danish ideas. Historically, the *comes*, or companion of the king's household, is more truly represented by the English notion of *gesith*, who afterwards became king's thegn, than by the general name of *eorl*, or the official title of ealdorman. The special investiture of an E. by girding on the sword, and placing the cap and cloak on the person, is now abolished. See COMES and COUNT.

Earl Marshal, originally Marshal of England, the title of a British officer of state, whose chief functions are to preside over the College of Arms, to take cognisance of matters relating to pedigrees and descents, to make proclamations of war and peace, and to grant armorial bearings. The office is believed to have been established in the reign of Richard II., who conferred it upon Thomas Mowbray, Earl of Nottingham, and it is now hereditary in the family of Howard, the head of which, and consequently E. M. at present, is the Duke of Norfolk. The last grant for the office was made on 19th October, 1672, by Charles II.

Earl'om, Richard, a distinguished engraver in mezzotint, was born in London, 1742. Among the most celebrated of his works are his *Liber Veritatis, or* 200 *Prints after the Original Designs of Claude de Lorraine* (1777); his works after Reynolds; and his *Portraits of Characters Illustrious in British History from Henry VIII. to James II.* (1810), in conjunction with C. Turner. E. died in 1822. The practice of etching has prevented the long existence of E.'s style.

Earl'ston, or **Er'cildoune,** a village on the Leader, Berwickshire, 30 miles S.E. of Edinburgh, has manufactures of ginghams, shawls, blankets, tweeds, and flannels. Near E. are the ruins of the Rhymer's Tower, so called as having been the residence of the famous Thomas Learmont, or Thomas the Rhymer (q.v.), to commemorate whom a stone with an inscription has been built into the church wall. Its name was changed from Ercildoune to Earlston from its being a seat of the Earls of March. Pop. 1060.

Early English, a style of Gothic Architecture (q.v.), the special feature of which was the introduction of the pointed arch, which hardly appeared in England till the rebuilding of Canterbury Cathedral in 1175. Down to the year 1200 the round Norman arch was still usually employed in conjunction with the pointed arch, to which it gave place at last, thereafter remaining practically banished as a feature of English architecture for three centuries. The E. E. architects, though deeply influenced by the gravity of the preceding (Norman) style, showed much originality and animation of design. They did not invent the lancet or long pointed window, but they were the inventors of the lancet style of fenestration, or the grouping of such windows together in twos, threes, fives, and sevens. The great window group, consisting of five lancets combined, and called the Five Sisters, of York Cathedral, is a good example, of such fenestration. Another distinguishing feature of the style is the use of the tooth ornament, a square four-leaved flower, generally used to enrich the deep hollow moulding of an arch. When thus used, the flowers are placed close enough to touch at the extremities.

Earn (Gael. *Erinn*, 'west'), a river and loch in Strathearn, S. Perthshire, 26 miles W. of Perth. The loch stretches 7 miles from E. to W., and is from 1 to 1½ mile broad, with a depth of 100 fathoms. The river flows out of the loch, and has an easterly course of 40 miles, falling into the Firth of Tay a mile below Abernethy.—*The Bridge of E.* is a village 6 miles S. of Perth, and lies near the mineral springs of Pitcaithley. Pop. 325.

Earn'est (Lat. *arrhæ*), or **Arles**, as it is called in Scotland, is a small sum of money given as a symbol of the completion of a bargain. The E. is not in any case essential to complete a bargain (see CONSENT, CONTRACT), it is merely a legal item of proof of agreement. In sale, however, E. causes the property to vest in the purchaser, but it does not affect the seller's right to demand the full price before delivery, if credit has not been given, or to stop the goods *in transitu* in case of insolvency. Nor does it affect any of the other rights vested in the seller prior to delivery. The question sometimes arises whether or not E. is to count as part of a stipulated price or wage. This will depend on the intention of parties. If proof of intention be otherwise insufficient, the proportion which the E. bears to the value of the subject of contract will be held to decide the question. 'If a shilling be given,' says Erskine, 'in the purchase of a ship or of a box of diamonds, it is presumed to be given merely in evidence of the bargain, or, in the common way of speaking, it is *dead* E.; but if the sum be more considerable, it is reckoned up in the price;' and, according to Blackstone, 'if it be but a penny, or any portion of the goods is delivered by way of E., it is binding.'

Earring (Lat. *inauris*, Gr. *enōtion*), an ornament pendent from, or inserted into, the lobe of the ear. Modern civilised nations regard the E. almost exclusively as a female adornment, but among less advanced and uncivilised people, it is worn by both sexes, a custom which sailors of different nationalities frequently affect. Among the ancient Greeks and Romans the E. was considered effeminate, while in Eastern countries, on the authority of Pliny, it was used by men and women alike. Earrings were worn by the English down to the 10th c. In the 16th c. the fashion was revived in England, and extended even to gentlemen, who followed the example of the courtiers of Henri III. of France. Satirical allusions to this custom are frequent in the writings of contemporary dramatists; it appears to have died out about the period of the Restoration. Earrings assume a great variety of form, and are often of the most costly description, as of gold enriched with precious stones. Pearls are valued for their spherical shape, their size, and their whiteness; but the elongated ones called *elenchi* were also in great esteem as forming a graceful pendant to the ring. Seneca speaks of one which had a couple of pearls above and below the precious stone as worth a patrimony. For elegance of design and beauty of execution, those of the Etruscans and Greeks have never been surpassed.

Ear-Shell, a genus of Gasteropodous molluscs, belonging to the family *Haliotidæ*, in which the shell is ear-shaped, with small whorls, and a large aperture. The outer lip is perforated for a siphon, and in ear-shells new holes are successively formed with the growth of the shell. No operculum exists. These shells are much used in inlaying work, on account of the beautiful tints of their nacreous or mother-of-pearl lining. They abound at the Channel Islands, and familiar species are the Ormer or Guernsey E.-S., and the Ass's E.-S.

Earth, The. It was generally believed by the ancients, and the belief still lingers among the uncivilised and uneducated races of mankind, that the E. was an immovably fixed, flat, circular disk, round which the sphere of the heavens moved in its daily revolution. Thales of Miletus (B.C. 640), and Pythagoras (B.C. 506), taught that the E. was globular in shape; but Aristarchus (B.C. 280) seems to have been the first to maintain its annual and diurnal motions. This hypothesis was developed and systematised by Copernicus, modified by Kepler, and finally established by Newton, as a consequence of the probably universal law of gravitation. To the mathematical astronomer, the close agreement between the true position of a planet or satellite and that obtained by calculation, is sufficient proof of the truth of the Newtonian system of the universe; but absolutely indisputable evidence is not wanting. The projected circular annual motion of every fixed star, in consequence of the Aberration (q.v.) of light, is an incontestable proof of the annual elliptic revolution of the E.; and the slight eastward displacement from the vertical of a mass dropped from a considerable height cannot but be due to a rotating motion of the E. The diurnal rotation of the E. is, however, made *visible* to the bodily eye by means of Foucault's beautiful pendulum experiment. A freely-suspended pendulum always tends to keep oscillating in the same invariable plane—hence a pendulum oscillating at either pole will appear to an observer on the E. to be continually changing its direction of oscillation, the change being one of rotation in a direction contrary to that of the E.'s motion. A pendulum at the equator will obviously not be affected; while one at any intermediate latitude will be influenced by the resolved portion of the E.'s rotation, which has for axis the diameter through the locality where the pendulum is. By making use of a long, slowly-oscillating pendulum, this effect is easily apparent in our latitudes within the space of an hour. The rotundity of the E., again, is proved by a variety of phenomena, such as the gradual apparent sinking of a vessel at sea, as it recedes from the observer, the invariably circular form of the E.'s shadow during a lunar eclipse, the possibility of circumnavigation, &c. By treating the E. as having been formerly a rotating fluid, Newton deduced that its form should be that of an oblate spheroid—the polar diameter being less than the equatorial, in the ratio of 229 : 230. This difference is too great, the true ratio being very nearly as 299 : 300. Sir G. Airy gave the exact dimensions as 7899·17 miles for the polar diameter, and 7925·17 miles for the equatorial. These results agree to the first decimal point with those of Bessel and Clarke, except that the latter gives two different equatorial diameters, viz., 7926·70 miles in 14° E. long., and 7924·69 miles in 104° E. long.

As important as the determination of the dimensions of the E. is the determination of its *mean density*—*i.e.*, the density of an equal homogeneous globe as compared with that of water. Newton, with characteristic sagacity, gave it as his opinion that this mean density would be found by experiment to be between five and six times that of water. His prediction has been fulfilled. Hutton and Playfair, from the observations of Maskelyne in 1774 on the perturbing effect produced by the mass of Schiehallion upon an otherwise vertical plumbline, deduced 4·71; and more recently Colonel James, from similar experiments at Arthur's Seat, obtained 5·316. Carlini and Plana, from the diminution of gravity due to ascending Mount Cenis, gave 4·39. The great uncertainty in these experiments, however, exists in the determination of the magnitude and density of the mountain with which those of the E. are compared. A more delicate and exact method is that suggested by Michel, and performed first by Cavendish (hence the name *Cavendish experiment*), but more recently by Reich of Freiberg, and Francis Baily. The principle involved is the same as in the Schiehallion experiment, viz., the comparison of the E.'s attraction with that of a known mass, which is in this case, however, not an irregular mountain, but a globe of lead. Two large balls are fixed at the extremities of a horizontally-rotatory board; and two of smaller size are attached to the ends of a horizontal bar, which is suspended by a cord over the centre of the board. By careful micrometer measurement with the telescope at some distance, the unrestrained position of rest of the bar is determined. Then by rotating the board until the larger balls are brought, on the opposite sides of the bar, each into close proximity to one of the smaller ones, an appreciable couple will be exerted upon the torsion balance in virtue of the mutual attraction of the masses. This position having been carefully measured, the board is again rotated, until the balls are in such a position as to produce upon the bar a couple equal but *opposite* to the former. From these experiments the observed attraction of a mass of lead of known volume and density can be compared with the known attraction of the E., of known volume but unknown density, and the unknown quantity is easily deducible. The difficulty here exists in the extreme delicacy of the measurements; but this very delicacy, necessitating as it does great care and precaution, renders the method the one upon which we can most depend for accuracy. Cavendish deduced 5·48, Reich 5·438, and Baily 5·66, as the mean density. Still another method was successfully applied in 1854, as far as regards the experimental part, by Sir G. B. Airy, the astronomer-royal. From a number of pendulum experiments at Harton Colliery near S. Shields, he found that the accelerating force of gravity was increased by $\frac{1}{19190}$th part for a descent of 1260 feet. This gave 6·565 as the value of the mean density—a result, however, which cannot be expected to be so accurate as that deduced from the Cavendish experiment, considering the uncertainty that exists in the determination of the density of the neighbouring rocks, and the geological configuration of the mine and vicinity. We may take, however, 5½ as being very nearly the mean density of the E.; and since the crust of the E. has only a specific gravity of from 2 to 3, it follows that the E. must be considerably denser in the interior than at the surface. But it is demonstrable that a globe of the same size and the same surface density as the E. would have, in virtue of the ever-increasing pressure as one approaches the centre, a mean density of considerably more than 5½, if the magnitude and form were due merely to the mutual gravitation of the whole. There must be some cause, then, acting upon the interior layers, so as to counterbalance the effect of pressure and render the density less than it otherwise would be. This cause is probably heat; a supposition borne out by the fact that, when digging a mine, sinking a well, or making a bore, the temperature is always found to increase with the depth about 1° F. for every 60 feet. This rate of increase must, however, according to Lord Kelvin, decrease as one descends, if the earth be a cooling body; but the decrease cannot be appreciable for the comparatively small depth to which we can penetrate. At a depth of 50 miles (a mere fraction compared to the whole diameter) the temperature would consequently be over 4000° F., a temperature at which no known substance can remain solid. We are not at liberty to infer from this that the interior of the E. is fluid, because the circumstances under which the material is exposed to this great heat are quite altered—the pressure, in fact, is considerably increased. Now, matter which expands when fused, as almost all known substances do, has its fusing point *raised* by increased pressure; and therefore, recognising the Hopkins-Thomson objection, that the known phenomena of nutation and precession are inconsistent with the internal fluidity of the E., we are forced to the conclusion that the globe is solid throughout. Lord Kelvin has further shown that the rigidity of the E. must be, on the whole, greater than that of an equal sized globe of glass, otherwise the *terra firma* would present the phenomena of tides. For the E.'s relations to the other members of the solar system, see MOON, PLANETS, SUN; and in AËROLITES, ATMOSPHERE, CURRENTS, EARTHQUAKES, GEOLOGY, GLACIERS, RIVERS, SEAS, SEASONS, VOLCANOES, WINDS, &c., the reader will find details of the more important phenomena daily occurring on our E.

Earth-Closet System. The principle of the E.-C. S. is based upon the fact that *dry earth* is one of the best known disinfectants and deodorisers. The introduction of the system, which is in successful operation in many parts of the United Kingdom, as well as in India and America, is chiefly due to the zeal, energy, and mechanical talent of the Rev. Henry Moule, vicar of Fordington, Dorsetshire. Moule's patent earth-closet resembles in outward appearance an ordinary water-closet. Under the seat is a watertight vault bedded in cement, or a moveable pail or tank, and at the back is placed a hopper or chamber for holding dry sifted earth. On using the closet for the first time a charge—$1\frac{1}{2}$ lbs. by weight, or $1\frac{1}{2}$ pints by measure—of earth is thrown into the receptacle, and after use a second charge is cast down either automatically, on the sitter removing his weight from the seat, or by his pulling a plug-handle. The simple mechanical arrangements of Moule's earth-closet admit of easy modification to meet special wants, and the vault may be emptied or the pan removed either from the outside or inside as desired. The organic matter is disintegrated and absorbed by the earth, and it is only when the earth is saturated with liquid and vapour that it fails as a deodoriser. It is essential that the earth be dry and sifted, and that no slops be thrown into the receptacle. The value of the earth-manure has been estimated at from £1 10s. to £3 per ton. Of the advantages of the E.-C. S. in agricultural districts and small communities there can be but one opinion. Wherever dry earth is obtainable, and facilities exist for the ready disposal of the manure, there the system is eminently practicable. In large centres of population its adoption can scarcely be expected, especially where the water-drainage system, with all its defects, is in operation. The labour and expense of preparing and storing large quantities of earth, and of its subsequent removal, even if facilities existed for the disposal of the manure, render the system impracticable for large cities. The most zealous advocates of the E.-C. S. do not even recommend it as practicable in towns of over 10,000 persons. The system, however, has been found to work well in gaols, barracks, factories, hospitals, and schools in the United Kingdom, and in prisons and military stations in India.

Modifications of the dry-earth system have also been practically tested in some English towns with successful results. Morrell's patent cinder-sifting ash-closet has the economic advantage over the dry-earth plan of utilising the coal-ashes which are daily produced, and as a rule the fuel refuse of a house is found to be sufficient for the inmates.

The Public Health Act of 1875 and the Public Health (London) Act of 1891 legalise the construction of earth-closets in place of water-closets in houses and elsewhere, subject to the approval of the local authority.

Earth'enware, a name applied indefinitely to pottery in which the body or paste is made of the coarser and more common materials. See POTTERY.

Earth-Houses, popularly known as *eirde* or *yird houses*, and occasionally referred to by archæologists as *weems* (Gael. *uaimh*, 'a cave'), are a class of structures peculiar to the eastern parts of Scotland. They are especially abundant in Aberdeenshire (where they are sometimes called 'Picts' houses'), but they range from Shetland to Berwickshire, and are confined, with few exceptions, to the counties bordering on the E. coast. The typical earth-house may be described as an elongated chamber, solidly built of unhewn and uncemented stones, curved and pear-shaped on the ground plan, the walls converging, and the roof formed of massive flat slabs. The whole structure is subterranean, the roof reaching to within a foot or a foot and a half of the surface level. The entrance is low and narrow, often a mere hole like a fox-earth, sloping downwards, and widening as it proceeds to the level floor about ten or a dozen feet inwards. The interior is thus a long, narrow, curved chamber, extending from 20 to 40 feet in length, and widening from 3 or 4 feet near the entrance to 8 or 9 at the further end, with an average height of from 5 to 6 feet. Sometimes the narrow part of the chamber is curved first in one direction and then in another, and occasionally a smaller chamber branches off from the larger. There is usually no provision for the admission of light and air, but several have been found provided with a smoke-hole in the roof near the further end. These singular structures are usually situated in dry knolls. One in Strathdon had a paved floor, and a well-built drain underneath it. The extreme length of chamber and passage was 58 feet. It was $3\frac{1}{2}$ feet wide immediately within the entrance, and 9 feet wide at the further end, while the height averaged about 6 feet. On the other hand, one at Eriboll in Sutherlandshire, which was 33 feet long, was not more than $3\frac{1}{2}$ feet in greatest width, and $4\frac{1}{2}$ feet high. In many cases they are accompanied by the remains of habitations above ground, probably huts of turf or wattled work. At Kildrummy, where some forty or fifty of them occurred within a radius of 2 miles, the underground structure was usually discovered by the remains of overground enclosures, the earth of which had been excavated to the depth of a foot or 18 inches, and placed as a low bounding fence round the sunken area of 10 or 12 paces square. At Kildonan, in Sutherlandshire, two of these underground structures had their entrances within the area of hut circles. They were thus evidently underground adjuncts to the overground residences of the early tribes, probably the winter dwellings of people who lived in huts in the summer season. Many conjectures as to the age and uses of these underground structures have been hazarded without the least reference to the evidence, which seems distinct enough on both points. No stone or bronze weapons have been found in any of them. The objects that have occurred in them are querns or hand-mills, stone mortars and cups, spindlewhorls, bronze pins and rings, corroded iron implements, rude pottery, and fragments of the lustrous red ware of the Romano-British period. This lustrous red ware, with embossed figures (commonly called 'Samian ware' in this country, though it is of Gallo-Roman manufacture), has been found in three E.-H. in Forfarshire, viz., at Tealing, Fithie, and Pitcur. In two other instances, viz., at Newstead, in Roxburghshire, and Crichton Mains, in Midlothian, bevelled stones, with Roman mouldings, and squared and chiselled stones, with diagonal and diamond work of Roman character, were found built into the walls of E.-H. As a class, they seem thus to belong rather to the early historic than to the strictly pre-historic period, and they were undoubtedly in use subsequent to the time of the Roman dominion in Britain. That they were occupied as dwellings is evident from the pavement, the smoke-holes, the querns, and other domestic utensils, and the accumulation on their floors of charcoal and bones of animals, which formed the refuse of the food of their occupants. They are not more uncomfortable, or much more incommodious, than many of the caves of the N. of England, which, as Boyd Dawkins has shown, have been occupied as habitations after the departure of the Romans from Britain. The best of the E.-H. give on an average a room 40 feet by 7, and 5 to 6 feet high. No structures precisely similar are known elsewhere. Several examples of a type closely analogous, however, are found in Cornwall and in Brittany. In many of the *raths* and early earthworks of Ireland there are underground structures, but they differ in form from those described above, and more nearly resemble the chambers in the larger sepulchral cairns. A double chamber of this type occurs under the area of the fortified hill of Dunsinnane in Perthshire.

Earth-Nut, or **Earth-Chestnut,** a name given to the tubers of certain plants belonging to the natural order *Umbelliferæ* (q.v.), such as the *Bunium flexuosum* and *Carum* or *B. bulbocastaneum*. The name pig-nut is given to the tubers of the latter species, on account of the fondness of pigs for these structures. These *Umbelliferæ* are harmless, and are used as esculents, like their near neighbours the parsley, celery, &c. Earth-nuts are highly esteemed in Sweden, and those of *B. ferulaceum* in Greece. The first-named species of *Bunium* is common in Britain, especially in marshy places.

Earth'quakes are sudden and more or less violent movements of the earth's surface. They are of various intensities, from a vague subterranean rumbling to a shock sufficient to set the earth into a violent undulatory motion, shattering rocks, opening chasms, destroying old lakes, or calling into existence new ones, altering, or, it may be, completely obliterating, the course of streams, submerging dry land below the sea, forming new islands, or extending the area of old territories, and all that with a suddenness and force which cannot but be attended with the overthrow of works of human construction, and the loss of much life and property.

Regarding the nature and origin of E. there has been much speculation from the earliest ages. Anaxagoras ascribed them to subterranean clouds bursting into lightning, and shaking the vaults in which they were confined; Descartes to the explosion of inflammable products in vast underground cavities; Stukeley and Priestley to electrical causes; Humboldt, Von Buch, and others to the action upon the earth's crust of waves induced in the great internal ocean of molten rock, once so generally believed in. (See EARTH.) The most scientific theory, inasmuch as it explains all known phenomena, and postulates nothing but what experience shows is highly probable, is that advanced by Mallet. He defines an earthquake as a 'wave or waves of elastic compression, in any direction, from verticality upwards to horizontality, in any azimuth, through the crust and surface of the earth, from any centre of impulse, or more than one, and which may be attended with sound-waves and sea-waves, depending upon the impulse, and upon circumstances of position as to sea and land.' The earth-shock originates as a ruptive force or explosion, due possibly to a sudden generation or condensation of steam in the vesicular cavities with which the slowly-cooling earth most probably abounds. This shock gives rise to a wave or a series of waves, each of which travels in a continually-increasing spheroidal shell, and therefore spreads over the surface in a corresponding growing circle. This circle, however, will vary considerably from the true mathematical form, inasmuch as the velocity of transmission depends upon the nature of the rock through which the shock travels, as also upon its jointed and faulted character. Experiment shows that such waves of compression travel more rapidly the more solid the rock is, and the actual rate in the Calabrian earthquake of 1857, as calculated by Mallet, was an average of 789 feet per second.

The *angle of emergence* of the wave is evidently greater the nearer the locality under consideration is to the origin of the shock—being a right angle at any place in the so-called *seismic vertical*, or line drawn vertically upwards from the position of central impulse. Here, of course, the intensity will be greatest, but it will exert no overturning power. Hence the greatest damage will not be done here, but will be on a certain closed curve, at every point of which the angle of emergence will be sufficiently small, and the intensity of the shock sufficiently great, so as to render that portion of the shock resolved parallel to the surface a maximum. If the origin of the earthquake should be below the bed of the ocean, the water directly over the seismic vertical will receive a violent blow, giving rise to an oscillatory wave, which will travel in a manner similar to the true earth-shock, but at a considerably less velocity. These statements are deduced from the theory upon dynamical principles, and are fully borne out by experience. In coast districts subject to E., the ocean-wave is more dreadful in its effects than the earthquake proper. Accompanied by a turbulent sea, traceable to no common cause, and immediately preceded by an extraordinary outdraught of water, laying bare the ocean-bed to a distance sometimes far below the low-water mark, it dashes with terrific fury upon the shore, tearing up trees and shrubs by the roots, levelling houses, and other works of human construction, and carrying high and dry upon its giant crest, seaweed, shells, fragments of wood, boats, and even large vessels. The origin of the rumblings heard before and after the passage of the shock is at once evident, being due to the more rapid transmission of the atmospheric waves produced at the surface of contact of the earth and air.

The most celebrated historic earthquake is undoubtedly that of Lisbon, 1st November, 1755. In the brief space of eight minutes, the whole city was reduced to ruins, and 50,000 inhabitants swallowed up. Perhaps the most awe-inspiring event was the disappearance, without leaving a trace behind, of the pier, with its crowds of terror-stricken fugitives. This earthquake also did incalculable damage at Coimbra, Oporto, Malaga, Fez in Marocco, where thousands of persons perished, and at the Madeira Islands. According to Humboldt, it extended over an area equal to about one-eleventh of the earth's surface, but its only effect in Scotland was the temporary alteration in level of some of our lakes. At Calabria, in Italy, there have been several destructive E. at various times, the last great one, by which about 10,000 lives were lost, occurring on 16th December, 1857. The W. Indies and the volcanic regions of S. America also suffer much from time to time. In August 1868, about 25,000 perished, and 30,000 were rendered homeless in the various towns and villages of Peru and Ecuador. Britain is fortunately rarely visited, and then but slightly. The place of most frequent occurrence is Comrie in Perthshire, and this would seem to be connected in some way with its geological position, which careful survey has shown to be on the great line of fault separating the Lowlands and the Highlands. As a rule, districts subject to E. are also volcanic. The most alarming E. of late years have been those of Ischia and Krakatoa (1883), Tarawera (1886), Morea (1886), and Charlestown, U.S.A. (1886). For catalogues and descriptions of E., and for more detailed information concerning the accompanying phenomena, the reader is referred to Mallet's works, to Von Hoff's *Veränderungen der Erdoberfläche* (parts ii., iv., and v.), to Lyell's *Principles of Geology* (vol. ii.), to Somerville's *Physical Geography*, to Daubeney's treatise *On Volcanoes*, and to Ponton's *E. and Volcanoes*.

Earth'work, in engineering construction, consists chiefly of cuttings and embankments for railways, roads, reservoirs, &c. The engineer who projects and lays out a railway has the 'quantities' of E. in cubic yards, both of excavation and embankment, calculated in detail in his office; and finds, by boring or otherwise, the nature of the ground in which the cuttings have to be made, and upon which the embankments are to rest. The work is executed by a contractor, whose price is based upon the quantities and information supplied by the engineer. Before the E. of a railway is commenced, its centre line is staked and nicked out (or marked by a little trench on the surface of the ground), its levels having been previously fixed, so that the quantity of land excavated in the cuttings may be, in general, equal to the amount required for making the embankments, in order that no soil may have to be excavated specially for this purpose. This is called 'equalising E.'

The slope or nature of the soil, the nearness of water, and other causes, occasion the special difficulties which occur in the construction of E. On ground which has a 'sidelong' slope it is often necessary to form the surface into steps before tipping upon it, that there may be no tendency for the whole embankment to slide down after it is finished. Cuttings through rock may require to be blasted. Embankments exposed to the action of water may require to be pitched with dry stone, or even protected by a masonry-face. Probably the greatest difficulty of all to be overcome in connection with E. is the construction of embankments upon soft and yielding soil. Various methods have been employed according to the special nature of the various situations, such as by efficient side-draining or giving an extra width to the base of the embankment, by the solidifying of the soil, by throwing in ballast, by raising a structure of piles, or (as across the celebrated Chat Moss) by supporting the embankment upon a raft made of hurdles or fascines or on an intermediate layer of dry peat. In the ordinary cases, where a stone facing is not necessary, the slopes of earthworks are dressed to a good surface, covered with about 6 inches of soil, and sown with grass, which is not only sightly in itself, but prevents the destruction of the faces by weathering.

Earthworks, though they have been advocated for permanent fortifications, are chiefly met with in the field. The most ordinary form is the parapet, excavated from a ditch in front or a trench behind. The exterior slope must have the inclination which the material would assume when poured loosely from a height—for ordinary soil, 45°. The top of the parapet, for defence, ought to be horizontal, or at least, parallel to the plane of site. As this, however, would interfere with the firing, it slopes gently outward from the crest (1 in 6). The inner wall, or revetment, terminates in a sloping step, or banquette, on which the defenders stand in firing. To resist musketry a parapet ought to be five feet thick; to resist heavy guns, 24 feet. On level ground, the ordinary height is 7½ feet. The parapet is often erected on a wide bank of earth or rampart; this where guns are to be used. The escarp, or slope of the ditch, ought to be continuous with the exterior slope of the parapet. Excavation is found to add 9 per cent. to the calculated bulk of most soils. The more complex forms of fieldworks (where the use of masonry is of course impossible) are of three classes—(1) Those open at the gorge, including the redan, a work of two faces forming a salient angle; the double redan, or *tête à queue d'hyronde*, which has, of course, a re-entering angle; the triple redan, with long flanks; the tenaille head, a low, two-faced work in the main ditch, and before the curtain; the lunette, an advance work, larger than the redan, with two faces and two flanks parallel to the capitals; bastion head, composed of several bastion fronts forming obtuse angles with each other. (2) Those enclosed all round, including the redoubt, which has no flanking defence from its own parapets, and which sometimes appears in the ravelin or outwork beyond the main ditch; and the bastion fort, the most complete enclosure, as each side or front consists of two faces, two flanks, and a curtain. (3) Those which consist of lines both continuous and at intervals, the separate works being always arranged so as to flank and defend one another, including lines of redans, lines of tenailles, or parapets forming a series of salient and re-entering angles, lines of bastion, or a succession of bastion-shaped parapets, each having two faces, two flanks, and a curtain; and indented lines *à la crémaillère*, composed of alternate short and long faces at right angles to each other. In rocky positions works are often entirely constructed of sandbags—tarred canvas bags holding about a bushel of earth. They are also placed on parapets to afford loopholes for riflemen.

Earth'worm, a species of *Annelida* (q.v.), belonging to the order *Oligochæta*—a group distinguished by the rudimentary nature of the bristles or *setæ* on the sides of the body, so characteristic of most other worms. The E. breathes by means of the general surface of the body, assisted by little *sacculi*, or pouches of the integument. Its body is of cylindrical shape, blunt in front, and pointed behind. The E. is a hermaphrodite, the sexual organs being contained within a limited number (8-15) of segments of the body. The position of these organs is denoted by a swelling of the corresponding joints, so as to form a prominent eminence, which, from its saddle-like appearance, has been named the *clitellum*. The eggs are contained in cocoons, and are deposited in clusters, and the young are developed directly from the eggs. The mouth is not provided with teeth or jaws, but a 'crop' and 'gizzard' exist. Certain sacs, termed *segmental organs*, found in most Annelides, communicate in the E. with the internal cavity of the body, and probably possess some excretory function. The bristles fringing the body exist in two rows, and are hooked. Earthworms effect much good in soils by opening them up and separating the solidified masses of earth, thus permitting the rain to gain access to the subsoils. Their food is entirely of a vegetable nature, while they in turn form food for moles, shrews, and allied mammals, as well as for very many birds. They appear to be nocturnal in habits. Several tropical genera and species attain a large size.

Ear'-Trumpet, an instrument adapted to relieve defective hearing, by collecting and concentrating sound, and conveying it into the ear. The ordinary E.-T. takes the form of a trumpet with a wide, bell-shaped mouth, which is turned in the direction of the sound, tapered to a bent ear-piece that is placed at the entrance to the auditory passage. It is generally made of tin or ebonite, and arranged in telescopic sections for convenience of being carried about. In another form, a bell-shaped vessel has two curved pipes connected by flexible tubes to end-pieces that either enter or cover the ears. The *auricle* is a contrivance designed for the same object, and consists of a small volute, which is inserted into the ear, with an expanded mouth. In some churches and other buildings there is placed a large funnel-shaped receiver, terminating in a circular throat and conducting pipe, from which branch off as many flexible tubes with ear-pieces as may be required.

Ear'-wax. See CERUMEN.

Ear'-wig, a genus of insects belonging to the Cursorial section of the order *Orthoptera* (q.v.), and forming the sub-family *Forficulina* or *Euplexoptera*, the latter name being given them from the beautiful structure of the hinder wings, which are thin, and have their *nervures* or supporting ribs so disposed that they can be folded like fans. The name suggests that these insects select the human ear as an occasional habitation. This, however, is not the case. The proper form of the name is 'ear-wing,' from the resemblance of the wings to the shape of the ear. The head is exserted, and has no ocelli; the front wings are small and leathery; the antennæ have fourteen joints; and the tail ends in a pair of 'forceps,' which are used by the insects in folding their wings. The pupa is like the perfect insect, but is not winged. The eggs are deposited in the earth, and are carefully watched by the mother. These insects live on vegetable matters. There are seven species indigenous to Britain.

Earwig.

Eas'dale, an island off the W. coast of Argyllshire, about 10 miles S.S.W. of Oban. It is only three-quarters of a mile long, but is widely known for its slate-quarries, which have been worked more than a century and a half. From this cause much of E. is now below the sea-level. Pop. 317.

Eas'el (Ger. *esel*, 'ass, donkey'), the wooden frame upon which artists place their pictures while in process of being painted, at a convenient height for working on the different parts. *E.-pieces*, or *E.-pictures*, are the smaller pictures of an artist accustomed to execute works on ceilings or walls.

Ease'ment, a term of English law denoting a privilege without profit which one person may have in the property of another by charter or prescription. Rights of E. include rights of way, of light and air, and of carrying on an offensive business. The analogous term in Scotch law is Servitude (q.v.).

East (Ger. *ost*, Old Norse, *aust*, probably from the same root as 'ice,' and if so, pointing out the N. of Europe for the origin of the term) is that point of the horizon at which the sun rises at the time of the equinoxes, being on the right of a person facing N. E. is also one of the cardinal points of the compass, corresponding to the true E. at those places where the needle points due N.

East'bourne, a town in the county of Sussex, 18½ miles S.W. of Hastings. It is a favourite sea-bathing place, and has a handsome parish church. Roman and Danish remains have been found here. The place has grown very much of late years; in 1821 the population was estimated at only 2007. Pop. parl. div. of county 66,460; mun. bor. 34,969; reg. sub-dist. 37,468; and civ. par. 34,278.

East Cape, the most eastern point of the Asiatic continent, projects with a bold and lofty headland into Behring Strait, opposite Cape Prince of Wales on the continent of America. Its summit, bristling with rocky pinnacles, is the site of a large and populous Tschutski village (Hooper's *Tents of the Tuski*). The same name is applied to the easternmost promontories of various countries and islands, as those of Madagascar, New Zealand, &c.

Eas'ter, as now understood and observed, is a Church festival in commemoration of the resurrection of Jesus Christ. A famous controversy in the early Church turned upon the time of the observance of E., the bearings of which will be best understood from a reference to the Gospel narratives. According to the first three Gospels, Jesus partook of the Jewish Passover with his disciples in the usual manner on the evening of the 14th Nisan, instituting on that occasion a memorial of himself (Matt. xxvi. 17-29; Mark xiv. 12-25; Luke xxii. 7-20); so that he must have been crucified on the 15th. In the fourth Gospel, on the contrary, the Last Supper took place on the 13th, and Jesus was crucified on the 14th (xiii. 1, 29; xviii. 28; xix. 14). Now the Church at first observed the Paschal festival (Heb. *Pesach*, 'the Paschal lamb'; whence the Gr. and Lat. *pascha*, the Fr. *pâque*, and the Scotch *pasch*) on the 14th Nisan, following the first three Gospels; but soon there arose a difference between the Eastern and Western Churches on this point, which got the name of the Quartodeciman controversy. In the W. there were a tendency to attach most importance to the resurrection, and a feeling that it was incongruous to stop the preceding fast on the 14th, and make a feast of that which ought to be a day of mourning for his death (the Jews of course connected the idea of rejoicing with their Passover for other reasons). The authority of the fourth Gospel was now called in by the Western Church (curiously enough that of St. John being adduced by the Eastern in support of their opposite view), to show that the Jewish Passover was completely abolished by the crucifixion of Christ on the day (14th) on which the lamb was killed, in other words, by Jesus taking the place of the lamb (cf. 1 Cor. xi. 23-26; v. 7), and that the fast ought properly to cease always on the first day of the week, to commemorate his resurrection. This feeling was further strengthened by the difficulty of adjusting the solar year to the lunar mode; and when, by the edict of Constantine (321), the *Sunday* was consecrated as a day of rest and religious observance, the Pascha was finally transferred from the 14th Nisan to the Sunday following the full moon on or next after the vernal equinox. The vernal equinox is now fixed as the 21st March, and the rule is, that if the full moon fall on a Sunday, E. is the Sunday after.

But neither tracing the festival to the resurrection of Christ nor to the Jewish Passover is in a sense going to the root of the matter. E. was properly and originally a heathen festival, which was appropriated by the Church, and applied to the resurrection. The spring equinox was observed among the ancient nations of the East as the beginning of the new year, and among almost all nations as a season of great rejoicing in honour of the sun-god, and of his return to clothe the earth with verdure, and 'fill men's hearts with food and gladness.' He appeared then to rise triumphant over darkness and death, to bring back life and light to the world. It is impossible nowadays to realise how close was the resemblance which the rites adopted by the Church in honour of Christ's resurrection bore to those practised by the Greeks, Phœnicians, Syrians, Egyptians, and many other nations, in honour of the solar deity, under the name of Adonis, Dionysus, Thammuz, Krishna, &c. The Church continued the worship of the Queen of Heaven, condemned by the prophet Jeremiah (xliv. 17), by applying it to the Virgin Mary under the very same title. The rites connected with the death and resurrection of Adonis—in which an image was laid out by women with all the ceremony and signs of grief practised at funerals, but the next day the image was taken out of its sepulchre, as it were, and their sorrow was turned into joy—were also imitated in the dramatic representations made by the Church at E. in honour of Christ.

The name E. (Old Eng. *Eoster* and *Eastre*), according to Bede is derived from the goddess Ostara (Old Swed. *Astargydia*, 'the goddess of love'; Old Norse, *ast*, 'love'), whose festival was held in the month of April, and the popular rites connected with the season, though now baptized into Christianity, had no doubt in many cases a heathen origin. For further illustration of this peculiar process of transformation consult article, CHRISTMAS. See Bingham's *Eccles. Ants.*, and J. J. Tayler's *The Fourth Gospel.*

Easter Island, Teapy Island, or **Davis's Land,** a volcanic island in the Polynesian Archipelago, 12 miles long and 4 wide, in lat. 27° 6′ S., long. 109° 30′ W. There are many colossal stone statues of unknown origin; and a wooden tablet with curious hieroglyphics was discovered in 1869. Pop. 150.

Easter Offerings, in England, are payable by every person in the parish sixteen years old or upwards, through the master or mistress of the family, at the rate of twopence per head, as compensation for personal tithe or labour. These can be recovered under the provision of statute 7 and 8 Will. III. c. 6, before justices of the peace.

Easter Law Term being formerly dependent on Easter Sunday, which might happen to fall on any day of the month between 22nd March and 25th April, both days inclusive, the Act 1 Will. IV. c. 70 was passed to remedy the uncertainty. The term now begins on 15th April and ends on the 8th May. See TERM, LEGAL.

East India Army. This name had a very different meaning in the days of the East India Company (q.v.) from that which it has now. The Company employed whatever soldiers offered themselves from any quarter—adventurers, deserters, and convicts, chiefly natives. But English officers were always employed, with liberal remuneration, and ultimately regiments were raised in England. Owing to the good pay, the terms of absence, and the liberal pensions given, the East India Company's service was highly popular. In 1857, the army of the Company consisted of 45,522 Europeans, and 232,224 natives; and these were divided into three armies, connected with and named after the Presidencies of Bengal, Madras, and Bombay. It was chiefly the natives in the first of these armies that took part in the Mutiny (1857). The Act of Parliament which in 1858 transferred the government of India to the Crown directed that these armies should be deemed Indian military forces of her Majesty, and should be 'entitled to the like pay, pensions, allowances, and privileges, and the like advantages as regards promotion and otherwise, as if they had continued in the service of the said Company.' The transfer was the cause of considerable dissatisfaction among the British troops, who maintained that they should have been consulted, or at least have obtained a bonus on re-enlisting; and ultimately those of them who chose were permitted to retire. By the legislation of 1861 and subsequent years, the Indian regular army has been reorganised. Its duty is now to serve either in India or elsewhere when required, although its expenses are defrayed out of the Indian revenue. The native portion of it had been reduced in 1874 to 123,678 men. On 1st April, 1895, the system under which each presidency had a separate command ceased, and an arrangement came into operation by which the Indian army has been divided into four commands, each under a lieutenant-general—Bengal, Bombay, Madras, and Punjab. The army is directly commanded by the commander-in-chief in India, and controlled by the Indian Government. The native regular army now consists of 145,000 soldiers. Besides these there are 19,294 men belonging to the native contingents which are supplied by the native princes of India for the defence of the country generally. They are trained and inspected by European officers, and when required will be called upon to act with the regular army. In the army estimates for 1894-95 the strength of the British forces in India is placed at 74,013 (13,319 artillery, 5679 cavalry, 354 engineers, 53,740 infantry, &c.), together with 12,445 horses and mules. From the census returns for 1891, under the heading of army, there would appear to have been in that year a grand total of 663,271; of these 29,223 were military officers, 416,997 non-commissioned officers and privates, 68,664 followers, 5119 persons upon military administrative establishments, and 143,268 whose military service was unspecified.

East India Company, the greatest corporation the world has ever known, and the association of merchants which founded the British Empire in India. The Portuguese anticipated England in opening direct commercial relations with the East. Vasco de Gama discovered the sea-road to India in 1497, and more than a century elapsed before his countrymen were deprived of their monopoly. The first charter of the English Company is dated 31st December, 1600. Akbar was the Great Mogul with whom the English merchants opened relations. The original English Company had only 125 shareholders, and a capital of £70,000, but in 1612 the capital was raised to £400,000; and about the same time permission was obtained from the Emperor Shah Jehan to erect factories at Surat, Ahmedabad, Cambay, and Gogo. The first voyages were to Surat and to other places on the Malabar coast, but the richest cargoes were brought from the Spice Islands of Java, Sumatra, &c. From this quarter the English were soon driven by the perseverance of the Dutch, who secured their monopoly by the massacre of Amboyna in 1622. But the Company steadily progressed during the 17th c. The profits were not excessive, but the honour of the English name was uniformly maintained. In 1626 a factory was established on the Coromandel coast, at Masulipatam; and in 1639, Fort St. George, now the citadel of Madras, was built on a narrow strip of land, ceded by a local prince. This was the first territorial acquisition on the mainland of India. In 1634, the wealth of Bengal was opened to the Company by permission to trade at Pippli, now a silted-up port of Orissa; in 1645, the English were established at Balasore and Hooghly, where their European rivals had long preceded them; but it was not till 1700 that the ground on which Calcutta stands was granted by the Nawab of Bengal. In 1661, the island of Bombay formed part of the dowry which Catharine of Portugal brought to her husband Charles II. In 1668 the King made it over to the Company, and in 1687 Bombay was recognised as the chief English settlement in India. Such was the origin of the three great presidencies.

The 18th c. forms a second epoch in the history of the E. I. C. In 1702, a new Company for trade with the East, with a capital of £2,000,000, was amalgamated with the E. I. C., under the title of 'The United Company of Merchants trading to the E. Indies,' with the privilege to trade to all places E. of the Cape of Good Hope to the Strait of Magellan, on condition of a loan to the state of £3,190,000 at 3 per cent. interest. This sum was independent of the trading stock of the Company, which about this time paid an average of 8 per cent. Hostilities with the French led, almost insensibly, to the growth of the Company as a great territorial power. In 1765 the financial administration of Bengal, Behar, and Orissa was ceded to the Company by the Mogul Emperor, Shah Alum, but British power in Madras was not firmly secured till the fall of Tippoo Sultan in 1799, and the Bombay Presidency acquired most of its territory in the beginning of the 19th c. Meanwhile, restrictions were occasionally laid upon the amount of the Company's dividends by the legislature; committees of the House of Commons made searching investigations into its affairs; and in 1773 an Act was passed reorganising the corporation in Leadenhall Street, and establishing a new government for India. The Court of Directors was to be composed of twenty-four persons, and the amount of stock qualifying a proprietor for a vote was raised from £500 to £1000. The Presidency of Bengal was made supreme over the other two, and the nomination of the governor was subjected to the approval of the Crown. A Supreme Court of Justice was established at Calcutta, of which the judges were also to be nominated by the Crown. In 1784, the Coalition Ministry of Fox was ejected from power, owing to the defeat in the Lords of his India Bill, which was intended to vest the whole management of Indian affairs in the hands of seven government nominees of the parliamentary majority. In 1784, however, a new bill was passed which first established 'The Board of Control,' consisting of six persons appointed by the Crown, before whom the Court of Directors were bound to lay all important documents for approval or alteration. Dundas, afterwards Viscount Melville, was the first President of this Board. In this capacity he carried a fresh Act of Parliament, in 1794, by which the monopoly of exclusive trade was extended for a further period of twenty years, subject to the annual payment of £500,000 to the state; while certain small privileges were for the first time granted to private traders. At this time the yearly sales of the Company's goods in England amounted to about £10,000,000 sterling.

The 19th c. has witnessed the extension of British rule or British influence over the whole of India, and also the final downfall of the E. I. C. In 1833, the trading monopoly was withdrawn, and with it fell all the manufactures of India which had been artificially maintained by the Company. The dividends to the proprietors of E. India stock were now paid out of the taxes on the native subjects of the Company; but it was explicitly declared that the E. I. C. exercised its political powers as trustee for the Crown, subordinate to the Board of Control. In 1853 the charter was renewed for twenty years, but the Mutiny in 1857 produced an irresistible current of public opinion in England in favour of abolishing the shadow of power and the substance of patronage which the Company still retained. Despite the strenuous opposition of the Company, the Act received the royal assent on 2nd August, 1858, which vested directly in the Crown all the powers exercised by the E. I. C. The government of British India is now vested in the Secretary of State for India and a council of not less than ten members, each of whom receives the salary of £1200 per annum. The government in India consists of the Governor-General or Viceroy, assisted by five ordinary members, one public works member, and certain extraordinary members of Council. Indian stock to the amount of £6,000,000, with interest at 10½ per cent. guaranteed by England, represented the capital of the Company until 1873, when an Act of Parliament was passed for its final absorption. See INDIA, BRITISH.

The Scottish E. I. C. was formed in 1695, but was almost still-born in the rapidity of its failure. That of Denmark, founded in 1618, was repeatedly reorganised (finally in 1792), but has long ceased to exist. The French Company, established in 1664, was dissolved in 1790, while the Ostend India Company only lasted from 1718 to 1731. The original Dutch Company dates from 1595, but several similar bodies were united into one in 1602. A company of Swedes was created in 1741, and reorganised in 1806.

East Indies, the name vaguely given in the 17th c. to that tract of country, with all its islands and peninsulas, which lies between the coast of Persia and the coast of China. It came into use to mark the imaginary correlation with the West Indian Islands, which, as is well known, were thought by their first discoverers to be connected with India; but the name now survives only in such phrases as 'East Indiaman,' for a ship trading to those parts, and the 'Honourable East India Company,' in speaking of the defunct corporation.

East'lake, Sir Charles Lock, an English historical painter, was born at Plymouth, 17th November, 1795. He was educated at Charterhouse, London, and at an early age became a pupil of the Royal Academy. When Napoleon arrived at Plymouth in the *Bellerophon*, E. made a study of him standing at the gangway, and produced the last portrait of him painted in Europe. He visited Italy in 1817, and Greece in 1819, and spent nine years (1820-29) in Rome, revelling in the picturesque aspects of Italian life. His first great picture is entitled 'Pilgrims Arriving in Sight of Rome' (1828), and it was followed by 'Christ Weeping over Jerusalem' (1841), 'Helena' (1849), 'Violante' (1853), 'Beatrice' (1855), &c. He was made a Royal Academician in 1830, President of the Royal Academy and a Knight in 1850, and D.C.L., Oxon, in 1853. E. died 23rd December, 1865, at Florence. He wrote *Materials for the History of Oil-Painting*, *Contributions to the Literature of the Fine Arts*, and translations of Goethe's *Farbenlehre* and Kugler's *History of Painting*. His work is chiefly distinguished by elevation of sentiment and delicacy of execution.—**Lady E.** (Elizabeth Rigby), also an artist and author, wrote a biography of her husband in the second series of his *Contributions to the Literature of the Fine Arts* . Died in Oct., 1893.

East'on, a town of Pennsylvania, U.S., at the confluence of the Delaware with the Lehigh, 60 miles N.W. of Philadelphia, and 75 W. of New York by railway. It is the seat of Lafayette College, has many churches, a public library, an opera-house, several newspapers, and three street railways. In the vicinity are rolling-mills, furnaces, and various factories, and there is also a trade in cotton, oil, rifles, and flour. Pop. 14,481.

East'port, a port of entry in Maine, U.S., on Moose Island, Passamaquoddy Bay, is a thriving town of the United States on the N.E. It has a harbour deep enough for the largest vessels, and defended by Fort Sullivan, and a trade in fish and timber. Steamers ply hence to Boston, Portland, and St. John. Pop. 4908.

East River, the strait between Long Island Sound and New York Bay, and separating the city of New York from Brooklyn and Williamsburg. It is 20 miles long, and 7 miles from New York is the strait known as Hellgate. This pass was formerly dangerous, but its obstructions have been removed within the last thirty years. A bridge across the E. R. to connect New York with Brooklyn, was opened 24th May, 1883. For miles the banks of the river are lined with quays, piers, and building-slips.

Eastwick, Edward Backhouse, C.B., F.R.S., a distinguished oriental scholar, was born in 1814, and was educated at the Charterhouse, and at Balliol and Merton Colleges, Oxford, at the latter of which he obtained an open postmastership in 1833. Having received an Indian nomination, he left the University before taking his degree and proceeded to India, where he joined the 6th Bombay Light Infantry regiment. In less than six years after his arrival in the country he passed as interpreter in Hindustani and Hindi, Marathi, Persian, Gujarati, and Kanarese, and received the High Proficiency Reward of 1000 rupees. During this time he served as Assistant Political Agent in Kathiawud and in Upper Scinde, and also on the staff of Sir Henry Pottinger, at Nankin, in China, by whom he was selected to convey the intelligence of the treaty and peace with China (1842). In the following year ill-health forced E. to return to Europe, and in 1845 he was appointed Professor of Urdu at Haileybury College. In 1851 he was elected a fellow of the Royal Society. On the closing of the E. India College, E. was appointed Assistant Secretary in the Secret Department of the India Office (1859), after which he became Assistant Secretary in the Political Department of the India Office, was gazetted Major of the London Rifle Brigade, was called to the Bar as member of the Middle Temple Inn of Court, and was appointed Secretary of H.M. Legation at the Court of Persia (1860). In 1862 he became Chargé d'Affaires, and negotiated the treaty for the telegraph line from the Persian frontier near Bagdad, to India. Serious differences having risen between E. and his chief the former returned to England in 1863 and left the diplomatic service. In 1866, the Marquess of Salisbury (then Lord Cranborne, and Secretary of State for India), appointed E. to be his private secretary, who in the same year was made C.B. *for services in Persia*, and later on proceeded to Venezuela as commissioner for the Venezuela Bondholders. On his return in 1868 he was elected, in the Conservative interest, M.P. for Penryn and Falmouth. Some time after this, E. became connected with an oil company which turned out a disastrous failure and involved him in very serious losses besides heavy expenses, all of which he, however, discharged in full with the assistance of his son, who also supplied the 'sinews of war' for the contest at the general election of 1874, at which E. lost his seat. In 1875 he received the degree of M.A. Oxon 'as a slight recognition of distinguished services.' During the remainder of his life he devoted himself to literature, and, besides continuously contributing to many of the leading journals, he prepared Mr. John Murray's several handbooks for India, and composed and brought out the *Kaisarnámah i Hind*, 3 vols. (unfinished), dedicated by permission to H.M. the Queen. On 16th July, 1883, E. died at Ventnor in the Isle of Wight, deeply engrossed with literary composition until almost the very last. Of the numerous works, besides those already referred to, which he published, the following may be mentioned—Translations of *History of the Arrival of the Parsees in India* (Persian), *Life of Zoroaster* (Persian), *Revolt of the Netherlands* (Schiller), *Bopp's Comparative Grammar* (see article BOPP), *Prem Sagar* (Hindi), *Bagh o Bahar*, *Gulistan*, *Anwar i Suhaili* (see article BIDPAI); also *Sindhi Vocabulary*, *Hindustani Grammar*, *Dry Leaves from Young Egypt* (1851), *Autobiography of Lutfullah* (1857), *Three Years' Residence in Persia* (1864), *Venezuela* (1866-68). E. also catalogued the Ouseley MSS. in the Bodleian Library (1852), and edited the Book of Genesis in the Dakhani language for the Bible Society (1858). E. was a Fellow of the Society of Antiquaries, member of the Royal Asiatic Society, the Asiatic Society of Paris, the Oriental Society of Germany, the Philological Society of London, and Fellow of the Society of Northern Antiquaries. He at one time edited the *Homeward Mail*, and for thirty years contributed to the *Athenæum*.

In 1880, E. was offered the title of K.C.S.I., but the despatch only found him while staying away in the hills in India, and by the time his acceptance reached England the Conservative Government had resigned. Their successors did not renew the offer, and E. died before the Conservatives returned to power. E. was a most painstaking and conscientious student and writer; his industry was immense; and from the day when he landed in India in 1836 until that on which he laid aside his pen for ever, his life was one of long, continued, unceasing application. He did his best to introduce the more accurate method of spelling Indian words, which has become more popular within recent years, and he made copies, after personal inspection, of the epitaphs of all the European tombs he was able to visit in the course of his wanderings over the Peninsula from 1875 to 1882. On being assured one day by a well-known savant at the Athenæum Club, that hard brain-work conduced to long life, E. quietly remarked, 'In that case, Professor, we two should live for ever.'

Eau de Cologne, a very celebrated perfume, invented by Johann Maria Farina of Cologne, the characteristic ingredients of which are essential oils obtained from trees of the orange tribe, such as citron, orange, bergamot, neroli, and petitgrain oils. In addition to these the 'original E. de C.' contains a proportion of lavender, rosemary, and benzoin, the whole being mixed with spirit of wine, to which an alcoholic extract of geranium flowers is added. The ingredients are very intimately mixed by frequent agitation, and allowed to settle in bulk for sixty-four days, when the perfume is ready to put up in flasks for sale. The best brands are those of the inventor.

Eau de Créole, a W. Indian aromatic liqueur, prepared by distilling the flowers of the Mammee apple or S. American apricot.

Eau de Javelle, a solution of potassium hypochlorite, which, towards the end of last century, was introduced for bleaching purposes at Javelle in France. It was soon supplanted by the so-called chloride of lime, or ordinary bleaching-powder.

Eau de Luce, a milky-white perfume of ammonia, benzoin, otto of lavender, and oil of amber. The *Aqua Luciæ* of druggists, so called from its inventor, had formerly a fictitious reputation as an antidote to snake-poison, but is now employed as a stimulant.

Eau de Millefleurs, a very complex bouquet or prepared perfume, in which the principal materials are otto of rose, bergamot oil, vanilla, violet, and jasmine essences, tincture of musk, lavender, neroli, and clove oils.

Eaux Bonnes ('good waters'), a favourite watering-place in the department of Basses-Pyrénées, France, 22 miles S. of Pau. Its warm sulphur-springs are beneficial in the early stages of consumption, and have led to the creation of a thermal establishment, frequented yearly by 6000 bathers. Pop. (resident) 812. In the vicinity are beautiful promenades and picturesque cascades.

Eaux Chaudes, a village of France, 3 miles S.W. of Eaux Bonnes, in the gorge of the valley of Ossau, has warm medicinal springs, whence its name.

Eaux Vives ('living waters'), a Swiss town in the canton of Geneva, 2 miles N.E. of Geneva, and on the margin of the lake. Pop. 7907.

Eaves'drop. The Roman law required a proprietor who had no *stillicidii servitus*, to place his building 2½ feet within his boundary. The principle was recognised by the English before the Norman conquest under the term *efesdrype*. In

Scotland there is no statute on the subject, but by custom 9 inches are required for the E.; but a proprietor may build to the confines of his property provided no drop from the building can fall on the adjoining property.

Eaves'droppers are, according to Blackstone, 'such as listen under walls or windows or the eaves of houses, to hearken after discourse, and thereupon to frame slanderous or mischievous tales.' The offence was in England punishable by fine and being compelled to find sureties for good behaviour, under statutes whose provisions seem to be extended to Scotland by 6 Anne c. 6; but the offence could be reached directly and indirectly by the common law of Scotland.

Ebena'ceæ, a natural order of Exogenous plants, comprising trees or shrubs with exstipulate leaves, polygamous flowers, persistent calices, a baccate or berry fruit, and large albuminous seeds. They chiefly belong to tropical climates. There are five genera, and the heart-wood of several species of *Diospyros* yields the ebony-wood of commerce, *e.g.*, Mauritius ebony, E. Indian ebony, and Ceylon ebony.

E'berhard is the name of several members of the Würtemburg dynasty, of whom the first, **Eberhard the Noble** (*erlauchte*), ruled from 1279 to 1325, and greatly extended the territorial possessions.—**Eberhard IV., the Quarrelsome** (*der Greiner*), grandson of the former, became Count of Würtemburg in 1343, distinguished himself in the wars of S. Germany towards the end of the 14th c., and died 15th March, 1392.—**Eberhard im Bart,** first Duke of Würtemburg, was born in 1445, eight years after the division of the territory between his father, Ludwig the Elder, and his uncle, Ulrich, the founder of the Stuttgart line. He succeeded, with the help of the Elector Friedrich, in consolidating the family inheritance, which he rendered indivisible by the Compact of Münsingen in 1482. The established constitution of Würtemburg was his work, and he also founded the University of Tübingen (1477). E. was the head of the Swabian Bund, and was raised to the ducal rank by the Emperor Maximilian I. at Worms, 1495. He died childless in February, 1496.

Eberhard, Christian August Gottlob, a German writer, born at Belzig, Prussia, 11th October, 1769, studied at Halle, wrote tales and poems which won considerable popularity, and died at Dresden, 13th May, 1845. Among his works are *Ferdinand Werner, der arme Flötenspieler* (1802); *Der erste Mensch und die Erde* (1828), a poem; and *Hannchen und die Küchlein* (1822, 20th ed. 1864), a graceful narrative poem, which has been translated into English by Cochrane, under the title of *Jenny and her Chickens* (Edinb. 1854). E. published his *Collected Works* in 20 vols. (Halle, 1830-31).—**Johann August E.,** a philosophical writer, born at Halberstadt, Saxony, 31st August, 1739. After studying at Halle and acting as a family tutor, he engaged in theological controversy, and published at Berlin his *Neue Apologie des Sokrates* (1772-73; 3rd ed. 1788), a book on the salvation of the heathen, which prevented him from rising in the Church. He remained a poor preacher at Charlottenburg until appointed in 1788 Professor of Theology at Halle. He was made Doctor of Theology and Member of the Berlin Academy of Sciences in 1808, and died 6th January, 1809. In philosophy he followed Leibnitz and opposed Kant; in theology he was one of the earlier German rationalists.

E'bernburg, a village in the Palatinate of Bavaria, about 20 miles S.W. of Mainz, on the Nahe. It is notable for the ruins of the castle of Franz von Sickingen. Within its walls many of the early Reformers found shelter, and here Ulrich von Hutten composed and printed several of his works.

E'bert, Karl Egon, a Bohemian dramatic and lyrical poet of considerable eminence and popularity, was born at Prague, 5th June, 1801; educated at Vienna and the University of Prague, and finally, after holding posts, chiefly as a librarian, settled in his native town as a poet. His poetry, mainly lyrical, is very popular among his countrymen. He also published dramas of some merit.

Eb'ionites (Heb. 'the poor': so named, according to their own account in Epiphanius, because they had sold their possessions for the common good in the time of the apostles) were a sect in the early Church who represented the Judaising tendency which saw in Christianity only the completion of Judaism by the realisation of the Messianic idea and the addition of a few isolated precepts. The E. regarded Jesus only as a man, distinguished above others for his legal piety, on which account he had been deemed worthy to be chosen the Messiah; his election to that office having been miraculously revealed at his baptism by John the Baptist. Jerusalem was still to be the seat of the theocracy, where Jesus, on his speedy return, was to restore it in surpassing splendour. In accordance with these views, the Gospel they used (the *Gospel of the Hebrews*) did not contain any account of the miraculous birth of Christ. In the Apostle Paul, as a matter of course, they saw only an apostate from the law and a false teacher, and therefore they rejected his epistles. The famous *Clementine Homilies* (q.v.) is an Ebionitish work.

There were, however, two different sections of E., one of which came nearer than the other to the orthodox doctrine of the Church. This was the Nazarites, a name originally applied to all Christians, who admitted the supernatural birth of Christ; they were distinguished for their opposition to the Scribes and Pharisees, acknowledged the call of Paul to be an Apostle to the Gentiles, and consequently did not consider the Mosaic law binding on the latter.

Eb'oli (the *Eburi* of Pliny), a town in the province of Salerno, 44 miles S.E. of Naples, with which it is connected by railway. It has several churches and convents, and an annual fair, held for twelve days. The ruins of the ancient *Eburi* stand on the *Monte d'Oro*, near the Sele, which is spanned by the remains of a fine Roman bridge. Pop. 11,536.

Eb'ony (Heb. *hobnim*, from *eben*, 'a stone,' Gr. *ebĕnos*, Lat. *ebenus*), a wood of great hardness and of deep-black hue, obtained from various kinds of trees belonging to the natural order *Ebenaceæ* (q.v.). The E.-wood is the *heart-wood* of these trees, which belong to the genus *Diospyros*. These trees in Mauritius and Ceylon afford the best E. A tree may attain a large size, and the heart-wood of the stem may of itself form logs over two feet in diameter, and often above ten feet in length. E.-wood, when felled, is usually immersed in water for periods varying from six to eighteen months, to further harden it. It is then taken out, the ends of the logs being prevented from splitting by being girt with iron rings. The wood is mostly used for inlaying and in turning, and was employed by the ancients. Commercial E. may be obtained from Leguminous plants, such as *Brya Ebenus* of America.

Ebor, see YORK.

E'bro (Lat. *Iberus*), a river of Spain, which has its source in the Cantabrian mountains, in the province of Santander, and flows S.E. through Navarre and Aragon, passing Logroño, Tudela, and Zaragoza, and falls into the Mediterranean below Tortosa, after a course of upwards of 400 miles, much of which is impeded by shoals and rapids. As its mouth is sanded up, a canal, the *San Carlos*, has been cut through the delta from Amposta to the Bay of Los Alfaques; and another, connected with the San Carlos and reaching as far inland as Zaragoza, has been completed. Besides these there is the famous *Imperial Canal*, or canal of Aragon, commenced by Karl V., which begins 3 miles below Tudela, and ends at the monastery of Monte Terero, near Zaragoza. The E. drains a basin of upwards of 25,000 sq. miles. Principal affluents on the left—the Aragon, Gallego, Segre; on the right, Xalon and Guadalope.

Ecbal'ium Officinar'um (Fr. *concombre sauvage*), commonly called the squirting cucumber, an annual plant of the natural order *Cucurbitaceæ*, is a native of the hotter parts of Europe, where it grows wild on rubbish-heaps. It is cultivated as a medicinal plant in some parts of Northern Europe, and a few acres are grown at Mitcham, in Surrey. It is a trailing plant, without tendrils, rough, and covered with stiff hairs. The fruit, like a small oblong melon, is covered with soft prickles, and is filled with a succulent tissue containing numerous black seeds, which, when the fruit is ripe, are forcibly expelled through the aperture where the stalk is attached to the fruit. This remarkable phenomenon is ascribed by Dutrochet to osmotic action within the fruit. The active principle of the plant is contained in the thick green mucus surrounding the seeds, from which is prepared the drug *Elaterium* (q.v.). For illustration see article CUCUMBER.

Ecbat'ana (Old Per. *Hagmatana*, and Old Testament *Achimetha*, probably 'treasure city,' Gr. *Engbatana* and *Ecbatana*), an ancient city of Media, which has been identified with the modern Hamadan (q.v.). E. was the summer residence of the Median, Persian, and Parthian kings, was built on a conical hill, and surrounded by seven separate walls, painted different colours, the outmost of which had a circumference of fully 28 miles. A recent theory is that there were two Ecbatanas, one at the modern Hamadan, the other at Takht-i-Suleiman, in the province of Azerbijan.

Ec'ce Hom'o (Lat. 'behold the man'), the exclamation of Pilate when he brought Christ forth bound and 'wearing the crown of thorns and the purple robe' (John xix. 5). The expression was adopted by the old masters as the title of pictures representing the Saviour thus presented to the Jews by Pilate. The greatest E. H. is that of Correggio, in the National Gallery. Guido, Morales, and other famous painters, have also treated the subject.

Eccen'tric, in machinery, a disk fixed eccentrically upon a revolving shaft, and used to transform its rotary motion into a reciprocating (approximately harmonic) one, in cases where the continuity of the shaft cannot be broken by a crank.

Eccentri'city, the name of an important element in central curves and surfaces of revolution of the second degree, being the ratio of the distance between the foci to the major axis. It is, therefore, less than unity for the Ellipse (q.v.), and greater than unity for the Hyperbola (q.v.), being equal in the former case to $\sqrt{(a^2-b^2)} : a$, and in the latter to $\sqrt{(a^2+b^2)} : a$, where a and b are the major and minor axes respectively.

Ecchymo'sis (from Gr. *ek*, 'out of,' and *cheein*, 'to pour'), a discoloration of the skin caused by the extravasation of blood in the skin or the tissues beneath it. E. is usually attended with swelling, and may be caused by disease, accidents, or injuries. E. can only take place during life, or before the vital functions have entirely ceased, so that its presence is an important condition in many cases of medical jurisprudence. E. may be diminished by the application of cold, in the cases of recently-inflicted injuries.

Ec'cles (a corruption of the Lat. *ecclesia*), a word that enters into the composition of a great number of names of places, as Eccleshall, Eccleshill, Eccleston, Ecclescraig, Ecclefechan ('the church of St. Fechan'), Ecclesmachan ('the church of St. Machan'), &c. The most important, however, is *Ecclesfield*, a town in the W. Riding of York, with manufactures of flax, linen, and cutlery. Pop. reg. subdist. and civ. par. (each) 25,885.

Ecclesias'tes (Gr. in the LXX. for Heb. *koheleth*, 'the preacher') is the title of one of the books of the Old Testament, which professes to be the utterances of the 'Preacher, the son of David, king of Jerusalem,' *i.e.*, Solomon (ch. i. 1, cf. 12). That it was the composition of Solomon was in ancient times the universal opinion, but there is now a very general opinion that the author's assumption of Solomon's name is nothing but a literary embellishment, the propriety of which would lie in Solomon's reputation for wisdom, and his ability to testify from experience of the vanity of all earthly things. Incidental indications that it was not written by Solomon are found in ch. i. 12, 16; ch. ii. 9 (unsuitable to the son of David, the only king before him in Jerusalem); ch. iii. 16; ch. iv. 1 (it is unlikely that Solomon would have described the misery and wrong caused by his own misgovernment); and ch. xii. 9-14.

As to the actual date of its composition, there are thought to be a number of indications that it was written after the Captivity:—(1) the whole nature of the language, and the prosaic character of the composition; (2) the profusion of Chaldaisms, scarcely found in any of the other books of the Old Testament; (3) the complaint about much book-making (ch. xii. 12); (4) sundry allusions to oppressive *foreign* kings then ruling (iv. 13-16; x. 16, 17, 20).

Regarding the plan of the book there has been the greatest diversity of opinion. Perhaps the most matured view is that while the book contains the germs of both the Pharisaic and Sadducaic systems, the object of the writer was to point out that the secret of true happiness, amid all the troubles of the world, consists in a true enjoyment of the good that comes from God. See Bleek's *Einleitung in das Alt. Test.* (2nd ed. Berl. 1865; Eng. trans. 1869); Ginsburg's *Ecclesiastes*; and Tyler's *Ecclesiastes*.

Ecclesias'tical Commiss'ioners for England were established by the Acts 6 and 7 Will. IV. c. 77 and 3 and 4 Vict. c. 113 (which two Acts were to some extent amended by statutes 4 and 5 Vict. c. 39, 13 and 14 Vict. c. 94, 17 and 18 Vict. c. 116, 23 and 24 Vict. c. 124, 29 and 30 Vict. c. 111, and 36 and 37 Vict. c. 64) in order to carry out the recommendations of commissions appointed to consider the state of the several dioceses in England and Wales, with reference to the amount of their revenues, and the more equal distribution of episcopal duties, the prevention of the necessity of attaching by commendam to bishoprics benefices with cure of souls; to consider also the cathedral and collegiate churches and the residence of clergy on their benefices. The Commission recommended such exchange of episcopal duties as would prevent translations and commendams, and the appropriation of part of the corporate revenues of the cathedral and collegiate churches, and of the whole endowments of the non-residentiary prebends, dignities, and offices, to establish a fund for the better provision of the cure for souls. Under these Acts, the composition of the body was materially changed: it now includes the two archbishops, all bishops, five Cabinet ministers, four Judges, the three chief deans, the Church Estates Commissioners (*ex officio*) and twelve laymen. The Church Estates Commissioners' duties are, amongst others, to control the purchase, exchange, letting, and management of lands and tithes. The method of procedure is for the Commissioners to lay a scheme before the Queen in Council, the Order in Council being afterwards registered in the diocese affected by it. But under the Ecclesiastical Leasing Acts, and in the later Acts relating to clerical residences and the spiritual provision for populous places, the Commissioners act independently. The Act first mentioned made very extensive changes in the limits of the episcopal sees, and introduced two new sees, Manchester and Ripon; it laid down the principle that all parishes should be subject to the episcopal jurisdiction in which they are locally situate, and re-arranged salaries, first-fruits, and tenths. Under the Act 23 and 24 Vict. c. 124, the lands and emoluments (except rights of patronage, residences, and lands connected therewith) of the various sees are vested in the Commissioners, subject to an obligation to provide what is an adequate endowment from time to time. These Acts dealt with the abolition of sinecures, pluralities of deans, and non-residentiary cathedral preferments, chiefly canonries, and the raising money for the cure of souls by the annexation of parishes to canonries, and of canonries to archdeaconries. The separate estates of deaneries and canonries, not suspended or annexed, and of non-residentiary prebends, are also vested in the Commissioners; and any corporation of vicars choral, priest or senior vicars, custos and vicars, warden and minor canons, &c., may transfer their lands to the Commissioners. The policy of the Commissioners is expressed in certain resolutions submitted to the Queen. Grants are given to augment the income and provide residences in certain districts. The Commissioners superintend the exchange of advowsons, the sale of livings in the gift of municipal bodies and of the Lord Chancellor, the erection of new parishes and the selection of sites for building. In fact, the Commissioners have now become the Church Building Commissioners, originally appointed in 1818 to distribute £1,000,000 in the erection of new churches. From the Commissioners' Report, 28th February, 1895, we find that in the preceding year they paid for augmentation and endowment of benefices (including terminable grants and grants under 23 and 24 Vict. c. 124; also annual payments in respect of capital sums held for certain benefices) £696,202 12s. 2d., for chancel repairs (after deducting £330 9s. 11d. received for dilapidations) £1716 7s. 6d., to bishops in respect of estates vested in or managed by the Commissioners (after deducting the net income of £53,100 12s. 9d. arising from the estates) £99,453 17s. 7d., to chapters and vicars choral (after deducting £556 16s. 9d. as share in respect of the suspended Hereford canonry) £150,814 16s. 1d., in capital sums for parsonage houses and sites £48,407 7s. 7d., for surveyors' charges, &c., £5766 11s. 7d. (rather a high item), for architects' charges £1546 6s. 11d., for income-tax (after deducting £30,644 0s. 3d., the deductions on that account from payments made to bishops, chapters, &c.) £9805 7s. 11d., and for official establishment expenses, &c. (after deducting registration fees received) £32,290 15s. 11d., certainly an exorbitant disbursement, when all the other charges are taken into consideration, and one deserving of the careful consideration of both Houses of Parliament. This charge is also indefinite since the amount received as registration fees is not given. The balance sheet showed £6,716,976 8s. 9d. in Government securities and £4,912,336 15s. 11d. in cash. The net income from all sources was £1,921,336 18s. 11d. for the year ending 1st November, 1894.

Ecclesiastical Corpora'tion in England may be *aggregate* or *sole*. The former consists of several members such as a dean and chapter, and is maintained by succession. The latter consists of one person, such as a bishop, a parson, a vicar; every holder of a benefice being regarded as a corporation *sole*, so that the temporalities vested in him do not descend to his heirs, as they otherwise would do by common law. The legal powers of an incumbent are nearly the same as those of a Tenant for Life (q.v.).

Ecclesiastical Courts are courts having jurisdiction in spiritual affairs. They are the Court of Arches, the Courts of Peculiars, the Archdeacon's Court, the Consistory Courts, the Prerogative Court of each Archbishop, the Faculty Court, and the Appeal Court of the Privy Council. The principal ecclesiastical court of the province of Canterbury is the Court of Arches. The parishes which are *peculiars* of the archbishop are under the jurisdiction of the judge of this court. The Court of Peculiars is a branch of the Court of Arches, and has jurisdiction over the parishes of the province of Canterbury in other dioceses. The Courts of Peculiars are numerous; and those with the diocesan courts and the courts of the province of York form the ecclesiastical administration of England. Formerly these courts had jurisdiction in testamentary and matrimonial affairs, but in 1857 this jurisdiction was transferred in the former matters to the Probate Court (q.v.), and in the latter to the Divorce and Matrimonial Court (q.v.); both which Courts are now merged in the Probate, Divorce, and Admiralty Division of the Supreme Court by the Judicature Acts of 1873 and 1875.

Ecclesiastical Law. See CANON LAW.

Ecclesiastical Titles Act. After the Reformation in England, successive Tudor monarchs were excommunicated by the Pope, and, on the other hand, severe statutes were passed by Elizabeth, according to which the attributing by act or speech any such authority or jurisdiction to the Bishop of Rome as he had heretofore claimed should be punishable with præmunire. From that time to 1848 there was no legal method of communication on public matters between England and Rome, although many millions of British subjects were Catholic. In 1827, Mr. Canning, as Foreign Secretary, was forbidden even to reply to a civil letter sent by the Pope announcing his succession. In 1848 the Act 11 and 12 Vict. c. 108 at last enabled her Majesty to hold diplomatic intercourse with the Pope. But it was forbidden to receive as diplomatic representative any person in holy orders in the Catholic Church, or a member of any community bound by monastic or religious vows. The Act was not made use of. After the death of Watson (the last of the old Catholic bishops) in 1584, the Pope maintained his spiritual authority in England through archipresbyters (Blackwell, Birkhead, and Harrison) until 1623, when a Bishop of Chalcedon, *in partibus*, was sent by special bull. Subsequently vicars apostolic were sent. The number fixed by Innocent XI. in 1688 was four, increased in 1840 to eight by Pope Gregory XVI., there being bishops *in partibus* as coadjutors. In Ireland the Catholic Church was always governed by ordinary bishops. In 1850 Pius IX. resolved that there should be a new division of dioceses in England, that there should be an archbishop of Westminster, and that the ordinary bishops should take their names from English towns. Wiseman, previously Bishop of Melipotamus, was made cardinal, and became first archbishop. This was done by the Bull 'Quibus Hierarchia Episcopalis in Anglia restituitur,' which was promulgated without authority from the English Government. This, and the Pastoral Letter of the new archbishop, produced a manifesto from the English clergy (see *Guardian*, 2nd April, 1851), in which they set forth the substantial identity and Catholicity of their Church before and after the Reformation. One title in the bull (St. David's) was already appropriated to an English bishop. Earl Russell then (4th November, 1850) wrote his famous Durham Letter; he was excited by the spread of Tractarianism, or Newmania, and called the bull 'insolent and insidious.' This raised a storm in the country. The result was the Act 14 and 15 Vict. c. 60, which declared the bull void, and imposed a penalty of £100 on all persons procuring, publishing, or using such bulls, or assuming the objectionable title. This Act no one has ever attempted to enforce. On the disestablishment of the Irish Church it was found to apply to the Anglican Irish bishops, and was repealed in 1871. Scotland was for some time after the Reformation under the authority of the English archpriests and vicars apostolic, but in 1629 Urban VIII. granted faculties to F. W. Ogilvie as prefect of the mission. In 1653 the secular clergy were, by decree of propaganda, erected into a missionary body. In 1731 Scotland (which had now its own vicars apostolic) was divided into a Lowland and Highland vicariate. The present tripartite arrangement dates from 1827.

Ecclesias'ticus [so called because the most important and popular of the *libri ecclesiastici* (as opposed to *canonici*), or books appointed to be read in church, though not canonical] is the Latin title of the Apocryphal book, called in the LXX. 'The Wisdom of Jesus the Son of Sirach.' The book seems to have been originally written in Hebrew, with the title 'The Proverbs of Jesus, Son of Sira'; of the original, however, nothing now remains but sundry quotations in the Talmud and Midrashim. The Greek version in the LXX. was made, according to the prologue, by the grandson (name unknown) of the author, in Egypt, in the reign of Euergetes. But this may have been either Ptolemy III. (B.C. 247-222) or Ptolemy VII. (B.C. 145-116), both of whom received the name Euergetes. Unfortunately the same ambiguity attaches to the high priest Simon described in chap. l. as if he had but recently died, as there were two high priests of that name, one who held office about B.C. 370-300, the other about 217-195. But the laudatory description is infinitely more applicable to the former, who was surnamed 'the Pious,' than to the latter, about whom Josephus has not a single good thing to tell. Now as the Simon referred to was dead, E. was probably written about 290-280, and the Greek translation made about 247-222. The aim of the book is to set forth the true nature of wisdom, and the religious and moral duties she teaches us to follow. See Ginsburg in Kitto's *Cyclo. of Bib. Lit.*

Ecclesiol'ogy is a term which was invented at Cambridge at the time of the Tractarian revival of theology at Oxford. The Camden Society, which was instituted in 1838 for the study and preservation of ecclesiastical antiquities, received latterly the name of the Ecclesiological Society. The science, which may be regarded as synonymous with Sacred Archæology, treats of—I. The arts, including architecture, sculpture, painting, engraving, and music; also furniture, plate, vestments, &c. II. Practices, ritual, symbolism, tradition, customs—1. The orders of the clergy. 2. Dignities, offices, and ministries of the Church. 3. Religious buildings, communities, and rules. 4. Distinctions among Christians, as catechumens, &c. 5. Divine service, rites, and ceremonies. 6. Discipline and ordinance. 7. Sundays, fasts, and festivals. 8. Usages and institutions. See Walcott's *Sacred Archæology.*

Ecg'berht (mod. *Egbert*), one of the greatest of the early English kings, was the son of Alckmund, ruler of Kent. Claiming the throne of Wessex in 787, he was compelled to flee before Brihtric, a stronger competitor, to the court of Karl the Great, with whom he remained studying the arts of war and of government until 800, when the witenagemot of Wessex chose him as king. At this time the 'Heptarchy' had become merged into the kingdoms of Mercia, Northumbria, and Wessex; and Mercia, under the energetic Offa, had reduced to dependence, and threatened to absorb, the two remaining divisions. But after consolidating his authority during nine years of peace, and subduing the Britons of Devon and Cornwall, E. joined the E. Anglians, who had revolted against Beornwulf of Mercia, and shattered the Mercian power in the battle of Ellandun, in 823. In 827-828 he marched into Mercia and Northumbria, compelled them to acknowledge the overlordship of Wessex, and received the submission of the Welsh. Thenceforth he reigned over the country from the Forth to the English Channel, with the title 'King of the English.' The Danes began to invade England towards the close of his reign. In 833 he suffered defeat from them at Charmouth, but won a victory over them and their allies, the southern Britons, at Hengestendun (Hengstone Hill) in 835. E. died in 836. He was an able, courageous, and aspiring ruler, and may, to a large extent, be considered the founder of the English monarchy. See Freeman's *History of the Norman Conquest*, vol. i.; Palgrave's *Anglo-Saxon;* Green's *History of the English People.*

Ech'ard, Laurence, an English historian, was born at Cassam, Suffolk, about 1671; held two livings in Lincolnshire; became archdeacon of Stowe in 1712; was presented to several benefices in Suffolk; and died 16th August, 1730. His chief works are *General Ecclesiastical History* (1702); *History of England* (1707-18); *A Gazetteer; A Description of Ireland*, &c.

Ech'elon (Fr. *échelle*, Old Fr. *eschele*, Prov. *escala*, Lat. *scala*, 'ladder'), a formation of troops in successive parallel divisions, each stationed so far to the right or left of the preceding division, as that, on advancing, it shall be in the same line with it. In this formation the different divisions have the same local relation to each other as the steps of an obliquely-placed ladder or a staircase. This formation was of considerable tactical value in former times for the different evolutions required in attack direct or oblique, or in retreat. In modern tactics, in which the grouping of men in close formation for attack would, under all but the most exceptional circumstances, prove a fatal mistake, the E., as a formation in actual warfare, is no longer in use. See DRILL.

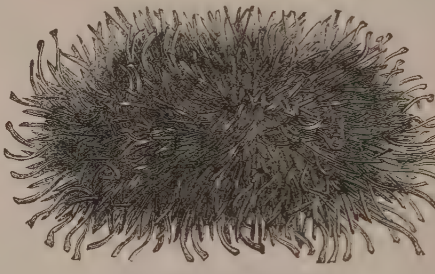
Echid'na, in natural history, a genus of quadrupeds belonging to the order *Monotremata*, and found only in extra-tropical Australia. Two species have been described, but they are believed to be the same, the differences between them being due to age and climate. The E. is about the size of the hedgehog, like which animal its back is covered with strong and very sharp spines. These are of a dirty white tipped with black, and, as in the case of the hedgehog, are erected as a means of defence. The snout is long and tubular, the tongue extensile and covered with a viscous secretion, enabling the E. to capture its food, which consists of ants. The mouth is unprovided with teeth, but on the palate there are several rows of spines, directed backwards. Each foot is armed with five powerful claws, by means of which the animal can burrow with great facility. It favours sandy localities, and is nocturnal in its habits.

Ech'imyd, a peculiar genus of Rodent mammalia, allied somewhat to the *Myoxidæ* or dormice, and inhabiting S. America. The fur is mingled in some species with spines, and has procured for the animals the name of 'spiny rats.'

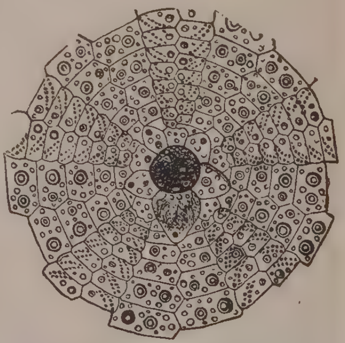
Echinoder'mata, a well-marked group of the animal world, regarded by some naturalists as entitled to rank of itself as a sub-kingdom of animals, but more usually considered to form the typical class of the sub-kingdom *Annuloida* (q.v.) or *Echinozoa.* It is represented by the sea-urchins, starfishes, sea-cucumbers, sea-lilies, and by the extinct orders *Cystoidea* (q.v.) and *Blastoidea* (q.v.). The characters of the E. are found in the general presence of a limy secretion in the skin or *perisome;* in the possession of a distinct digestive canal, a nervous system, and heart; in the presence of a water-vascular system, subserving locomotion; and in the absence of paired or lateral appendages. The symmetry of the body is readily seen to be *radial.*

Echinorhyn'chus, a genus of intestinal worms found in the digestive organs, and sometimes in the abdominal cavity of vertebrated animals. The body is round, sometimes elongated, and often shortened to a kind of sac. The proboscis is armed with hooks, by which they attach themselves to the coats of the intestines. *E. gigas* is the largest known species; it is found in the hog, and the wild boar, and the females are sometimes fifteen inches long. *E. hæruca* is a smaller species, and has been found in the liver of the cat.

Echi'nus, or **Sea-Urchin**, a typical genus of *Echinodermata* and of the order *Echinoidea*, having the body enclosed in a *test* or globular shell formed of layers of hexagonal limy plates, and which (save in a few instances—*Echinothuridæ*) is of rigid nature. The plates in all living Echini are disposed in ten double rows, which divide the shell meridionally into zones. Five of these double rows are perforated with holes for the protrusion of the numerous tube-feet or *ambulacra*, and are hence named *ambulacral areas.* The intervening and alternating five rows are not perforated, and are named *interambulacral areas.* In some cases the ambulacral areas do not extend from pole to pole of the shell, but are limited in the form of a rosette-like arrangement to the upper pole. This arrangement is named *Ambulacra circumscripta*, and is seen in the heart-urchins; and the name *A. perfecta* is applied where the ambulacral areas extend completely (as in the common E.) from pole to pole. The mouth opens at the lower pole. Around the mouth an oval membrane of leathery nature exists; whilst five plates are named *ocular* plates, from the fact of each bearing a little *ocellus*, or *eye.* The exterior of the E. shell bears numerous spines, each moveable and articulated by a ball-and-socket joint to a tubercle on the shell. The spines have gained for the Echini the name of 'sea-hedgehogs'; whilst the shell without the spines has given origin to the name 'sea-eggs,' often applied



Sea Urchin (showing spines).



Sea Urchin (showing shell, top view).

to these animals. Peculiar parasitic organisms known as *Pedicellariæ* (q.v.), occur on the exterior of the E. shell. The digestive system includes a set of five jaws—named the 'lantern of Aristotle'—gullet, stomach, and intestine. A tubular heart exists, and is connected with the alimentary canal by circular blood-vessels; and the nervous system consists of a ring surrounding the gullet and giving off five chief nerve-trunks. Breathing is subserved by a peculiar vascular and ciliated membrane, the *mesentery*, which supports and attaches the internal organs to the walls of the shell. The ambulacral system consists of a set of vessels, by which water is introduced into the shell, for the purpose of inflating the numerous little tubular feet, each provided with a terminal sucker, and by means of which these animals move slowly about. The sexes are distinct in all these forms; and in their development the Echini pass through a metamorphosis. The Echini are classified into the *Echinida* (with no more than twenty rows of plates in the shell), and the *Tesselata* (with more than twenty rows). The former group includes all living Echini, exemplified by the genus *Echinus* itself, by the 'heart' and 'cake' or flat urchins (*Spatangidæ*), by *Cidaris*, and numerous other forms.

Ec'ho (Gr. 'sound,' especially a 'returned sound'). If a series of sound-waves travelling through the air meet an opposing obstacle, a portion of the energy will be transmitted to the obstacle in the form of vibrations, which may be ultimately communicated to another region of the air as sound, while another portion will be simply *reflected* at the surface in a direction generally differing from the original one. This portion when heard constitutes an E. When the sound-waves strike the surface at right angles, the E. will be heard at the spot whence the sound proceeded; or they may be so directed after impinging obliquely upon several surfaces in succession. If the reflecting surface be close at hand, sufficient time may not have elapsed to distinguish the E. from the original sound, as in the case of large rooms or vaulted caves, when there is simply a confused *resonance*. Assuming $\frac{1}{9}$th of a second as the shortest interval between two successive sounds which can permit of them being completely distinguishable by the ear, it follows that for the perception of a distinct E., the reflecting surface must be about 60 feet distant, since sound travels at the rate of from 1050 to 1150 feet per second. A reflecting surface may be of such a form that a sound radiating from a certain spot may be so reflected as to converge at another definite spot; and thus the slightest whisper uttered at the former place may be distinctly heard at the latter, though inaudible elsewhere. An Ellipse (q.v.), with its foci, fulfils such a condition. The elliptical form of the Albert Hall quite marred the music with which its opening was inaugurated—the orchestra having been heedlessly placed at one of the foci. The Whispering Gallery of St. Paul's is also of this nature. Some echoes, again, are capable of repetition for a considerable number of times, the reflecting surfaces acting in the same manner as the mutually-inclined mirrors of a kaleidoscope. Such are the echoes of Killarney, and that of Simonetta near Milan, described by Southwell as repeating the report of a pistol sixty times. The prolonged rolls of thunder are simply a succession of echoes produced by reflection from the huge cloud-masses scattered over the sky.

E'cija, a town in the province of Sevilla, Spain, on the Xenil, 45 miles N.E. of the city of Sevilla. It stands in a fertile plain, is embosomed in trees, has a fine *alameda* or public walk, several churches, monasteries, and hospitals, and Saracenic gates and towers. It has manufactures of linens, woollens, and leather. E., the ancient *Astigis* (in Basque or Iberic, 'rock-dwelling'), became the *Colonia Augusta Firma* of the Romans, and Roman remains have been found. Pop. 23,615.

Eck, Johann Mayr von, a celebrated theological disputant, was born at Eck, Swabia, in 1486, studied at Heidelberg and Tübingen, and was appointed for his argumentative skill to the chair of theology in Ingolstadt University in 1510. His attack on Luther's *Theses*, in his *Obelisci* (1518), drew him into a public discussion with Luther and Karlstadt at Leipzig in 1519. His hatred towards the Reformers, to whom he affixed the name *Lutherans*, was implacable. Through his influence the papal bull of 1520 was issued, which condemned Luther's writings as heretical and erroneous. He was prominent in the Augsburg Diet, 1530, in the Conference of Worms, 1540, where he argued for three days with Melancthon and others, and in the Conference of Ratisbon, 1541. He died at Ingolstadt in 1543. He was self-confident, greedy, ambitious, and possessed slender talents and learning. He produced numerous polemical, ethical, and theological works, of very little value. His translations of the Bible had no success.

Eck'ermann, Johann Peter, the friend of Göthe, was born in 1792 at Winsen on the Lühe, a little town between Lüneburg and Hamburg. He studied at Göttingen in 1823, where he became private secretary to Göthe, with whom he lived on terms of the closest intimacy, and died at Weimar, 3rd December, 1854. His chief work is his *Gespräche mit Göthe*. The first part of these was published at Leipzig in 1836, the second at Magdeburg in 1848. They have been translated into all European languages. There is an American translation by Fuller (Boston, 1839), and an English by Oxenford (Lond. 1850). E.'s work is of the highest value, being a faithful picture of Göthe's domestic and literary life, and throwing a clear and full light on the varied génius of that great man. The *Gespräche* also contains, as their author himself says, 'many valuable explanations and instructions as to science, art, and the practical affairs of life.' E. also edited (1839-40) the *Sämmtlichen Werke* of Göthe, in 40 vols. A slight autobiography of E. is prefixed to the *Gespräche*.

Eckh'a, the name for the most common wheeled conveyance in India. It is a light two-wheeled cart, without springs, drawn by a pony, and covered with a cloth awning on a wooden framework. The E. is rarely used by Europeans, but natives will take long journeys in it. A good pony has been known to take a loaded E. 60 miles in twelve hours.

Eck'mühl, or **Egg'mühl,** a village in Lower Bavaria, on the Laber, 11 miles S. of Ratisbon, the scene of the defeat of the Archduke Karl of Austria by Napoleon I., 22nd April, 1809. Karl's attempt to seize the highway to Donauwörth, which would have secured the possession of Bavaria, was frustrated on the 21st by Davout; and next day Napoleon, with 65,000 men, suddenly attacking the Archduke, whose force amounted to only 28,000 men, compelled him to retreat on Ratisbon, with the loss of 6000 men and 16 guns. For his share in this engagement Napoleon created Davout, then Duc d'Auerstadt, Prince d'E.

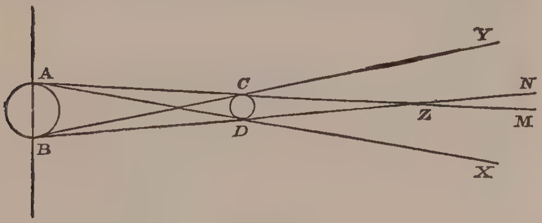
Eclamp'sia (Gr. *ek* and *lambanō*, 'I seize'), a term used to designate certain convulsive affections. E. depends upon a source of irritation of the periphery of the nerves, generally of a transient nature, and it disappears when the exciting cause is removed. It is distinct from the convulsions of hysteria, epilepsy, catalepsy, muscular convulsions, apoplexy, &c. It is an exceedingly alarming disease, and sometimes ends fatally.

Eclec'tics (from Gr. *eklegein*, 'to choose'), the name given to those philosophers who select various doctrines from earlier schools, and seek to form them into an harmonious system. The Neo-Platonic school of Alexandria is the chief eclectic school of ancient times, blending a subtle Greek dialectic with Oriental mysticism and Christian metaphysics. Bacon and Descartes, and also Hegel, have been styled the founders of modern eclecticism. The chief eclectic of recent times was Victor Cousin, whose system seems to have been based on a passage in Hegel's *Geschichte der Philosophie*. Cousin sought to combine the principles of Reid and Stewart with those of Proclus, Kant, Hegel, and others, and through his brilliant rhetoric won for his system a wide but fleeting popularity. At one time the chairs of philosophy in France were almost all held by his followers, but his eclecticism has now fallen into disrepute.

Eclip'ses (Gr. *ekleipsis*, lit. 'a leaving out,' hence 'a failing to appear.') are those astronomical phenomena in which a greater or smaller portion of a luminary is cut off from view.

This may occur in two distinct ways—either by the intervention of an opaque body between the luminary and the observer; or, if the eclipsed body be of itself non-luminous, by the interception of the light which, by its reflection, renders the body visible. To the former class belong solar E., those of Jupiter's or Saturn's satellites, as sometimes viewed from the earth, transits of Venus and Mercury, and occultations of stars; while lunar E., and the transit of a satellite's shadow over the disk of Jupiter and Saturn, may be mentioned as cases of the latter class. The word *eclipse*, however, when used without any qualification is understood as referring to either the sun or the moon; and it is in this restricted signification only that these phenomena are briefly discussed here.

A Lunar Eclipse is occasioned by the passage of the moon through the earth's shadow, necessarily accompanied by the interception of a portion of the sun's light, which would otherwise fall upon the moon's disk. This can only happen when the earth is between and in the same straight line with the sun and moon, *i.e.*, at the time of full moon. A consideration of the annexed figure will make the whole quite intelligible. A B represents a plane section through a great circle on the sun's surface, and C D a similar section of the earth's—both sections being in the same plane. Draw to these circles the four common tangents A X, A M, B Y, B N. In consequence of the much greater distance separating the earth and sun, as compared with their diameters, we may suppose these tangents to intersect at A B and C D—the extremities of two parallel diameters. Now the space C D Z is the section of a cone within which there is total shadow. This cone is called the *umbra;* and it is the entrance of the moon into this region which constitutes an eclipse—total or partial, according as the moon is wholly or partially immersed. Around this cone is another region, represented in section by Y C Z and Z D X, from which sunlight is partially excluded, and which is known as the *penumbra.* To an observer on the moon during its passage through this region, the sun would present the same appearance that it does to us during a partial solar eclipse. There is not, however, an eclipse at every full moon, since the moon's orbit does not lie in the plane of the ecliptic, but makes with it an inclination of rather more than 5°. The phenomenon is only possible when the moon at its full is sufficiently near its node; and it is found from calculation that no eclipse can take place if the node be distant from the point of the ecliptic opposite the sun by more than 11° 25′ 40″, and that an eclipse *must* take place if this distance be less than 9° 20′ 29″. The possibility of there being an eclipse within these limits depends on the relative distances of the sun and moon from the earth at the time. Even in the *umbra*, however, the moon receives solar light which has been refracted through the earth's atmosphere, and it is therefore usually distinguishable as a dark, copper-coloured disk.



Eclipse.

A Solar Eclipse is caused by the interception to a terrestrial observer of the whole or a portion of the sun's light by the opaque body of the moon. Accordingly it cannot take place but at new moon, and then, as in the case of lunar E., only when the moon, while in this position, is sufficiently near its node. The limits, corresponding to those given above for a lunar eclipse, are 15° 35′ 56″ and 17° 50′ 42″—the possibility of an eclipse happening within these again depending on the relative distances of the sun and moon from the earth. The only true difference between a lunar and a solar eclipse is that in the former the moon passes through the earth's shadow, while in the latter the earth passes through the moon's; but to a terrestrial observer the apparent differences are very striking. An eclipse of the moon is visible to all observers on the hemisphere of the earth turned away from the sun, and undergoes all its phases at precisely the same time for all observers; an eclipse of the sun is visible over a limited area, and differs in its extent and the time of its occurrence for every observer. The breadth of the earth's shadow at the moon's distance is considerably greater than the moon's diameter; that of the moon's shadow on the earth is at most a few miles, while sometimes the *umbra* falls short of the earth altogether—a phenomenon which cannot happen unless the moon's apparent diameter be less than the sun's. During a lunar eclipse the moon is always wholly immersed in the *penumbra;* during a solar eclipse the earth is never so, and hence the explanation of the fact that an eclipse of the sun is invisible at localities outside a certain closed area of the earth's surface. An eclipse of the moon is totally independent of the earth's diurnal rotation; but a solar eclipse is not. It is this consideration that renders the calculation of the latter so complicated and difficult compared with that of the former. In both, E. may be total or partial, but only in the case of the sun can there be what is termed an *annular* eclipse. This happens when the moon passes centrally over the sun's disk, the *umbra* at the same time falling short of the earth.

The earliest recorded solar eclipse is that mentioned in Chinese history as having taken place in the reign of Shingkang about 2169 B.C. It is mentioned incidentally in connection with the names Ho and Hi, two astronomers who were put to death for neglecting to predict the phenomenon. The famous total eclipse, predicted by Thales of Miletus, and which according to Herodotus interrupted the battle between the Lydians and Medes, occurred, if we accept the calculations of Sir G. B. Airy, on 28th May, B.C. 585. The total E. of Xerxes (B.C. 478) and of Agathocles (15th August, B.C. 310, according to Airy) may also be noted. In later times, we have the celebrated E. of 1434 and 1598, both total in Scotland; and that of 3rd May, 1715, the last total eclipse observed in England. The years 1868-71 will always be memorable for their total E., and for the great service done to astronomical science during their observation. That of 17th August, 1868, observed in India, is celebrated for the long duration of totality—as much as 6 minutes 50 seconds; that of 7th August, 1869, was well observed in N. America; that of 22nd December, 1870, was not successfully observed; while that of 12th December, 1871, was visible in Ceylon and Southern India. The same interesting series of E. will recur in precisely the same order after the lapse of between eighteen and nineteen years. (See METONIC CYCLE.) The most striking phenomena to a scientific observer during a total eclipse of the sun are the corona or ring of light, and the irregular red-coloured protuberances round the dark body of the moon. The corona depends greatly for its size and appearance upon the condition of the earth's atmosphere; but the protuberances are truly solar, being the huge flames of the ignited gases which form the sun's chromosphere. These flames, which can now be observed by means of a spectroscope without the aid of a total eclipse, are best considered under SUN. It is enough to mention that at the moment of totality the solar spectrum is reversed, the continuous spectrum disappearing, and the absorption lines becoming bright. (See SPECTRUM ANALYSIS.) In 1895 two total lunar, and three partial solar, E. occurred. For more detailed information regarding E., both mathematical and descriptive, see Herschel's *Outlines of Astronomy*, and Proctor's *Sun*.

Eclip'tic, the course among the stars which the sun, in virtue of the earth's annual revolution, seems to pursue—so named from the *Eclipses* (q.v.), which only happen when the moon is in or near this great circle. The E. does not coincide with the celestial equator, and accordingly the sun has an apparent annual motion in Declination (q.v.) as well as in right ascension. (See ASCENSION, RIGHT.) On the 21st of June and the 21st of December or thereabouts, the sun reaches its greatest distances N. and S. of the equator, being then at its summer and winter solstices respectively. The *obliquity* or angle of *inclination* of the E. to the equator is continually changing, being affected by the positions of the other planets, and by the earth's own Nutation (q.v.); but the difference between its extreme variations can never exceed 2° 42′. Its mean value is 23° 27′ 19″·93. The nodes, or the points at which the E. intersects the equator, are called the equinoxes, the vernal equinox occurring about the 21st of March, and the autumnal about the 22nd of September. They are subject to a slow but continuous westward motion, each having an angular annual motion of 51″·1, and therefore taking 25,362 years to make one complete revolution. This continuous variation is known as the precession of the equinoxes. (See ARIES, PRECESSION.) The E. is divided into twelve equal portions, each containing 30°, and receiving its name *originally* from the constellation which occupied the same space in the heavens. In consequence of precession, however, the *signs*, as they are called (see ZODIAC), no longer coincide with the constellation of the same name.

Ec′logue (Gr. *eklogē*, 'a selection') was at first the name of a poem, or series of poems, chosen on account of their beauty from an author's work; afterwards the term was applied to Virgil's *Bucolics*, or pastoral poems, and hence has become synonymous with a pastoral idyll. See PASTORAL POETRY.

École Polytechnique′. In 1794 the National Convention of France, to prepare young men for the public services, and especially for engineering, civil and military, created an educational institution, named at first *L'École des Travaux Publics*, but after 1st September, 1795, the E.P. Founded on the plan of Monge, the school was re-organised in 1816, and its constitution has been subsequently modified. It supplies cadets for the artillery service of the army and the fleet, for military and naval engineering, for the corps of engineers of roads, bridges, mines, &c. It is under the control of the Minister of War, and is subject to military discipline. The governing staff is military, but the teaching staff may be either military men or civilians. Admission is by competitive examination, and the competitor must be a Frenchman or naturalised, a bachelor of science, and between sixteen and twenty years of age, except in the case of officers already serving under the French flag, who are admissible to the age of twenty-five years. The outfit required costs from 500 to 600 francs, and board costs 1000 francs per annum, but assistance is given to poor students under certain conditions. The course extends to two years, in each of which special subjects require to be mastered. There is an examination at the close of the first, and the great examination at the end of the second year. The measure of success at the latter regulates the position to which cadets may at once attain.

Écoutes′ (Fr. 'listening places,' from *écouter*, 'to listen'), galleries made beneath or before a glacis to shelter troops placed there to disturb the miners of the besiegers.

Écraseur (Fr. *écraser*, 'to crush'), an instrument invented by Chassaignac, of Paris, for removing diseased parts from the living body by a rapid process of strangulation. The D. consists of a loop of fine steel chain, wire or other material, which, having been passed over the tumour or through the tissues to be removed, is gradually tightened by a mechanism in the stem, to which it is attached, until the tumour is completely separated. By this means the operation is completed with little or no hæmorrhage, and in many cases parts can be operated upon more conveniently than by the scalpel.

Ec′stasy (Gr. *ekstasis*, 'a change of anything from its ordinary place') is the term applied by Plotinus and the other Alexandrian philosophers to that faculty by which they fancied they obtained a knowledge of God and the world of universal ideas not liable to the imperfection of knowledge obtained through organic conditions, and manipulated by a finite mind. In some cases it produced immediate vision of beauty or moral perfection; to philosophers, by the gradual process of dialectics, it revealed the ideas of unity and proportion. Music, dialectics, and love or prayer, are its three sources. This faculty, called by Proclus 'illumination,' dealt with such subjects as the Alexandrian unity; the three hypostases of absolute unity, the first intelligence, and universal soul; and the doctrine of Emanation (q.v.). E. may in the same sense be applied to the vision of such mystics as Behmen, Tauler, &c. More generally, E. is applied to a mental state, in which an emotion seems to absorb the whole mental force, and leave none for will or intellect. E. is also a medical term for the morbid state in which consciousness of external objects and also voluntary motion are suspended, the mind being fixed in abstract contemplation, and the muscles generally rigid, or only partly relaxed. It is distinguished from catalepsy and trance *proper* by the presence of intelligence. The predisposing causes are all those which lower the nervous system. E. may be induced by religious excitement or mesmerism. It is probably accompanied by cerebral congestion, and often passes into epilepsy and mania.

Ec′tasis (from the Gr. *ekteinō*, 'I stretch out'), a term used to indicate aneurismal distension of the walls of the pulmonary artery or capillaries, as seen in the air-cells.

Ecthy′ma (Gr. *ekthūma*, 'a pustule') is an acute inflammation of the skin, characterised by an eruption of large round pustules, upon a hard inflamed base. The pustules are discrete and scattered, with dark-coloured crusts, which on separation often leave a brown stain or a superficial ulcer, followed by a cicatrix. The eruption seldom occurs on the face or scalp, and is most frequent during spring and summer in young adults. *E. chronicum* has three varieties—*E. infantile*, which appears in ill-fed and delicate children or in those debilitated from previous disease; *E. luridum*, in old persons whose constitution has been injured by excesses; and *E. cachecticum* in persons of unsound and cachectic constitutions of all ages. The pustules resemble those following the irritation produced by tartarised antimony. Treatment—gentle laxative and alterative medicine with diluents and abstemious regimen, and for local application solution of superacetate of lead. In the chronic form, tonics and alteratives, as nitro-muriatic acid with gentian.

Ec′toderm (Gr. *ektos*, 'without,' and *derma*, 'the skin'), the name applied to the outer of the two layers into which the tissues of Cœlenterate animals are divided. The E. corresponds roughly with the outer 'skin' of higher animals. In sponges and higher forms, the name E. is also given to the external layer of the tissues, and is used in contrast to the *endoderm* or inner layer.

Ectozo′a (Gr. *ektos*, 'without,' and *zoos*, 'living'), a name used only in a general sense in zoology for such parasites as lice, ticks, and many lower crustacea, which live upon the skin or external surfaces of other animals.

Ectro′pium, or eversion of the eyelids, is caused by swelling and protrusion of the conjunctiva, and also by morbid contractions and adhesions, or partial or total destruction, of the skin of the eyelids. E. may be cured by a simple plastic operation.

Ectrot′ic, a term used to indicate modes of treatment which aim at preventing the development of disease, as cauterisation to destroy the pustules of small-pox or limit the spread of erysipelas.

Ecuador′ (the Spanish form of 'equator'), or República Del Ecuador, a republic of S. America, so called from lying on both sides of the equator; bounded N. by the United States of Colombia, E. by Brazil, S. by Peru, and W. by the Pacific. Its area is estimated at 118,630 miles, and its pop. at 1,271,860, including 870,000 Indians. The Guayaquil is the only considerable stream in the W.; the Pastassa, Marona, Tigre, Curary, Santiago, and Napo, affluents of the Amazon, drain the E. The country is traversed by a double range of the Andes, which encloses plateaux of from 8000 to nearly 10,000 feet above the sea. The highest summits are Chimborazo, 20,608 feet, Cayambe, 19,535; Antisana, 19,282; and Cotopaxi, a volcanic cone, 18,811. The climate varies much—from the tropical heat of the low tracts to the perpetual spring of the valleys and the cold of the region of perpetual snow. The capital is Quito (q.v.), and the chief port Guayaquil. The chief exports are cocoa, caoutchouc, coffee, hides, ivory-nuts, straw hats, and Peruvian bark; the chief imports are cotton and woollen goods, wines, groceries, flour, and hardware. In 1893 the value of the former was £2,342,085, and of the latter £1,675,360. The largest export trade is carried on with France, and the largest import trade with Great Britain. In 1893 the revenue amounted to £720,950, and the expenditure to £738,908. The foreign debt, capitalised, of the republic amounts to £750,000, and the internal debt to £834,000. The constitution, dating from 1884 and modified in 1887, vests the executive in a President, elected for four years, and the legislative power in a congress of two houses. These are a senate (two senators elected by each province for four years, and half retiring every two years), and a chamber of deputies (one deputy for every 30,000 inhabitants elected every two years). E. rebelled against Spain in 1820, joined Colombia in 1822, and became an independent republic in 1830. Since 1863 there has been much civil dissension, culminating at times in actual war, and continual disputes have occurred between E. Colombia and Peru in reference to boundary questions. The army consists of 3300 officers and men, together with 30,000 national guard. One cruiser, a torpedo launch, two gunboats, and a transport constitute the navy. Duran and Chimbo are connected by a railway 63 miles long, and there are 1250 miles of telegraph in working order. The *sucré* is the coin in use in the country; it is mostly composed of silver, and is valued at 3s. 4d. No gold is in circulation.

The following is a list of the provinces of E., together with their estimated population, according to the latest returns, and their chief towns:—

Province.	Population.	Chief Town.
Azuay	132,400	Cuenca
Bolivar	43,000	Guaranda
Cañar	64,014	Azogues
Carchi	36,000	Tulcan
Chimborazo	122,300	Riobamba
Esmeráldas	14,553	Esmeráldas
Guayas	98,042	Guayaquil
Imbabura	67,940	Ibarra
Leon	107,739	Latacunga
Loja	66,456	Loja
Manabi	64,123	Portoviejo
Oriental (La Region)	80,000	——
Oro (Del)	32,600	Machala
Pichincha	205,000	Quito
Rios (De Los)	32,800	Babahoyo
Tunguraua	103,033	Ambato
Total	1,270,000	

The Archiepelago de Galapagos (area 2400 square miles, and pop. 200), is now under the control of E., and consists of Santa Cruz, San Salvador, San Cristobal, Isabela, Fernandina, Santa Maria, Espanola, Santa Fé, &c., of which Isabela is the largest, and in places rises 1400 feet above the level of the sea. The province of La Region Oriental is mainly occupied by Indians, and lies chiefly between the Amazon and the Yapurá to the E. of the Andes.

Ecumen'ical [lit. 'of the whole world,' Gr. *oikoumenikos*, from *oikoumenē* (*i.e. gē*), 'the inhabited (world)', general, universal], a term applied to ecclesiastical councils when of the whole Church, to distinguish them from provincial or diocesan synods.

Ec'zema (Gr. 'anything thrown out by heat') is one of the most common of skin diseases. It is non-contagious, and is characterised by an eruption of numerous minute vesicles, frequently confluent, extending over a surface of irregular form, and usually of considerable extent. In the fully-developed disease the skin is often red, smooth, and shining, the tissues being loaded with infiltrations. The varieties of E. are classified according to the nature of the eruption and the parts of the body affected, the more important being—*E. vesiculorum*; *E. pustulosum*, or *impetigo*; *E. papulosum*, *prurigo*, or *lichen*; *E. rimosum*; *E. chronicum*, or *psoriesis*. E. may occur symptomatically, as a consequence of some constitutional disturbance, or as an effect of local irritation of the skin. See *E.*, by Dr. T. M'Call Anderson.

E'dam ('the dam or dyke on the Ey'), a town in N. Holland, on the Ey, 12 miles N.N.E. of Amsterdam. It has a small harbour, manufactures of rope, salt, and leather, some shipbuilding, and trade in cheese and wood. It was here that the fleet of De Ruyter was constructed. Pop. 3221.

Edd'a (Old Norse, 'grandmother'), the name of two collections of Norse poems and legends. 1. *The Poetic* or *Elder E.*, containing the *Völuspá*, a lay on the origin and destruction of the world, and poems on the exploits of gods and heroes, which partly reappear in the German *Nibelungenlied* (q.v.). This E. was collected by Sæmund Sigfusson, an Icelandic priest (born about 1050, died 1133). Portions of it were translated into German by the brothers Grimm, and a complete translation was executed by Simrock (3rd ed. 1864). 2. *The Prose* or *Younger E.*, a synopsis of Scandinavian mythology, ascribed to Snorri Sturleson (born in Iceland 1178, died 1241), who probably wrote the *Prologue* and *Epilogue*, the other parts, *The Deluding of Gylfi*, and *Conversations of Bragi*, being derived from the *Elder E.* The *Elder E.* was published at Copenhagen, 1828; later editions are those of Münch (1847), and Möbius (1860). The *Prose E.* was published by Resenius (1665), and by Rask (Stockholm, 1818). A later edition is that of Sweinbjörn Egilsson (1848-49). The *Elder E.* was discovered in 1643 by the Icelandic bishop Brynjolf; the *Younger E.* in 1623 by Arngrim Johnson. See Mallet's *Northern Antiquities*, Thorpe's *E. of Sæmund*, and Magnusson and Morris's translation of songs from the *Elder E.*

Edd'oes. See Cocco.

Edd'ystone Lighthouse stands on a very dangerous reef, submerged at high water, about fourteen miles from Plymouth. The character of this reef, and its proximity to an important port, caused measures to be taken very early for the protection of shipping. In 1696 a gentleman named Winstanley obtained authority to erect a lighthouse there, and in 1700 his building, a wooden one, was finished. It was destroyed during a terrible storm in 1703, the workmen, lighthouse-keepers, and Winstanley himself all being drowned. Six years later another wooden lighthouse was built on the same site by Rudyerd, and this remained until 1755, when it was burnt down. Smeaton (q.v.), the celebrated engineer, was then called in, and constructed the graceful column 68 feet high, which defied storm and wind 1759—1882, when it was removed. The present tower, which

Eddystone Lighthouse (built by Smeaton).

was opened with great ceremony by the Duke of Edinburgh on 18th May, 1882, was designed by James N. Douglas, chief engineer to the Trinity Board. Work on the rock commenced on 23rd July, 1878, and it was estimated that the work would take five years to complete. The foundation stones were laid on 19th August, 1879, and the last stone of the masonry on 2nd June, 1881, being thus completed within three years. It is built entirely of granite from the De Lant quarries in Cornwall and from Aberdeen. A solid cylinder of granite, 44½ feet in diameter was first built up from the rock to the height of 2½ feet above high water. From this, as a base, the tower springs, leaving a terrace 4½ feet wide all round. The lantern, 133 feet high, exhibits a white double-flashing half-minute light, visible in clear weather for 17½ miles. Smeaton's tower has been placed on Plymouth Hoe.

E'delinck, Gerard, a Flemish engraver, born at Antwerp in 1649, went to Paris in 1666, where he became professor at the Gobelins, and died 2nd April, 1707. He engraved many of Le Brun's pictures, and some of Raphael's and Leonardo da Vinci's. His style was clear, brilliant, and accurate, and his works rank among the foremost of their kind.

E'den (Heb. 'delight' or 'loveliness'), according to the Book of Genesis, was the site of a garden in which the first man and woman were placed by their Maker. The only guide we have to the locality indicated is that the garden was watered by a river which was 'parted into four heads'—Pison, Gikhon, Hiddekel, and Phrath. Hiddekel and Phrath are easily identified as the Tigris (Dan. x. 4) and Euphrates; but the conjectures offered in the attempt to identify the other two have been almost innumerable. The problem is to find a locality *on the Euphrates and Tigris*, with two other rivers that would correspond to the Pison and Gikhon, and with the adjunct at the same time of regions answering to Khavilah and Cush, which were 'compassed' by these rivers respectively. (1) A number of eminent scholars (Calvin, Bochart, Huet, &c.) have fixed the locality of E. in the lower part of Babylonia, making the Pison and Gikhon the two channels by which the united stream of the Euphrates and Tigris enters the Persian Gulf. (2) Others (Reland, Calmet, Rosenmüller, &c.) have found it at the source of these two rivers, making the 'river' from which the four streams diverged to be a 'well-watered region;' the Pison and Gikhon being two small streams (Araxes, Phasis, &c.) rising, like the two large ones, in the mountains of Armenia. (3) One of the oldest and most widely-received theories, and one which has been supported by eminent scholars in modern times (Bertheau, Ewald, Kalisch, &c.), is that by the Pison was meant the Ganges (others, the Indus), and by the Gikhon, the Nile.

The subject entered on a new phase owing to the discovery in the terra-cotta library of Assur-bani-pal at Nineveh, of copies of Babylonian legends regarding the creation and primitive history of mankind. From these Assyrian inscriptions, then, the following details may be gathered. The name of Babylonia under the Cassile dynasty was Gan-Duni, which probably gave rise to the Hebrew Gan-Eden (Garden of E.). Gikhon is, letter for letter, the same as Gukhan-de, the Akkadian name (Akkad, with a capital of the same name, was Upper Babylonia, the original state) of the Arakhtu or Araxes, 'the river of Babylonia,' which joined the Euphrates at Babylon, after flowing through a deep valley which runs into the heart of Northern Arabia; so that it would literally 'compass the whole land of Cush, *i.e.*, S. Arabia. Hiddekel was the Akkadian name of the Tigris, and Pison the Pasi-Tigris; Khavilah being probably Khuliya, which was situated on the last-named stream.

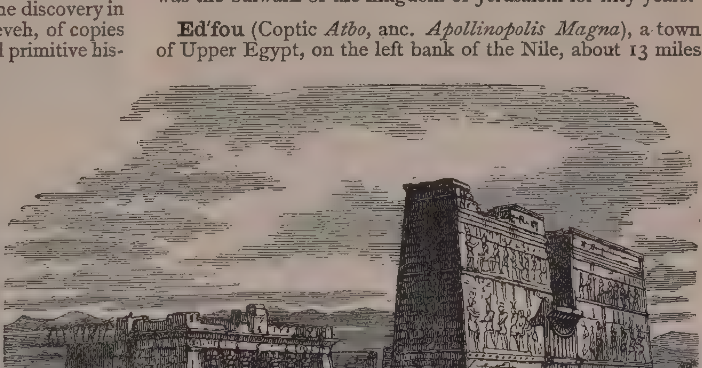
On the other hand, the mountainous region of Armenia is sometimes called in the inscriptions 'the land of the four rivers,' because in it four streams take their rise, of which three are the Araxes, Euphrates, and Tigris. It was from this region (the cradle of the Turanian race), moreover, that the Akkadians (Highlanders) originally came; and if the site of E. had been *transferred* from Armenia, in which four rivers took their rise as if from one source, to Chaldæa, the four rivers of which run into one stream, this combination of two geographies would explain the ambiguity in Gen. ii. 10-14, in which the four are described as branching off from a single parent stream, and at the same time as flowing from four distinct 'heads,' which commentators have laboured to show do not mean sources, but streams. See Smith's *Chaldæan Account of Genesis*.

Eden (perhaps from the root *dan* or *don*, 'water'), a river rising in the Pennine chain in Westmoreland, near the N.W. boundary of Yorkshire. It traverses Westmoreland and Cumberland in a N.N.W. direction, and falls into the Solway Firth after a course of 65 miles.—E., a river in Scotland, rises in the east of Kinross-shire, traverses Fifeshire, and falls into St. Andrews Bay, after a course of 20 miles. There are also lesser streams of the same name in Kent and Roxburgh.

Edenta'ta (Lat. *e*, 'without,' and *dens*, 'a tooth'), an order of Placental or higher mammalia represented by the anteaters, sloths, armadillos, pangolins, and by the aard-vark of S. Africa. They are so named from the rudimentary structure of their teeth, only one set of which is developed. They are therefore Monophyodont mammalia. Moreover, the teeth have no enamel covering or true roots. Incisors are wanting, save in one of the armadillos, and canines are generally absent. Clavicles are usually developed. The skin may develop bony plates (armadillos) or horny scales (pangolins). The testes are abdominal, and the mammary glands pectoral or abdominal. The toes have powerful nails. The E. chiefly occur in S. America, where remains of extinct E., often of large size (*Glyptodon*, *Megatherium*, &c.), are also found.

Edess'a (Gr. *Callirhoe*; mod. *Urfah* or *Orfa*), an ancient town in the N. of Mesopotamia, about 70 miles W.S.W. of Diarbekr. It is still a place of importance from its situation on the commercial highway between Aleppo and Kurdistan, and carries on morocco-leather manufactures. Pop. 39,860, of whom 2000 are Armenian Christians. Its origin is unknown. It was enlarged by Seleucus, and in his time was named E. from a Macedonian town of the same name. After the spread of Christianity E. was celebrated for its schools of theology, the chief of which, the *Schola Persica*, vigorously engaged in the Nestorian controversy against St. Cyril in the 5th c. E. was taken by Baldwin in the first crusade (1097), and made the capital of a county of the same name, which was the bulwark of the kingdom of Jerusalem for fifty years.

Ed'fou (Coptic *Atbo*, anc. *Apollinopolis Magna*), a town of Upper Egypt, on the left bank of the Nile, about 13 miles



Ruins at Edfou.

below the Lesser Cataract. The ruins of its two temples are among the most interesting in Egypt. The sculptures of the chief temples represent the progress of the Sun through the circle of the Hours. The entrance is a gateway 50 feet high, flanked by two pyramids 114 feet high. The temple, founded by Ptolemy Philometer, B.C. 181, is 145 feet wide and 424 feet long, was girt by a wall 20 feet high, and could serve as a fortress. Within the square is a covered colonnade, faced by a portico 53 feet high, with a triple row of pillars having richly-foliated capitals. The modern E. is a poor village, with manufactures of cottons and pottery.

Ed′gar. See EADGAR.

Edge′cumbe Bay or **Port Denison,** is situated on the coast of Queensland, its entrance being in 20° S. lat., 148° 10′ E. long. The town of Bowen is built on its western shore, about half way from the entrance. Its pop. is: municipality 1082; district, area 11,333⅘ sq. miles, 2788.

Edgecumbe, Mount, a conical mountain at the mouth of Norfolk Sound, on the island of Sitka, on which the Russians established the colony of New Archangel, now belonging to the United States. It has quite recently been an active volcano, and traces of its action are manifest.

Edgehill, Battle of, was fought at Edgehill in Warwickshire, on Sunday, 23rd October, 1642, between the Royalists, led by Charles I. in person, and the Roundheads under Robert Earl of Essex, son of Elizabeth's favourite. It was the first important action of the civil war. Prince Rupert, who commanded the royal cavalry, broke the left wing of the Parliamentarians, and pursued it to Keinton, where his troopers took to plunder, while Essex with his right wing compelled the Royalists to retreat. Of 4000 that fell in the battle, the larger proportion belonged to the army of Charles.

Edge′worth, Richard Lovell, an English mechanician, was born at Bath in 1744, educated at Oxford, and settled in Ireland in 1782. He was returned to the Irish Parliament, in which he spoke against the Union. E. made experiments relating to carriages, railways, &c., and in 1804 was employed by the British Government to establish telegraphic communication between Dublin and Galway. He died 13th June, 1817. Among his works are *Practical Education* (1798), written in concert with his daughter Maria; *Professional Education* (1808); *Essay on the Construction of Roads and Carriages* (1813); and various treatises on subjects connected with mechanics. See *Memoirs of R. L. E., begun by Himself and concluded by his Daughter* (Lond. 1820).—**Maria E.,** daughter of the preceding, was born at Hare Hatch, Berkshire, 1st January, 1767. In 1782 she accompanied her father, Richard Lovell E., to Ireland, and remained with him until his death in 1817. He was a part author of her first work, *Essays on Practical Education* (1798), and of her *Essay on Irish Bulls* (1801). Her knowledge of the habits and qualities of the Irish peasantry was embodied in numerous entertaining fictions. She was the friend of Scott, Moore, Herschel, &c. She died at Edgeworthstown, Longford, Ireland, 21st May, 1849. Her writings comprise *Castle Rackrent* (1801); *Belinda* (1803); *Lessons for Literary Ladies, Early Lessons, Popular Tales* (1804); *Leonora* (1806); *Memoirs of R. L. E., Tales of Fashionable Life* (1809). A collection of these appeared in London in 1825.

Edg′ing Iron, an implement of crescent form, with a spade handle, used for cutting the sides of drains.

Edg′ings, in horticulture, rows of low-growing plants to mark off a flower-bed from gravel walks or from a lawn. Stone, wood, wicker or wire work, or tuft are sometimes used for E., but the dwarf-box is most commonly employed. See HORTICULTURE.

E′dict. All the higher magistrates of Rome issued edicts. The consuls convoked the comitia, army, and senate by E.; the censors proclaimed the census by E.; the ædiles published market rules by E.; the magistrates with jurisdiction laid down every year their rules of justice by E.—the Prætor Urbanus, the Prætor Peregrinus, and the Ædilis Curulis in the *edicta urbana;* the provincial governors in the *edicta provincialia.* The E. was orally proclaimed, and also written on a white tablet suspended in the forum, so that persons standing on the ground might read it. The general E. put out by the magistrate on entering office was called *perpetuum,* as lasting through his term of office; an occasional E. was called *repentinum;* a part taken from the E. of a predecessor in office was called *tralatitium.* One E. did not differ much from another, and after the consolidation of prætorian law (*jus honorarium*) by the lawyer Julian in the reign of Hadrian, this part was stereotyped. E. was also applied to the legislative ordinances of the emperor, as supreme magistrate; these were distinguished from *decreta,* or judicial decisions on appeal or in certain classes of actions involving a delicate discretion, and *epistolæ* or *rescripta,* which was an interpretation of the law by the emperor in answer to a query. All these imperial constitutions had under the Lex Regia the force of laws.

E. in Scotland meant merely a formal public notice, at a church door or market-cross, that parties might come into a suit.

In France the ordinances of the Merwing kings, chiefly to notify prohibitions or to organise some new state department, were called edicts. The name was replaced by *capitularia* under Karl the Great, but was revived by the Capetian kings. They were signed by the king, *viséed* by the chancellor, and sealed with green wax to show their permanent character. Some edicts were named after the place of execution—*E. de Crémieu, d'Amboise,* &c.; others from their subject-matter *E. des duels, des secondes nôces,* &c. The word has now been superseded by *loi.*

Edict of Nantes, granted 30th April, 1598, by Henri IV. of France, was for long the only charter of Protestant liberties in that country. The Huguenots were declared eligible to all public posts. In certain districts, and in the houses of noblemen with full rights of jurisdiction, the exercise of the religion was declared free. Elsewhere, only thirty persons might be assembled at a nobleman's house for worship. Their petitions and suits were judged of by a specially-constituted 'Chambre de l'Édit'; and in several of the municipal constitutions and local parliaments of the S., provision was made for chambers half Catholic, half Huguenot. The speech of Henri in the 'Parlement' is given by Voltaire (vol. xxx. p. 233). 'Il faut que tous soient bons Français,' he says. The Edict was carried against vehement opposition by a speech of De Thou, in which he spoke of Pope John going to Constantinople to prevent Justin persecuting the Arians. Like the previous Edicts of Pacification of Chancellor L'Hôpital, and the subsequent Edict of Grace (Nîmes, 1629), the E. of N. was a mere compromise. It was systematically evaded, and finally revoked by Louis XIV., guided by Louvois and Le Tellier, in 1685, when the persecutions of Languedoc began. Complete toleration was not established till 1787.

Edict′al Cita′tion, in Scotch legal procedure, is the form by which a party out of Scotland, but under the jurisdiction of a Scotch court, is cited to appear before it. In former times this was done by proclamation at the market-cross of Edinburgh and at the pier and shore of Leith; it is now done by delivery of copies of the citation at the record office of the Keeper of Edictal Citations in the Register House at Edinburgh. These records are open to public inspection. In criminal prosecutions, if the accused cannot be found, he must be edictally cited by delivery of a copy to a member of his family within his home, or by posting a copy to the most patent door of the house, provided he has not left it permanently forty days previously, or by leaving a copy at place named in the bail bond (in cases of bail), or by leaving a copy at last known residence.

Ed′inburgh, the capital of Scotland, and chief town of the county of Edinburgh or Midlothian, is situated on the S. shore of the Firth of Forth, and about 1½ miles from it. The city, which covers an area of over 2 sq. miles, is built on ridges of varying height, and is environed by hills. On the S.E. rises Arthur's Seat (822 feet); to the S.W. lie the Braid Hills and the Pentlands; and to the N.W. Corstorphine Hill. Pop. entire town 263,646; parl. burgh 261,225. E. is famous for the beauty of its situation, the picturesque time-worn appearance of its old streets, and the grace and stateliness of its modern buildings. The oldest part of the city, rugged and sombre, with Gothic spires and pinnacles crowning the long slope from the Castle Rock to Holyrood, contrasts strangely with the chaste Greek structures and the bright elegant aspect of the New Town. One of the most delightful features of E. is the exquisite glimpses of the sea, of hilly and sylvan scenery unexpectedly disclosed in the heart of its busiest thoroughfares.

The city receives its name E. (Eadwinesburh) from the Northumbrian king Eadwine, who built the castle in the 7th c. It became a possession of the Scottish kings in the reign of Indulf (945-961), and was then called in Gaelic *Dun-Edin;* but the earlier name has prevailed. E. did not become the Scottish capital till a later date, being too near the English border for safety; but about the middle of the 15th c. it was recognised as the metropolis. David I. made it a burgh in 1128, and it was walled and fortified by James II.

The fact that E. was originally a walled city gives to what is called the *Old Town* its peculiar characteristics of lofty houses, narrow streets, and *wynds* or *closes*. The city was originally limited to the ridge which extends from the Castle to Holyrood House. In 1769 the North Bridge (renovated and widened in 1875) was erected, spanning the valley which contained the North Loch. The construction of the *New Town*, beginning with St. Andrew Square, quickly followed, stretching in parallel terraces between the Old Town and the Firth. Other improvements were the opening of the South Bridge in 1788, of Waterloo Place and the Regent's Bridge in 1819, and of George IV.'s Bridge in 1836. Among the comparatively recent improvements are the spacious and handsome thoroughfare, Chambers Street, and the splendid Public Library. The city is at present extending rapidly westward, and its suburbs also are increasing to the S. The buildings in the New Town are constructed almost entirely of a fine sandstone brought from the neighbouring quarries of Craigleith. Among the finest streets are George Street, the centre of the New Town, and Princes Street, which runs parallel to it on the S. From the latter, which is the chief thoroughfare, is obtained a view unsurpassed in any European capital, of the Castle Rock, a steep mass of gloomy basalt, sprinkled with verdure, crested with old grey battlements, and towering above the green shaded slopes of the gardens that occupy the former bed of the Nor' Loch. In the W. are many handsome streets and squares, one of which, Moray Place, is a magnificent specimen of the Doric style applied to domestic architecture.

The Castle, crowning the Castle Rock (380 feet in height), is the most prominent object of the Old Town. The Scottish regalia, consisting of crown, sceptre, sword of state, and silver rod, have been shown there since 1818. Queen Mary's Room and Queen Margaret's Chapel are also objects of interest. Midway between the Castle and Holyrood stands St. Giles' Cathedral, a cruciform structure, with an ancient coronal spire. Beside St. Giles' are situated the law-courts and the old hall of the Scottish Parliament, 122 feet long, with a magnificent oak ceiling, painted window, and numerous portraits and statues. Holyrood Palace occupies the site of an ancient abbey, founded by David I. in 1128, and contains a picture gallery and the apartments of Mary Queen of Scots. Among other fine buildings are the University, the Industrial Museum, Surgeon's Hall, Heriot's Hospital, the New Infirmary, the Royal Institution, National Gallery, High School, General Post-Office, Register House, St. George's Church, the Scotch Episcopalian Cathedral (erected 1874-79), Bank of Scotland, the Irvingite Church (1876), &c.

E. possesses numerous monuments, the most attractive of which is the Scott monument in Princes Street, a splendid but somewhat showy Gothic spire, erected 1840-45. In the same street are statues of John Wilson, Allan Ramsay, David Livingstone, the Duke of Wellington; in George Street, of George IV. and William Pitt; in St. Andrew Square, a column in memory of Lord Melville; and in Charlotte Square, the Prince Consort Memorial (August, 1876). Opposite the High School is the monument of Burns. On the Calton Hill (345 feet in height) are the columns of the unfinished National Monument, the Nelson Monument, and those of Burns, Playfair, and Dugald Stewart. In the graveyards of E. are the tombs of many distinguished men. In Greyfriars rest George Buchanan, Robertson, Blair, Henry Mackenzie, Allan Ramsay; in the Calton, David Hume; in the Canongate, Adam Smith, Dugald Stewart, Adam Ferguson; in the Dean Cemetery, Lord Jeffrey, Lord Cockburn, and Professor Wilson; in the Grange Cemetery, Hugh Miller and Dr. Chalmers.

E. contains numerous charitable institutions, as Heriot's Hospital, Donaldson's Hospital, Chalmers' Hospital, Fettes College, &c. The funds of George Watson's Hospital, Daniel Stewart's Hospital, Gillespie's Hospital, and Merchant Maiden Hospital, were diverted for educational purposes by the Merchant Company in 1870, under the Endowed Institutions (Scotland) Act. The city is largely resorted to for the sake of education. Besides the University, High School, Academy, Fettes College, Edinburgh Institution, Collegiate Institution, and Merchant Company's Schools, there are many lesser schools of a superior kind.

E. has no manufactures of importance. The printing, publishing, and book trade may be called its staple industry; but brewing, iron-founding, and coach-building are largely carried on. There are also large india-rubber and vulcanite works, a number of tanneries, and an increasing trade in jewellery. The city is the centre of the railway and banking systems of Scotland, and its beauties and associations attract a constant stream of visitors. It contains four parl. divisions, each of which returns one member:—Central 63,392; East 61,931; South 82,337; and West 53,565.

The society of E. is composed more largely of the learned professions than that of almost any other city. The clergy, lawyers, physicians, teachers, artists, and authors form a very considerable section of its population; and though not the commercial, it is undoubtedly the ecclesiastical, legal, and literary centre of Scotland. See Arnot's *History of E.* (1 vol. 1779); Chambers' *Traditions of E.* (1824); and Wilson's *Memorials of E. in the Olden Time.*

Edinburgh, University of, was founded by the Town Council of E. by royal charter of James VI. in 1583, and obtained the rights and privileges of the other universities in the kingdom by an Act of the Scottish Parliament passed in 1621. At first there were teachers, called regents, who instructed the students in Greek, logic, metaphysics, moral philosophy, and natural philosophy, taking the students of each year (four years) in rotation, each regent teaching every subject; but the number of chairs gradually increased, and the system was changed in 1708, when separate professorships were established—Latin, Greek, Logic and Metaphysics, Moral Philosophy and Natural Philosophy, and Mathematics (already in existence)—in place of the regents. The University now contains, as constituted in 1893, six Faculties, viz., Arts, Science, Divinity, Law, Medicine, and Music, in which over fifty University professors are appointed to teach. Under *Arts*, we find Mathematics, Humanity, Greek, Logic and Metaphysics, Moral Philosophy, Natural Philosophy, History, Rhetoric and English Literature, Sanskrit, Education, Fine Arts, and Celtic languages; under *Science*, Practical Astronomy, Agriculture and Rural Economy, Engineering, Geology, Technology, &c.; under *Divinity*, Hebrew and Semitic Languages, Ecclesiastical History, Divinity, &c.; under *Law*, Civil Law, Constitutional History, Scots Law, Public Law, &c.; and under *Medicine*, Botany, Medicine, Anatomy, Chemistry, Surgery, Natural History, &c. By the Universities Act of 1858, the privileges of the University were increased, its government was transferred from the Town Council to the Senatus Academicus, and arrangements were made for an improved course of study. The University is a corporation, including a Chancellor, elected for life by the General Council, who is head of the University; a Rector, elected for three years by the votes of the students; the Principal, appointed for life by the curators; the Professors, registered graduates, alumni, and matriculated students. Gladstone (1859), Carlyle, Lord Moncrieff, Sir William Stirling-Maxwell, the late Earl of Derby, the present Duke of Devonshire (1877), the Earl of Rosebery (1880), the late Earl of Iddesleigh, the Marquess of Lothian, the Rt. Hon. Geo. J. Goschen, and the Rt. Hon. J. P. B. Robertson (1893), have, in succession, held the rectorship. The superintendence and control of the teaching and discipline, the revenues and property of the University, are intrusted to the Senatus Academicus, formed by the Principal, who is President, and all the Professors. The E. U. grants the degrees of Master of Arts—Bachelor of Arts being now abolished — Bachelor of Medicine, Doctor of Medicine, Bachelor, and Doctor of Divinity, Bachelor, and Doctor of Laws, Bachelor, and Doctor of Science, and Bachelor, and Doctor of Music. In the session, 1894-95, there were 738 students in the Faculty of Arts, 1454 in the Faculty of Medicine, 444 in the Faculty of Law, and 68 in the Faculty of Divinity, 146 in the Faculty of Science, and 11 in the Faculty of Music: the total number being 2861. During the fifty years before 1826 there were only 168 graduates in Arts; up to 1850 the average number of such graduates was only ten yearly. Now the annual number of graduates has very largely increased, 86 having passed all the ordinary examinations for the degree of Master of Arts in 1894-95. The University Library, which originated in a bequest of about 300 volumes by Clement Little, an Edinburgh citizen, in 1580, now contains about 150,000 printed volumes, and about 700 volumes of MSS. The museums in connection with the University are the Natural History Museum, the Anatomical Museum, the Botanical Museum—at the Botanic Gardens, Inverleith Row—and the small museums attached to several of the scientific classes. The students' debating societies comprise the Dialectic, Diagnostic, Scots Law, Philosophical, and Philomathic Societies. There are above 100 bursaries and scholarships, belonging principally to the Faculty of Arts, ranging in annual value from £5 to £160, open to competition among the students. To provide for the increase of attendance at the University, a splendid building, in close proximity to the New Infirmary, was erected, containing a complete suite of class-rooms, for the use of the Medical Faculty, and University Hall, to accommodate 2000 persons for public ceremonials. Among the distinguished men who have been Professors in E. U. are Dugald Stewart, Adam Ferguson, Thomas Brown, Sir William Hamilton, David Hume, John Erskine, William Cullen, Joseph Black, James Syme, and William Aytoun. The E. U. has always been famous for its medical school, which has for long attracted students from other countries by the fame of its Professors and the excellence of its teaching. It is at present unsurpassed by any medical school in Britain or the Continent.

Edinburgh Review, a celebrated critical and political journal, the earliest of the large quarterlies, and the first great expositor of Whig principles. The opening number was published on the 10th of October, 1802. The idea of the *Review* originated with Sydney Smith; but Francis (afterwards Lord) Jeffrey became editor; and with them were associated Horner, Brougham, John (afterwards Lord) Murray, and Dr. Thomas Brown. Among the names of later contributors are those of James Mill, Hallam, Sir William Hamilton, Hazlitt, Macaulay, and Carlyle. The projectors of the *Review* found a publisher in Constable—'to whom,' says Lord Cockburn in his *Memorials*, 'the literature of Scotland has been more indebted than to any other bookseller.' The largest circulation attained by the *E. R.* was 13,000 copies in 1813; and Jeffrey, as editor, received at first £50, and afterwards £200, for each number. The literary criticisms of the *Review* were often prejudiced, but always able. Its fame, however, stands highest as a political organ. The Whig party certainly owed in great measure its subsequent brilliant triumphs to the persistent and consistent help it received from the *E. R.*

Edinburghshire, or **Midlothian,** a county in the E. of Scotland, bounded N. by the Firth of Forth, N.E. and E. by Haddingtonshire, S. by Peeblesshire and Lanarkshire, and W. and N.W. by Linlithgowshire. The surface is undulating and hilly, the chief ranges being the Moorfoots (highest point 2136 feet) in the S.E., the Pentlands (highest point 1839 feet) in the centre. There are also several isolated hills in the W., and Corstorphine Hill and Arthur's Seat near Edinburgh. The principal rivers are the Gala, which flows into the Tweed, the N. and S. Esk, which unite and enter the Firth of Forth at Musselburgh, the Water of Leith, which falls into the sea at Leith, and the Almond, which separates E. and Linlithgowshire. E. consists mostly of coal-measures, with trap in the Pentlands and Lower Silurian in the S.E. A great coal-bed, 15 miles long by 8 broad, runs beneath Carlops and Musselburgh. Area, 236,089 acres; corn crops, 34,682; green crops, 18,436; clover, &c., 34,655; pasture, 50,129; small fruit, 279; fallow, 65; mountain and heath, 60,933; nursery grounds, 317; and woods, &c., 11,110. The chief manufacture is paper; limestone and sandstone are largely quarried; coal and ironstone are extensively worked, and there are valuable herring-fisheries on the Firth of Forth. The chief towns are Edinburgh, the capital; Leith, the only large port in the county; Dalkeith, Roslin, and Pennycuik, inland; and Musselburgh, Portobello, Granton, and Newhaven on the Firth of Forth. E. returns one member to Parliament. E. formed part of the ancient English kingdom of Northumbria, and of the old earldom of Lothian. Pop. civ. county 434,159; and parl. county district 86,839.

Edison, Thomas Alva, the celebrated inventor, was born at Milan, Ohio, U.S., on 11th February, 1847. Having received an elementary education from his mother, an intelligent Scotch lady, he started as a train boy, taught himself printing, learned telegraphy, for a time was an employé of the Western Union Telegraph Company, and since then has produced many valuable inventions, such as electric lamp, steam-dynamo, carbon telephone, phonograph. In a splendid laboratory at W. Orange, N.Y., he works with a band of skilled investigators. See LIGHT, ELECTRIC; TELEGRAPH; TELEPHONE, ELECTRIC; PHONOGRAPH.

Ed'monton, a town in Middlesex, 7½ miles N.N.E. of London, with a trade in timber, carried on by means of the river Lea. E. is the burial-place of Charles Lamb, and the 'Bell at E.' acquired celebrity from its having been mentioned by Cowper in *John Gilpin*. Pop. reg. sub-dist. and civ. par. (each) 36,351.

Edmund's, St., Hall, Oxford, named after St. Edmund, Archbishop of Canterbury in the time of Henry III. In 1557 it came into the possession of Queen's College, and this society procured an Act of Congregation vesting in itself the perpetual right of nominating the principal. In 1763, George Holme, D.D., sometime Fellow of Queen's, bequeathed £1000 to the University in trust, to apply it, with accumulated interest, to the purchase of the advowson of a living, to which the principal of St. E.'s H. should be presented. The advowson of Gatcombe was purchased in 1821, to which the University first presented in 1844. The members of the Hall are admitted to the lectures given at Queen's College. There is a Vice-Principal besides the Principal, but there are no Fellows and no other foundation. In 1894 there were 35 undergraduate students, 37 members of Convocation, and 98 members on the books.

E'dom (Heb. 'red') was the territory of the descendants of Esau. Down to the time of the Captivity, E. is synonymous with Mount Seir, *i.e.*, the narrow mountainous tract extending from the Dead Sea to the head of the Gulf of Akaba, its capital being Bozrah, and its seaports Elah and Eziongeber. David added Mount Seir to the kingdom of Israel; but as the power of the kingdom of Judah declined, the Edomites extended their power to the N.W., and at last encroached on the territory of Judah as far as Hebron; while their original territory was taken possession of by the Nabathæan Arabs. In the later Jewish and Roman history, E., then called Idumæa, was composed of the southern part of

Judæa and a part of Arabia Petræa extending S.E. from the Mediterranean to the W. side of Mount Seir. Roman writers after the Augustan age use 'Idumæa' and 'Judæa' as synonymous, and soon after the destruction of Jerusalem the name disappears from history, and is merged in that of Arabia.

Edriophthal′mata (G. 'sessile-eyed'), the name given to a group of *Crustacea* (q.v.), in which the eyes are not supported on stalks (*Podophthalmata*). To the E. belong the three orders whale-lice, wood-lice, and sandhoppers. In E. a Carapace (q.v.) is rarely developed, and the head is usually separate and distinct from the body. The adult E. possess seven pairs of feet. Another character of E. is found in the fact that the mandibles or principal pair of jaws often possess *palpi*, or feelers. The eyes may be either simple or compound, and are situated in the sides of the head.

Edri′si, El, Abu-Abd′allah-Mohammed, a famous Arabian geographer, was born at Septa (mod. *Ceuta*) in 1099, studied at Cordoba, lived at the court of Roger II., King of Sicily, and died between the years 1175 and 1186. He had deepened a strong predilection for geography by wide travels, and had thus amply fitted himself for the task to which he was subsequently appointed by the Sicilian monarch. This was to prepare a globe that would embody recent observation and discovery. To collect material from various travellers and from remote corners of the world was the labour of fifteen years. But at last the globe, of pure silver, was completed, and his description of it forms the still more valuable and enduring work, *Nushat-ul-Mushtâk* (1153), which was first and badly translated into Latin by Sionita and Hesronita (Par. 1619). Many editions have appeared of isolated parts, as *Spain*, by Conde (Madr. 1799); *Africa*, by Hartmann (Gött. 1796); *Syria*, by Rosenmüller (Leipz. 1828), &c. A copy of the complete work was issued in French (2 vols. Par. 1837-40).

Educa′tion (Lat. *educo*, 'I draw out'), in its widest sense, means the drawing forth or development of the varied capacities of man's nature. The term, however, is more generally applied to the formal methods and processes by which, in time of youth, this development of the powers of man is promoted in harmonious relations and with beneficial results. E. is thus threefold, as it regards respectively the body, with which man toils; the mind, with which he thinks; and the character, in the spirit of which he lives. Physical E. treats of the laws that regulate and the exercises that develop the growth of the bodily frame, and fit it for the healthy discharge of its different functions, and includes a knowledge of human physiology and the laws of health. Intellectual E. must be carefully adapted to the strength of the mind, and to the stage of growth which it has reached; and as the chief agent in this department is the communication of knowledge, the educator must ever be on the alert to determine the most suitable subjects of study, and the best means of obtaining through them the desired educational results, and especially to guard against instruction degenerating into the mischievous process familiarly known as 'cramming.' Intellectual E. may also be viewed in the light of the various courses of study that are provided for pupils, according to the period of time during which they will be under instruction, and that are represented by primary schools, secondary schools, and universities. Recent political and economic movements have given a strong impetus to primary E. throughout the civilised world, legislators having come to see that through national E. alone will the masses be enabled to govern themselves wisely, and adequately to hold their own in the great industrial struggle for pre-eminence among the nations. This interest in E. has manifested itself in measures that seek to ensure, by compulsion if requisite, the school attendance of every child, and to improve at once the status and the professional equipment of the teacher. The main educational work of the primary schools must always consist of reading, writing, and ciphering, although in some countries these schools have been honourably conspicuous for their maintenance of higher subjects of study. The secondary schools have long been the battle-ground of many important educational controversies. At one time the chief subject of dispute was the relative educational value of classical and mathematical instruction, but this question has now been so widened as to include a consideration of the claims of science and of modern languages, particularly of our own. Signs are not wanting that the indiscriminately polemical spirit has died out, and that the programme of higher scholastic study will be definitely continued in accordance with the changed necessities and demands of modern times. The universities have also been the subject of much controversy and the scene of many changes; and one of the most difficult educational problems is how to bring the secondary schools and the universities into such relations that both may discharge their proper functions most effectively. In the E. of the emotions and the will, scholastic training holds a comparatively subordinate place; for although the teacher may effect much good, both by the example he sets and by the spirit he awakens, each individual must necessarily be exposed from youth upwards to the multifarious influences that make or mar the character of man.

It is estimated that one in every 5½ of the population of the United States attends school; one in 5 in Ireland; one in 5·6 in England and Wales; one in 6 in Scotland, Germany, and Switzerland; one in 8 in Belgium and France; one in 10 in Austria; one in 14 in Italy.

Education Societies, Laws Affecting.—The 6 and 7 Vict. c. 36 exempts from all local rates lands and buildings belonging to any society for the purposes of science, literature, or promotion of the fine arts, if supported wholly or partly by annual voluntary contributions, and which does not pay any dividend or bonus to the contributors; 17 and 18 Vict. c. 112 gives legal facilities to these societies and to educational societies for procuring sites and buildings, and for settling them in trust.

Grammar-Schools.—In 1840 an Act was passed for improving the condition and extending the benefit of grammar-schools, defined as all endowed schools, whether of royal or other foundation, founded or maintained for teaching Latin or Greek, or both of them. The intention of the founders is to be considered when the revenues are insufficient, and Latin and Greek, or either one of them, may be dispensed with under an order of a Court of Equity (3 and 4 Vict. c. 77). The Endowed Schools Act of 1850 has since then placed all these Grammar-schools under the control of the Charity Commissioners.

Sites for Schools.—By 4 and 5 Vict. c. 38 it is enacted that landlords who have an estate in Fee (q.v.), or in tail, or an estate for life—but in the two latter cases only with the consent of the person next in the remainder, if he be legally competent—being possessed of the beneficial interest, may give, sell, or exchange land, not exceeding an acre, as a site for a school to educate poor persons; and the rights of all persons in waste or common land conveyed for this purpose by the lord of the manor are barred. The Mortmain and Charitable Trusts Act of 1888 repealed all former legislation and re-enacted that gifts and assurances of land for public park, school, &c., should be free from the effect of the Statutes of Mortmain, but at the same time bound these gifts, &c., by certain restrictions.

Education under the Poor Law.—By 7 and 8 Vict. c. 101, and subsequent amending Acts, the Poor Law Commissioners may combine unions or parishes into school districts for any class of infant poor not above the age of sixteen, being orphans or deserted by their parents, or whose parents consent to the placing of the children in the district schools.

Reformatory and Industrial Schools.—The laws relating to these schools were consolidated and amended in 1866, and further amended by Statute 35 and 36 Vict. c. 21. Any offender under sixteen years old who is convicted summarily of an offence punishable with penal servitude or imprisonment, and who is sentenced to imprisonment for not less than ten days, may be sent by the justices before whom he is charged to a certified reformatory school, to be there detained for not less than two or more than five years; and the justices are bound to select a school conducted as nearly as possible according to the religious persuasion to which the offender appears to belong.

Elementary Education.—In 1870 an Act was passed to provide for public elementary E. in England and Wales. A public elementary school was defined by the Act to be one at which E. was principally elementary, and at which the charge for ordinary instruction did not exceed ninepence per week for each scholar. The object of the Act seems to have been to provide and maintain sufficient schools, and to compel children who would not otherwise receive efficient education to attend them. Fees of scholars, the parliamentary grants, and moneys raised by loan, formed the school fund. Any deficiency was to be supplied by rating. No parliamentary grant was to be made to any school board on account of instruction in religious subjects. Every child in good health who was not receiving sufficient instruction in some other manner, and who was between the ages of five and thirteen, afterwards reduced to ten under conditions, could be compelled to attend a public elementary school, if there was one within three miles of its residence, and the school board had power to impose a fine, recoverable summarily, not exceeding five shillings, with costs, for breach of this rule. This Act was followed by others, which more or less amended it, though they did not, excepting the last, in any material point change the scheme as just stated, in 1873, 1876 (directly compelling attendance), 1880, 1890, and in 1891, when ordinary elementary education at the elementary schools became *free*, so that in 1894 of 19,709 schools inspected, no fewer than 16,289 were *free* schools, and the number of *free* scholars was 4,377,741 as against 821,000 children who paid fees. In 1893 an Act was passed dealing more particularly with the half-time attendance, under which the minimum age for partial, as well as total, exemption from school attendance, was raised from ten to eleven. In Scotland, under Acts of 1872 and 1878, parents are now obliged to send their children to school, when there is one within three miles of their residence, under penalty of fine or imprisonment in case of failure. Every public school subject to inspection and in receipt of public money is open to children of any religious persuasion. The jurisdiction of presbyteries and of Church courts in Scotch schools is abolished, and transferred to the parochial school boards, these being amenable to the Educational Department in London.

Edur', or **Edar** (Idar), a Rajput state of India, the foremost of the Mahi Kantha group, in political relation with the Bombay Government, is situated to the N.E. of Baroda. The gross revenue is £52,444, half of which is absorbed by eight great feudatories and eighteen lesser nobles. E. is tributary to the Gaikwar, paying annually £3034. Area 1900 sq. miles; pop. 302,134; of whom 273,284 are Hindus, and 10,094 are Mohammedans. The soil is fertile and especially productive of fruit trees, of which the mango is very fertile. Grains of all kinds, sugar-cane, and oil-seeds are grown. Quarries are worked for a very useful building stone. The only manufacture is soap. Most of the inhabitants are Kolis, and it was a Koli dynasty that formerly ruled the country, which was ultimately conquered by the Rajputs in 1656. The Maharajah Juwan Singh died in 1868 and was succeeded by his son, Keshri Singh (born in 1861), who was educated at the Rajkumar College at Indore. The town of E. (pop. 7086) is the residence of the Rajah, but otherwise a place of no importance.

Edward the Confessor. See EADWARD.

Ed'ward I., king of England, the eldest son of Henry III. and Eleanor of Provence, was born at Westminster, 16th June, 1239. After some suspicious intrigues, E. finally sided with his father against the nobles in that struggle called the Barons' War. He shared in the defeat at Lewes (1264), but afterwards overthrew the Earl of Leicester and his party at Evesham (1265). In 1270 he left England to join in the last Crusade; and in 1272, while returning from the Holy Land, heard of his father's death. E. reached England in 1274, and was crowned in that year, together with his consort Eleanor, the daughter of the King of Castile. E.'s first work as sovereign was the subjugation of Wales. The Welsh princes had been deeply involved with the baron's party against Henry III., and soon after Edward's succession Prince Llewellyn's refusal to do homage forced on a war, which was ended by the defeat and death of that prince in 1282. The King then thoroughly reduced the country, introduced English customs, and settled the confiscated lands on his nobles. Having thus welded together England and Wales, E. bent his mind to the Union of England and Scotland. In the previous history of the two countries, there had been authentic instances of homage done by the Scotch monarchs to the English. This furnished a ground for E.'s claims; and the death of the Maid of Norway (1290) gave him an opportunity for their assertion. In 1291 he was chosen arbitrator by the thirteen competitors for the Scottish crown. The claims of these were finally narrowed down to a choice between two—John Baliol, Lord of Galloway, and Robert Bruce, Lord of Annandale. E., who was formally acknowledged feudal superior of Scotland, decided in favour of the former. The decision was given at Berwick, 17th November, 1292; and next day Baliol swore fealty to the King. The indignities heaped upon him, and the outcry of his people, soon compelled the Scottish sovereign to declare war on England. E. marched into Scotland in 1296, sacked the town of Berwick, made Baliol prisoner, proclaimed Scotland his fief, forfeited to him in consequence of her king's treason, placed garrisons in the principal towns, and appointed English governors over the country. William Wallace (q.v.) headed a revolt of the Scottish party in the spring of 1297; defeated Warrenne, Edward's regent, at Stirling in the summer of the same year; ruled Scotland for a brief space; and then at Falkirk, in 1298, was conquered by an army which E. led in person. The country was not yet, however, wholly subdued; the nobles, aided by France and led by Bruce and Comyn, still resisted. In 1305 E. again invaded Scotland, the castle of Stirling surrendered, and he was master of the land. Wallace was captured, and executed at London. In the next year Robert Bruce appeared as leader of the national party. He was crowned at Scone on 27th March, 1306, and the rising of Scotland followed. The news roused E., now an old man, to terrible fury, and he resolved on immediate invasion. Having gathered a great army, he marched north, but died 6th July, 1307, at Burgh-on-Sands, near Carlisle, when his foot was almost on the Scottish frontier.

The name of E. is an outstanding one among English sovereigns. His character was marked by iron strength and most politic sagacity. An imperious temper was relieved by generous impulses; he was cruel, and yet forgiving; vindictive, and yet merciful. As a soldier E. had no rival, and he possessed the art, so valuable to a general, of attaching to himself the personal devotion of his men. Of English kings, E. first recognised and respected the existence of an English national spirit. By his judicial reforms he gained for himself the title of the 'English Justinian'; in his reign the Court of Chancery and justices of the peace took their origin. Under his rule, if not fostered by him, can be first seen the English Parliament in something like its present shape. A greater respect for law can also be dated from E.'s reign; and this was largely due to the example of the King. His imperial policy has often been called by harsh names, and viewed in a wrong light. It was not one of vulgar aggrandisement, dictated by mere ambition; but one of annexation, to end in union. E. saw farther and clearer than any politician of his time that the French dominions of England were lost, and his aim was to consolidate the whole island of Britain into one kingdom. Wales he united to England. Hence his strenuous attempt to annex Scotland—an attempt which, if successful, might have anticipated by four centuries the ultimate benefits of the Union. See Freeman's *Essay on the Relations between the Crowns of England and Scotland*. Palgrave's *Documents and Records illustrating the History of Scotland* takes a similar view. See also Green's *History of the English People*, and for the Scottish view of E.'s character and conduct, Burton's *History of Scotland*.

Edward II., son of the preceding, was born 25th April, 1284, and was called E. of Caernarvon from his birthplace. He was the first of English royal heirs-apparent to bear a title taken from the Principality, being created Prince of Wales in 1301. E. succeeded to the throne at the age of twenty-three, but even then seems to have selected a line of policy—to loose himself from the dominance of the barons. To this end he filled the great offices of state, not with English nobles, but with men of lower rank and alien birth. A passion for favourites also inclined him to this conduct. Piers Gaveston, a Gascon, was created Earl of Cornwall, and placed at the head of affairs. The barons demanded and obtained his banishment; and when he returned, the Earl of Lancaster had him executed in 1312 on Blacklow Hill, near Warwick. While these troubles weakened E.'s power at home, his arms were unsuccessful in Scotland. Bruce and his party rapidly made head, and after a seven years' struggle reconquered from the English all but the castle of Stirling. E. resolved to march to its relief, and raised an immense army, composed of 30,000 disciplined horse, and vast numbers of wild Welsh and Irish. At Bannockburn (24th June, 1314) the great force was utterly routed; and henceforth Scotland was free from English supremacy. Just after this disgrace, E. became infatuated with another favourite, Hugh le Despenser, who was made Earl of Glamorgan. Lancaster and the barons, at once becoming jealous, entered London with their troops in 1321, and had Despenser and his father driven into exile. But E. in the next year took vigorous measures, defeated Lancaster in Wales, executed him at Pontefract, and recalled his favourite. He then concluded a truce for fourteen years with King Robert of Scotland; but this act destroyed the popularity which his mastery of the barons had won him. His queen, Isabel, went to France with her son in 1325, ostensibly to conclude a treaty; she refused to return, and intrigued there with the exiled barons, the chief of whom was Roger Mortimer. She landed with a hostile force in 1326 at Orwell, in Suffolk, having the young Prince with her, and the King was abandoned by every one. Being taken along with his favourite, Despenser was hung, and E. himself deposed at Kenilworth, and murdered at Berkeley Castle, 20th September, 1327. See Green's *History of the English People.*

Edward III., son of the preceding, was born at Windsor, 13th November, 1312, and began to reign in 1327. The government was at first administered by a regency, but in 1330 E. caused Mortimer, the real head of affairs, to be executed at Tyburn, and assumed full kingly authority. In 1328 he married Philippa of Hainaut. In 1332, Edward Baliol having dethroned David Bruce of Scotland, and being unable to preserve his usurped crown, obtained assistance from E. The Scotch were defeated at Halidon Hill, 19th July, 1333; Baliol was restored, and Berwick annexed to England. E. was now diverted from the Scottish to the French war, in regard to which he has been greatly misrepresented. The contest was forced on him by Philippe of Valois, who desired to seize E.'s duchy of Aquitaine, which had never belonged to the kings of Paris. E., anxious to avoid a struggle, placed Guienne in Philippe's hands for forty days; and when Philippe refused to restore it, war was inevitable. E.'s claim to the French throne through his mother Isabel was palpably untenable, French law excluding female succession to the crown; and was probably advanced to win over the Flemish allegiance. After several years of undecisive campaigning, E. invaded France with 30,000 men, and on 26th August, 1346, overthrew a vastly superior French army at Crécy, where his son, the Black Prince, displayed brilliant valour and slew the King of Bohemia, and where the English archery told with fearful effect upon the French, who left above 30,000 dead on the field. The battle was as severe a blow to feudalism as to France, because it proved the superiority of yeomen on foot to the most splendid chivalry. Other successes followed. In October, 1346, David of Scotland was defeated and captured at Neville's cross; Calais surrendered in 1347. At an earlier date (24th June, 1340) the naval victory off Sluys made the English masters of the sea. While E. returned home and repelled a Scottish invasion, the Black Prince ravaged central France, and on the 19th September, 1356, won a glorious victory at Poitiers with 8000 against 60,000 men, and carried Jean, Philippe's successor, captive to London. France, torn by foreign and intestine strife, seemed hopelessly crushed, but E. was weary of war. The constant need of supplies caused him to summon frequent Parliaments, the influence of which steadily increased. Peace was made by the treaty of Bretigny in 1360, E. resigning his claim to the French crown and retaining Guienne, Poitou, Calais, and Guisnes. E. reaped no lasting good from his victories. 'England,' says Freeman, 'was successful in battles, but she was thoroughly beaten in war.' In 1369, Charles, King of France, renewed the struggle; the English were driven step by step from their Continental possessions, and E.'s reign closed in gloom. His last years were embittered by the caprices of his mistress, Alice Perrers, and by the unpopularity of his administration. But the 'Good Parliament' of 1376, supported by the Black Prince—conduct which redounds more to his honour than Poitiers—attacked the abuses of the royal government, and carried several admirable reforms before E.'s death in 1377. E.'s reign is more important for its social and religious changes than for the victories with which it is ringing. It was a time in which, while Norman and Saxon were rapidly blending, while Chaucer was founding a new literature and Wickliffe heralding a religious revolution, English law was taking definite and potent form, the spirit of resistance to arbitrary power was gaining strength and courage, and scholasticism, chivalry, feudalism, and the temporal authority of the Church were fast passing away. See Freeman's *Essay on Edward III.*, Kitchen's *History of France*, and Green's *History of the English People.*

Edward IV., son of Richard Duke of York, was born at Rouen, 29th April, 1441, and during the lifetime of his father bore the title of Earl of March. On the defeat of York at the battle of Wakefield Green, 21st December, 1460, where he himself was slain by the successful Lancastrians, E. assumed the claims of his father, and marched on London, routing on his way the Lancastrians at Mortimer's Cross. He was declared king, 3rd March, 1461. On the 29th of the same month his claims received a bloody sanction by a great victory over the forces of Queen Margaret at Towton, in Yorkshire. A year after the battle of Hexham, in 1464, Henry VI., who had been in hiding, was betrayed and imprisoned in the Tower. E., who was popular in London on account of his courage, beauty, and winning manners, reigned secure until his marriage, first private and then avowed, with Elizabeth Woodville, the widow of Sir John Grey, and his conferring honours upon her relatives, offended his chief partisan, the Earl of Warwick, the 'King-maker.' The latter, for the time aided by the Duke of Clarence, entered into a conspiracy against E., and by a surprise forced him to flee to France in 1469. Henry was replaced on the throne, but E., having obtained help from Charles the Bold of Burgundy, landed in England at Ravensburne, 14th March, 1471, and on the 14th April routed the forces of Warwick at Barnet, the King-maker himself being among the slain. The next month (4th May) he almost destroyed the forces of Margaret at Tewkesbury. Margaret and her son Edward were captured. The Queen was imprisoned, her son was murdered, and Henry himself was in a day or two found dead in his bed in the Tower, the suspicion being that he was assassinated by Richard, Duke of Gloucester, the third brother of E. E. reigned undisturbed till his death, 9th April, 1483. Although he has an evil reputation for his indulgence, he was an able and powerful ruler. He founded the Absolute, or, as now styled, New Monarchy, which lasted till the end of the Tudor line. During his reign the silk manufacture is said to have been introduced into England, and in 1476 William Caxton set up his printing press in England. See Green's *History of the English People.*

Edward V., eldest son of Edward IV., was in his thirteenth year when his father died. What is called his reign lasted from 9th April to 22nd June, 1483. His uncle, Richard Duke of Gloucester, contrived to obtain possession of his person, as also that of his younger brother, the Duke of York, and got himself made protector. The young princes were then thrown into the Tower, and they disappeared, the belief being that they were murdered by Richard's orders. See Green's *History of the English People*, and Sir Thomas More's *Life of Edward V.*

Edward VI., the only son of Henry VIII., by Jane Seymour, was born at Hampton Court, 12th October, 1537. He was only ten years of age when he succeeded to the throne, and he died before attaining his majority. E. was well educated; he gave promise of high and pure character, and in religion had a strong Protestant bias. During the early part of his reign the kingdom was administered by his uncle, Lord Hertford, who had been appointed by Henry VIII. president of a council of regency, and under the title of Duke of Somerset became Protector or guardian of the kingdom. During Somerset's regency, the Scotch, who refused to marry their young queen Mary with E., were defeated at Pinkie (10th September, 1549), and vigorous efforts were made to establish Protestantism. The Six Articles were repealed; priests were allowed to marry; a new service-book, now known as *The First Prayer-Book of Edward VI.*, was drawn up; and Roman Catholic clergy who refused to submit to the changes were persecuted. The result was insurrection, which Somerset put down, but through the influence of Dudley, Earl of Warwick, he was himself deposed and executed, 22nd January, 1552. Dudley was made Duke of Northumberland, and favoured the party of Cranmer, which, among other measures, introduced the Forty-Two Articles of Religion, now reduced to the Thirty-Nine Articles of the Church of England. Under Northumberland's influence E. made a will, which he had no right to do without the consent of Parliament, excluding Mary and Elizabeth the two daughters of Henry VIII., as being illegitimate, from the throne, and vesting it in Lady Jane Grey, descendant of Mary, younger daughter of Henry VII., whom he had married to his son, Lord Guildford Dudley. E. shortly after this arrangement died at Greenwich, 6th July, 1553. See Froude's *History of England*, vols. iv. and v.; Haymond's *Life of E. VI.*; E.'s own *Journal* in Holinshed's *Chronicle*; and Green's *History of the English People*.

Edwardes, Sir Herbert, a distinguished lieutenant of the Lawrences in their administration of the Punjab, and a hero of the Indian Mutiny, was born 12th November, 1819. In 1857 he was Commissioner of Peshawur, perhaps the most important military post in India, where he not only maintained order throughout the Sepoy war, but was able to send down reinforcements, both of Europeans and staunch native troops, to the camp before Delhi. To him, as much as to any single man, was due the tranquillity of the Punjab in this crisis, and thus directly the safety of India. He died in England, 23rd December, 1868.

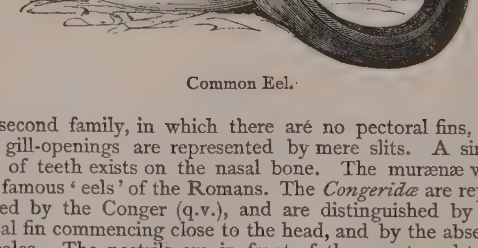
Edwards, Jonathan, a celebrated American divine and metaphysician, was born at Windsor, Connecticut, 5th October, 1703. He was the son of the Rev. Timothy E., for sixty-three years pastor of Windsor. E. entered Yale College in 1716, and took his degree of B.A. September, 1720, standing highest in his class. He studied there two years more, was licensed, preached a few months in New York, and in September, 1723, became tutor in Yale College. On 15th February, 1727, he was ordained colleague to his grandfather, in Northampton, Massachusetts. Here he laboured for twenty-three years, his church being stirred with memorable revivals in 1735 and 1740. In the full tide of his success a difference sprang up between him and his church. He held that conversion should be the term of communion. But the alienation began in 1744, when, on learning that some young members had been reading obscene books, he made their names public and called for discipline. He was dismissed in 1750, most of the people turning against him. In 1734 E. and other ministers in his county originated the Indian Mission at Stockbridge. They gave both money and influence in its support, receiving in 1739 from the Colonial Government a grant of 4000 acres, as compensation, near Stockbridge. Here E. began to preach in January, 1751. In this Arcadian retreat he found time to pursue his favourite studies. The room is still pointed out where, in about four months, he wrote *The Freedom of the Will* (Boston, 1754), the most famous of all his works, and the ablest defence ever made of the Necessarian doctrine. E. was elected President of Princeton College, and installed 16th February, 1758. Smallpox being prevalent, he was inoculated, but died from the effects, 22nd March, 1758. E. has stamped his theology indelibly upon New England character. A close student, a clear logician, a profound thinker, he must ever rank among the great fathers of the Church. In spite of his rigorous, one may say pitiless, Calvinism, he was benevolent, gentle, and devout to a degree rarely seen on earth. Among his other works are *Revival of Religion* (Bost. 1742); *Religious Affections* (Bost. 1746); *Life of Brainerd* (Bost. 1749); *Original Sin* (Bost. 1758); *History of Redemption* (Edinb. 1777); *Nature of Virtue* (Bost. 1788). **Jonathan E., D.D.,** son of above, was born 1745. He was likewise a distinguished theologian, became President of Union College, Schenectady (1799), and died 1st August, 1801.

Ed'win. See EADWINE.

Eecloo', a town of E. Flanders, Belgium, 10 miles N.W. of Ghent, and 15 miles S.S.E. of Bruges, on the railway between these places. It has large manufactures of cotton, wool, tobacco, soap, leather, salt and oil. Pop. 11,879.

Eekairee' (*Akhari*, or *Ikkeri*, 'two streets'), a semi-ruined city in the Shimoga district, province of Mysore, British India, 162 miles N.W. of Seringapatam. It was the capital of a powerful state in the 17th c., and the remains of its walls testify to the strength and extent of the place. There are many buildings of great size in ruins, and amongst them are the remains of a large temple containing curious figures of stone. A village now occupies part of the site and contains a pop. of 182.

Eel, a name given indiscriminately to fishes with elongated bodies, but restricted to certain genera of Teleostean fishes belonging to the section *Apoda* of the sub-order *Malacopteri* ('soft-finned'). The term *Apoda* indicates the absence of the *ventral* fins. The E. has soft fin-rays, and a swimming bladder communicating with the throat by a *pneumatic duct*. The body is covered by minute detached scales, which are frequently concealed by the skin. The lateral line of mucous canals exudes a large quantity of *mucus*, which protects the body in the absence of scales. The best-known families of eels are the *Anguillidæ*, *Murænidæ*, *Congeridæ*, and *Gymnotidæ*. The first family has comb-like teeth, the gill-openings being lateral. To this family belong the sharp-nosed E. and the broad-nosed E. The 'mottled muræna' exemplifies the second family, in which there are no pectoral fins, and the gill-openings are represented by mere slits. A single row of teeth exists on the nasal bone. The murænæ were the famous 'eels' of the Romans. The *Congeridæ* are represented by the Conger (q.v.), and are distinguished by the dorsal fin commencing close to the head, and by the absence of scales. The nostrils are in front of the snout, and teeth exist on the palate and vomer. The *Gymnotidæ* are represented by the electric E. of S. American rivers. This genus has no dorsal fin or scales, but possesses a long hind fin.



Common Eel.

Other eels are the 'glass-E.,' so named from their translucent bodies. The hair-tailed glass-E. inhabits the Mediterranean Sea, as does the pig-nosed species. The name sand-E. is applied to the hornels, and also to the sand-lance.

The true eels are well-known fishes, celebrated for their voracious nature, and for their tenacity of life. They occur in both salt and fresh water, and are esteemed by many as articles of food, although the flesh is rather fatty and insipid. Eels are largely captured in Holland, and are brought alive to England in 'welled' boats. They are captured in Britain and abroad by means of 'E.-pots' or 'bucks,' wicker-cages fixed usually near weirs in rivers, and also by lines baited with worms, minnows, or other bait. Spearing eels is chiefly practised in winter, whilst the eels lie in the mud.

Eel-Pout, a term applied to the Burbot (q.v.), and also to the viviparous Blenny (q.v.).

Eels (in paste and vinegar). These minute organisms are Nematoid worms belonging to the *Nematelmia* (*Scolecida*, q.v.), and to the *Anguillulidæ*. The vinegar eel is a familiar species, and is nearly allied to the *Vibrio tritici*, which produces Ear-Cockles (q.v.) in wheat. These organisms are free nematoids. They possess rudimentary eyes, and, generally, a posterior sucker. They produce few ova at a time. These organisms appear in vinegar and other fluids, probably from the ova being readily conveyed to and contained in such fluids.

Efen′di, or **Effen′di,** a title of honour among the Turks conferred upon persons occupying recognised positions in the civil service or in social life. The title is frequently affixed to the name of the office which the person holds, as *Hakim-E.*, the Sultan's first physician. The corresponding military title is *Aga*.

Effaré′, or **Effrayé** (Fr. *effarer* or *effrayer*, 'to frighten,' the former being derived from the Lat. *efferare*, 'to look wild'; the latter from *exfrigidare*, 'to freeze with terror'), an heraldic term, applied to an animal rearing as if scared or enraged.

Effeereres, or **Affeerors** (Lat. *forum*, 'a market'), were those persons who were sworn in courts-leet to settle the fine of anybody who was punishable arbitrarily or in a way not determined by statute. They also arranged the fines in the baron's court. It is said that Shakespeare was an A. at Stratford-on-Avon.

Effeirs′, or **Effeir′ing,** is a Scotch law-term signifying corresponding to or relating to. *In form as E.* means 'in legal form.'

Eff′igy (Fr. *effigie*, Lat. *effigies*, 'an image'), an image or likeness in painting, sculpture, or drawing. It is not, however, a word recognised in art; and in common use it signifies such a caricature semblance as at once manifests and stimulates contempt for the person who is the subject of it. To hang or burn a person *in E.*, is to hang or burn the E. of the person as a sign of contempt for and dislike felt towards him. The practice was much more common in the earlier half of the present century than now.

Eft (Old Eng. *efete*), a name popularly used as synonymous with Newt (q.v.). The Scotch term 'esk' or 'ask' (probably connected with 'asp') is also used as an equivalent to E.

Eg′ede, Hans, the apostle of the Greenlanders, was born 31st January, 1681, at Harstad, a village in Nordlandene, Norway. After studying at Copenhagen, he was ordained priest in 1707, and became pastor of Vaagen. His ambition was to go as missionary to Greenland, and, after many hindrances, domestic and otherwise, he sailed for that inhospitable land with his wife and family in 1721, and laboured there for fifteen years with great industry and success. Frederik IV., King of Denmark, aided the mission; and in 1740, after his return to Copenhagen, E. was made a bishop. He died in 1758. E. wrote two works on the subject of his mission, one of which was translated in 1745, under the title *Description of Greenland*.—**Povel E.**, son of Hans, born in Norway in 1708, afterwards Bishop E., translated the Bible into the Greenland tongue, and compiled a dictionary of the same, which appeared in 1750 under the title *Dictionarium Grönlandico-Danico Latinum*, and a Greenland Grammar (1760). He died in 1789.

E′ger, a town of Bohemia, on the right bank of the river E., 90 miles W. of Prague. It has manufactures of cloths, hats, and shoes, and its trade has greatly increased since it became a point of junction for three railways. E. has several churches and educational establishments. The Gymnasium in 1850 was elevated into an Obergymnasium, with eight classes. The town-house contains a painting of the death of Wallenstein, who was assassinated here, 25th February, 1634. Pop. town 18,483, district 36,740.—The *river* E. rises in the Fichtelberg, on the borders of Bavaria, 2240 feet above the sea-level, flows N.E. and E., and passing Elbogen, Saaz, Birdin, and Theresienstadt, falls into the Elbe, after a course of 195 miles.

Ege′ria, or **Ægeria,** from whom Numa feigned that he had received instructions for the institution of the rites that would be most acceptable to the gods, was the most celebrated of the four Camenæ, or prophetic nymphs, in Roman mythology.

Egg. The E. is generally named the *ovum* in physiology and zoology, and may be assumed to be represented in every group—even in the lowest—of the animal world. Thus the *nucleus* found in many *Protozoa* (q.v.) either represents the E. or the female organ which gives origin to the equivalent of an ovum. Eggs vary very much in different animals in the relative development of their parts. Every perfect E. consists of a *vitelline*, or outer membrane, of a yolk or *vitellus*, of a *germ* vesicle, and of a *germinal spot*. The E. of a hen, for example, consists of these parts or their equivalents, after impregnation, and of superadded matters (white or albumen, shell, &c.) to protect the essential part of the ovum during its development. Sometimes numerous eggs are deposited at once, or the number may be limited to one or two. The eggs most sought after in commerce are those of Rasorial birds, such as our fowls, turkeys, and their allies; whilst those of turtles are also eaten as a delicacy. The true idea of an E. or ovum is necessary to the comprehension of what is involved in the term *individual*, as used in zoology—an *individual animal* being the *total* result of the *full* development of a *single* E.

Egg, Chemistry of.—Chemically the quantity and quality of the parts of an ordinary hen's E. have been determined as follows:—The entire weight is 1000 grains, of which the *white*, consisting, in 100 parts, of 80 parts water, 15½ parts dry albumen, and 4½ parts salt, &c., weighs 600 grains; the *yolk*, consisting, in 100 parts, of 53¾ parts water, 17½ parts dry albumen, and 28¾ parts oils suspended in the yolk in minute globules, weighs 300 grains; while the shell, consisting of lime, weighs 100 grains.

Egg Trade.—Great attention is now being paid to the rearing of poultry in the United Kingdom. Stimulus was given by the Birmingham show, and the directors of the Crystal Palace have since done much to promote a love of barn-door fowls. But yet home-laid eggs cannot be obtained in sufficient numbers. Imports of eggs are gradually and rapidly increasing. In 1845 only about 70,000,000 were received, and in 1860 160,000,000. The value of imported eggs in 1860 was £336,000; in 1880, 6,228,405 great hundreds, value £2,235,451; and in 1894, 11,876,968 great hundreds, value £3,786,329. Of these Germany contributed 3,361,188 great hundreds (£937,087), Belgium 2,954,843 (£885,136), France 2,440,559 (£982,800), Russia 1,369,959 (£383,639), Denmark 1,254,914 (£422,790), and British possessions 275,448 (£99,260). From this it would appear that the French E. is more costly than the German, and the Danish E. than the Russian; and that, while we are paying the foreign E. merchant over 3½ millions sterling, the market with our own colonies is represented by so humble a sum as £99,260.

Egg'a, or **Eggan,** a town of W. Africa, in the Yoruba country, on the right bank of the Niger, a little below the point where it receives the Kudunia. Its length is variously stated at from 2 to 4 miles; the streets are narrow, the houses conical, built of clay, and sometimes stained with indigo. E. is now one of the principal settlements within the Niger Territories all of which are governed by the Royal Niger Company, holding a charter dated 10th July, 1886. The chief manufacture is a kind of blue cloth, and the chief articles of export from E. and the surrounding district are calabashes, silk, yams, potatoes, hides, india-rubber, coffee, gums, palm-oil, corn, and fish. Pop. uncertain.

Egg-Apple, or **Egg-Plant,** the name given to the edible fruits produced by species of Solanaceous plants allied to the potato. Of these species, *Solanum ovigerum* and *S. melongena* of the E. Indies are well-known examples. In the latter, the plant has a woody stem and attains a height of two feet. The fruit is in shape and size like a hen's egg, and is of white or yellowish colour. These fruits are eaten in the E. Indies.

Egg-Plant.

Egg'ar Moth, a species of Lepidopterous insects, the caterpillars of which are found on clover and broom. The adult moth is of a yellowish-brown colour.

Egg-Bird, or **Sooty Tern,** a species of the *Sternidæ* or Terns (q.v.), common in W. Indian seas, and coloured dull black above and white below. The bill is long and straight. The popular name of the bird is derived from the favour in which its eggs (numbering three, averaging 2 inches in length, and of a pale cream-colour) are held. Several other species of tern are also known under the name of E.-B.

Egg, Sea. See ECHINUS.

Eg'ham ('church-town'), town in the county of Surrey 18 miles W. from London, on the right bank of the Thames, and connected with the market-town of Staines, on the opposite bank, by a handsome bridge. The meadow of Runnymede, where King John signed Magna Charta, 15th June, 1215, is in the neighbourhood. Pop. civ. par. 10,187.

Eginhard, or **Einhard,** a Frankish historian, was born about 770 in Austrasia, and studied at Aix-la-Chapelle under the famous Alcuin (q.v.). He became a favourite of Karl the Great, who made him his private secretary and superintendent of buildings. On Karl's death, Hludwig the Pious appointed E. tutor to his son Lothar. It was once supposed that in 815 he resigned his offices and entered a monastery, while his wife at the same time took the veil; but his title, Abbot of Fontenelle, of Bladigny, &c., seems to have been merely a lay dignity, especially as his wife bore him a son after 815. Having received the relics of the martyrs Petrus and Marcelinus from Rome in 827, he placed them in his abode at Mühlheim, which he renamed Seligenstadt ('town of the blessed'), and where he founded a Benedictine abbey. He died probably in 844. The romantic tale of his loves with Emma, Karl's daughter, and of her carrying him across the palace courtyard, that the snow might not betray his nocturnal visit, is purely fictitious, as E. does not mention an Emma among the Emperor's daughters. A similar tale is recounted of a daughter of the Emperor Heinrich III. in William of Malmesbury. E.'s works include *Vita Caroli Magni*, a precious source of information in regard to the great emperor, rich in interesting details, and written in singularly excellent Latin; *Annales Regum Francorum, Pipini, Caroli Magni, et Ludovici Pii;* and *Epistolæ*, sixty-two in number, which shed considerable light on the history of his times. The best edition of E. is that by M. Teulet, with a French translation (Par. 1840).

Eglantine. See SWEET BRIER.

Eglinton, Earls of. See MONTGOMERY.

Eg'mont, Lamoral, Count, Prince of Gavre, one of the most striking historical figures of the 16th c., the descendant of an ancient and noble Batavian family, was born at the castle of Hamaide, Hainaut, in 1522. In early youth he acted as page to the Emperor Karl V. In his nineteenth year he commanded a troop of light horse in an expedition to Barbary. In 1545 he married Sabina Countess-Palatine of Bavaria, the Emperor Karl, Ferdinand King of the Romans, and the Archduke Maximilian being present at the wedding. E. was the head of a splendid embassy to England in 1553, to solicit the hand of Queen Mary for Philip II. of Spain; in the spring of 1554 he was sent on a second mission to exchange the ratifications of the marriage treaty. To him were due the victories of St. Quentin (1557) and Gravelines (1558), which the Spaniards won against the French forces. From his position and influence he became naturally involved in the struggles of the Protestants in the Netherlands. In this connection, the vacillation and weakness of his character proved his ruin. On the outbreak of the troubles he took his place side by side with his ally the Prince of Orange in the van of the malcontents; but when the Protestants arose in open insurrection, E. wavered, and finally deserted the Prince of Orange and the Protestants. The promulgation of the decrees of the Council of Trent in the Netherlands in 1564 occasioned the greatest discontent, and E. was selected to proceed (1565) on a mission to Madrid to lay before Philip the complaints of his Flemish subjects. Margaret, Duchess of Parma, whose administration as Regent of the Netherlands had been so far successful in establishing a spirit of toleration and conciliation between Catholics and Protestants, was superseded in 1567 by the cruel and bigoted Duke of Alva. The new governor called a meeting of the council of state at Culemborg House on the 9th September, 1567, and here E. and his friend Count Hoorn, who had been invited to the meeting in the interests of the country, were arrested and sent under military escort to the fortress of Ghent. For the purpose of wreaking swift vengeance on those who had allied themselves with the cause of the people and of Protestantism, Alva instituted a tribunal which became popularly known as the *Council of Blood.* Arraigned before this court on a charge of treason, resting on ninety different counts, E. and Hoorn were found guilty, were condemned to death, and were beheaded in the market-place of Brussels, 5th June, 1568. See Juste's *Le Comte d'E. et Le Comte de Hornes*, Prescott's *Philip II., King of Spain*, and Motley's *Rise of the Dutch Republic.*

Egmont, Mount, a remarkable extinct volcano, of conical form and isolated position, in the province of Taranaki, in the N. Island of New Zealand, 8270 feet above the sea.

Eg'ret, a term frequently applied to a species of heron inhabiting the southern parts of America, and passing northwards in the spring of each year. Its colour, and also that of allied species, is snowy white, the tail being of a yellowish tint. The bill is long and sharp, and of bright yellow colour. The average total length of the full-grown bird is 4 feet. The food consists of worms, fishes, and small mammals. The tail-feathers are in great request for the purpose of making brushes for switching away flies and other insects. The name E. is often very loosely employed in ornithology, and probably the separation of the egrets from the herons, advocated by some writers, is hardly warrantable.

Reddish Egret.

Egripo, or **Erripo,** an Italian corruption of the Gr. *Euripos*, 'the strait with the violent channel,' a name given first to the channel between Negropont and the mainland, and then to the town E., Egripos, or Negropont, on the site of the ancient Chalcis (q.v.).

Egypt (Lat. *Ægyptus*, Ital. *Egitto*, Fr. *Égypte*), according to its present geographical limits, is a country in Africa, extending along the basin of the Nile from the Mediterranean to a line, corresponding to 21° 50′, drawn from the 2nd cataract, Wadi Halfa, eastward to Sherm Abu Kut, on the Red Sea, and including Lower Egypt, Upper Egypt, and the northern part of Nubia, together with the peninsula of Sinai. It is bounded E. by Arabia Petræa and the Red Sea; W. by the Libyan Desert, or eastern part of the Sahara; and S. by the Nubian Desert and Nubia W. of the Nile. E. is one of the most interesting countries in the world, on account of its early civilisation, its intimate connection with sacred history, its imperishable monuments of art, and the magnificence of its ruined cities and temples. The following table gives the areas and populations of the various divisions of E., in respect of the settled lands, according to the latest census and estimates:—

Division.	Area in sq. miles.	Population.
Lower Egypt	6,204	3,965,664
Isthmus	10½	32,471
Asia	⅓	3,923
Upper Egypt	4,483¼	2,776,982
Oases	—	38,225
Totals .	10,698	6,817,265

The absolute estimated area of E. is, however, 400,000 sq. miles, of which only 13,000 are cultivated and settled. Lower E. contains 10 sub-divisions; the Isthmus, 2; Asia, 1; and Upper E., 9. Cairo is the capital, and the other important towns are Alexandria, Damietta, Tanta, Rosetta, Bulak, Port Said, Ismailia, and Suez.

General Aspect.—The great natural feature of E. is the river Nile, which flows through its entire length, and which is the means of its internal commerce, and the main support and regulator of its whole system of agriculture. In its windings through Nubia, and during its straighter course in E. Proper, the Nile (q.v.) is enclosed by a double range of low hills, sometimes 10 or 12 miles apart, but in many places approaching the river's banks precipitously. About 100 miles from the Mediterranean the stream separates into two main and several minor branches, enclosing the fertile region of the Delta. The western half of E. forms part of the Libyan Desert, and the hills which separate it from the Nile valley are called the Libyan Mountains. Those flanking the right bank of the river are the Arabian Mountains, which reach a height of 9000 feet. Between the Nile and the Red Sea the surface is for the most part hilly and barren, but there are numerous *wadis* or fertile ravines where a rich vegetation is kept alive by perennial springs. The cultivable parts of E. are the Delta, the Nile valley to the limits of the inundation, the oases in the Libyan Desert, and the fertile plains of Upper Nubia. There are also many productive tracts in the southern territories, formerly subject to E., particularly in Darfur (q.v.), but these are only partially and rudely cultivated.

Hydrography and Climate.—The length of the Nile, from the Albert N'yanza to the sea, is about 3300 miles. It receives in its upper course the Asua, the Bahr-el-Ghazel, the Sobat, the Blue Nile, and the Atbara; but below the point of confluence with the last of these, and for the final 1500 miles of its course, its waters are not further augmented by a single tributary. The Atbara, or Bahr-el-Aswad ('black river'), is the great source of the black mud or slime that gives to E. her fertility. This alluvium is regularly distributed over the flat lands by the great annual inundation of the Nile, the most singular of all hydrographic phenomena, whether as regards its results or its regularity. The river begins to rise at Khartum, at the confluence of the Blue Nile, early in April, and in Lower E. the first day of the inundation is usually the 25th of June. The flood reaches its height in three months, remains stationary some twelve days, and then gradually subsides, leaving a deposit of mud which has been estimated as amounting to 6 inches in a century. Any irregularity of excess or deficiency in the inundation seriously affects the productiveness of the land, but this seldom happens. Much waste country is being reclaimed by improved irrigation and an extension of the system of canals. The climate is extremely dry, as the whole of E. Proper lies within the 'rainless zone.' The year is practically divided into two seasons, spring and summer, the summer heat being tempered by the fresh northerly or Etesian breeze. Of all the prevailing winds, the most oppressive and unhealthy is the Khamsin, or hot wind of the S., which blows during April and May. After the inundation, *i.e.*, in November or later, the soil gives forth exhalations which favour ophthalmia, dysentery, and other diseases. The temperature in Lower E. varies from 50° to 100° F., while it is some 10° higher in the southern parts of Upper E., where also the climate is healthier. The plague, which is rarely severe in its visitations, does not usually ascend far above Cairo.

Geology and Mineralogy.—The Libyan and Arabian hill ranges are cretaceous, consisting chiefly of durable sandstone, and being covered in part by nummulitic limestone. Of this limestone are built the three pyramids of Gizeh. A belt of granitic rocks, about 50 miles broad, stretches along the S. of Upper E., beginning at the cataract of Assouan, and extending into Nubia. It is a wild region, presenting bold cliffs towards the Nile, which is occasionally forced into splendid cataracts. Besides those already mentioned, the chief rocks are syenite, basalt, breccia, alabaster (at Tel-el-Amarna), and porphyry. To a great extent the surface is covered with the shifting desert sands. The alluvium brought down by the Nile consists partly of quartzose sand, and partly of argillaceous earth. At Gebel Zabara there are emerald-mines. Among the other minerals are marble, salt, nitre, natron, and sulphur.

Botany, Agriculture, and Zoology.—The botany of E., which is confined within the Nile valley, is singularly rich, and includes many European trees and plants. The most notable trees are: the date-palm, the doom-palm, the acacia, the tamarisk, and the sycamore. There is an extensive cultivation of sugar-cane, cotton, indigo, opium, hemp, tobacco, &c.; while among the fruits are the orange, apricot, pomegranate, lemon, and fig, besides apples, pears, peaches, plums, grapes, melons, and cucumbers. The lotus, or water-lily of the Nile, is still found, but the famous papyrus has retired far up the river. Agriculture has long been a favourite occupation, the system of irrigation having been carried to great perfection. The chief cereals are wheat, barley, rice, millet, maize, and durra. In 1895 the area under cultivation amounted to 5 million acres. The fauna of E. proper is extensive, including, besides all the usual domestic animals, the jackal, hyæna, ichneumon, jerboa, the camel, the crocodile, the soft tortoise, the ostrich, &c. Among the animals formerly common were the hippopotamus, rhinoceros, and giraffe. There are many aquatic birds, and several kinds of serpents, of which the most deadly are the asp and the cerastes. The most notable insect is perhaps the sacred beetle (*Scarabæus sacer*). Of fish the Nile affords a plentiful supply, while locusts and mosquitoes are the scourge of the country.

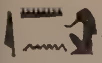
Manufactures and Commerce.—The modern Egyptians are in great part an agricultural people, but the various manufacturing industries have been greatly developed of late years. Much attention has been devoted to the cultivation of sugar-cane in Upper E., and the banks of the Nile are fast becoming dotted with sugar-factories, and about 87,000 acres are now under sugar cultivation. There are also large cotton-factories, several dyeing and cotton-printing establishments, extensive iron-foundries, and some ship-building. The other manufactures are pottery, firearms, woollen cloths, carpets, glass, and red caps. As in ancient times, E. has once more become the highroad of Eastern commerce, nearly all the trade to and from India passing now through the Suez Canal (q.v.). The vast traffic between E. and England is for the most part in goods in transit, chiefly from India. It consists of exports to England, amounting (1894) to £9,284,801; imports from England, £4,065,814. There is, however, an important export trade in native produce, the principal articles of which are beans, wheat, cotton, cotton-seed, hides and skins, oilcake, onions, rags, sugar (from the cane), and raw wool: gum, ivory, hides, ostrich feathers, come from the Sudan; senna and wax from Abyssinia; tamarinds from Dar-fur; cotton and sugar from Upper E., besides mother-of-pearl, shells, drugs, &c. The chief imports are butter, cheese, coal, coffee, cotton-yarn, hardware, woollens, cotton manufactures, flour, indigo, furniture, millinery, rice, sacks, silk, soap, wine, and wood for fuel: indigo, shawls, come from the East; sheep and tobacco from Turkey and Syria; cottons, woollens, and hardware from England and Germany; and cloth, furniture, and millinery from France and Austria.

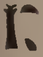
Railways and Finance.—The railways of E. belong to the state, and have a total length of 1255 miles. The two main lines are those from Alexandria to Suez, and from Cairo to Minieh, up the Nile Valley. It is intended to carry the latter as far as Khartum. On 2nd December, 1893, the Khedive opened a steam tramway, 50 miles long, connecting Ismailia and Port Said, and constructed for the purpose of conveying passengers and mails. There are also 1922 miles of telegraph wires belonging to the government. The Eastern Telegraph Company has also lines from Alexandria and Port Said to Suez. The state expenditure for the year 1894-5 was estimated at £9,840,000, and the revenue at £10,516,500, while in the same year the aggregate state debt amounted to £104,406,890. No financial accounts were ever published until the establishment of the English and French control in 1880. Fresh arrangements were made, which will powerfully aid the development of the resources of Egypt, consequent upon the usurpation of power by Arabi Pacha and the intervention of Great Britain to restore the power of the Khedive in 1882. The modern coins are the piastre (of 40 paras) = 2½d., the 50-piastre piece (gold) = 10s. 5d., and the £E. = 20s. 6d.

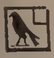
Government and Army.—The ruler of E. paid to the Sultan, as tribute, £681,667, in 1894-5. In 1866 the succession was made direct from father to son, instead of, according to the Turkish law, the eldest heir, and in 1867 Ismail, the ruling prince, received in a firman from the Sultan the title of *Khedive* or sovereign. The administration is in the hands of a Council of State of six ministers appointed by the Khedive and a British financial adviser whose adhesion is required to any financial scheme proposed by the Egyptian Government. The Egyptian army is under the command of an English general, and officered partly by Englishmen and partly by Egyptians. Its total strength is 13,000, while the English army of occupation, which since the rebellion of 1882 has remained in Egypt, is over 3,000. Beyond a few gunboats and yachts E. possesses no navy.

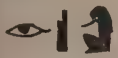
Education and Religion.—Much is being done for the spread of education in E. There are some 6700 elementary schools, 15 government colleges, and 21 higher grade schools. Unfortunately female education is neglected. Most of the Egyptians are Mohammedans, but the Copts number 600,000.

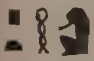
History.—Upper E. was once called Meroë, and at another time Cush or Ethiopia, both which names were afterwards carried to Abyssinia. The local name of E. itself is Chemi (Ham or Sham, also said to mean 'the black'); the Hebrew name was Mizraim, one of the tribes of the children of Ham. The Greek names, Ægyptus and the Land of Copts, were at first applied to the Delta alone. E. probably contained two races, that seen in the kings who ruled at Sais, and that seen in the kings and gods of Thebes. The first is marked by a retreating forehead, a forward mouth, and an excessive length from chin to the back of the head; it is still seen in the modern Fellah and the Galla tribe S. of Abyssinia. The second has an intellectual head, with upright forehead and aquiline nose. According to one view the latter was a conquering race, owning the land, to which it gave its warriors, religion, and language; the former tilled the land and paid the taxes (Morton's *Crania Ægyptiaca*). The first king of the old empire is Mena or Menes ('the eternal,' Minos and Menu), the founder of Mennefer or Memphis ('good port') and of the earliest religious rites. His date varies from 3000 to 2000 B.C., the Greek lists of Eratosthenes, Manetho, and the tablets of Abydos being in almost constant contradiction. He is the first of six dynasties, some of which lived at This (Gr. Abudos), ruling over the land between Lycopolis and Tentyra. Another Thinite king, called Kakan, introduced the worship of the bulls Apis and Mnevis, and the goat Baentattu. In a later Memphite dynasty is the name of Ser or Serbes, afterwards made the god Aiemapt on account of the encouragement he gave to medicine and building with polished stones. The history of the fourth (Memphite) dynasty is contained not merely in Greek glosses, but in local inscriptions. Senefru conquered the 'Shepherds of the East,' near the *mafka* mine in Sinai; Khufu (Cheops) built the great pyramid (*mer* or *abmer*) at Ghizeh, near which Caviglia and Mariette discovered the Temple of the Sphinx. Cheops also conquered Thebes (which had by this time absorbed This, Elephantine, Heracleopolis, and Heliopolis) and Tih, or the hill country in Sinai, where inscriptions may be seen at Wadi Magarah. Besides the *primitive* deities, such as Ra, the Sun (who formed a trinity with Mut, the mother, and the hawk-headed Chonso, a moon-god), the *secondary* deities, Kneph, the ram-headed spirit, Ptah, the fire-god, Thoth, the ibis-headed god of letters or pillar-god, Hathar or Venus, and Bast, goddess of chastity, were now worshipped. Isis and Osiris were at first demigods, and their popularity changed from time to time. Their sons were Horus, the hawk-headed, and Anubis, the jackal-headed. Osiris had been killed by Typhon, the hippopotamus. Nephthys was the sister of Isis. This period is marked by the first *cavo rilievo* and painting in monochromes; it has an extensive hieroglyphic language. The following are some of the principal deities and countries :—

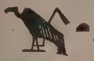
 . . . . *Amn*, Amen, Jupiter.

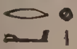
 . . . . *Bast*, Bubastis, Diana.

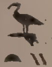
 . . . . *Hathar*, Athyr, Venus.

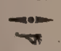
 . . . . *Heshar*, Osiris.

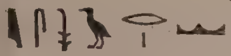
 . . . . *Ptah*, Vulcan.

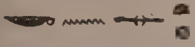
 . . . . *Mut*, wife of Amen-Ra, Thermontis.

 . . . . *Ra*, the Sun.

 . . . . *Teti*, Thoth, Mercury.

 . . . . *Khem* or *Min*, Chem. (Ithyphallic god).

 . *Assuru*, Assyria.

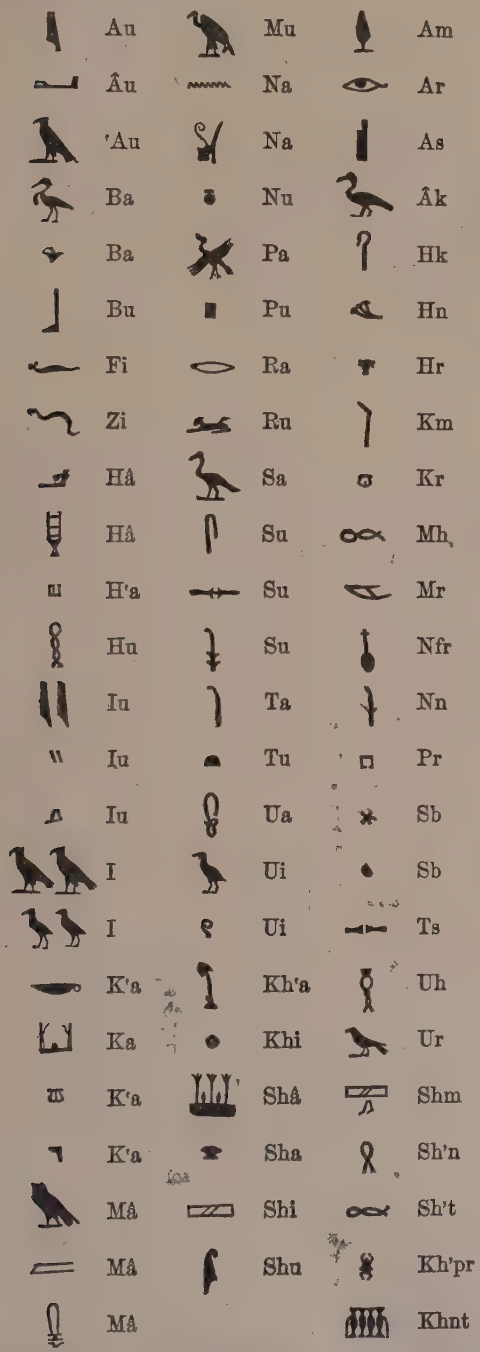
 . . . . *Kenus*, Nubia.

The fifth dynasty is called Elephantine, the name of a city on an island in the Nile, just below the cataract at Syene. The kingdom of Elephantine may have reached N. to Silsilis, and S. to the cataract at Abousambul in Nubia. The kings are now distinguished by the termination Ra. One of them, Ptahhept, is the author of the moral precepts on the Prisse Papyrus. The sixth dynasty (Memphite) includes Nitocris, the 'rosy-cheeked queen,' and there is a trace of an expedition against the Herusha, or inhabitants of the Waste, on the N.E. There were probably contemporary dynasties at This, Thebes, Memphis, and Elephantine. There was also a race of kings at Heracleopolis ruling from Memphis up the river to Lycopolis. A king of Heracleopolis (perhaps Amenemha III.) constructed the Lake Mœris to drain off excessive inundation and to store against deficient inundations. Another king of Heracleopolis built the Labyrinth with 1500 cells—the Tomb of the Sacred Crocodiles described by Herodotus. In the city of Chois, in the Delta, there was an independent dynasty, of priests, who saw the invasion of the Hykshos, or shepherd kings, called 'lepers' in the British Museum Papyrus, probably an Arabian or Phœnician race, who fixed themselves at Memphis and confined the native rulers to Thebes. But these names lead into what Dr. Birch—occupying a middle place between the extravagant chronology of Bunsen and the sober estimates of Sharpe—calls the Middle Empire, consisting of twelve dynasties from 2000 B.C. to 1600 B.C. This period ends just before the reign of Rameses I., whose date in Sharpe's chronology is *circa* 1200 B.C. A more interesting era is that of Thothmosis III., *circa* 1322 B.C., when it seems almost certain that the sovereign power of E. was concentrated at Thebes (Tape, or '*the* city'). Before going to that era, a few names must be mentioned. Osirtesen I., king of Thebes, perhaps before the conquest by Cheops of Memphis, built the tombs of Beni Hassan; adapted hieroglyphics to represent not objects or even words merely, but syllables and letters; divided the year into the seasons of vegetation, harvest, and inundation, containing twelve months of thirty days, to which the five additional days, called by the Greeks *epagomenai*, were added; and encouraged the application of steel to the arts of peace and war. Thebes and Memphis combined against the Hykshos, or Caphtorites, whom they drove into the N.E., and who left behind in the name Pelusium their Canaanitish name of Philistines. Amunothph I. (1430?) first married a black-skinned wife, thus obtaining Ethiopia as far as Tombos or Napata. Negroes now appear in the sculptures as domestic and agricultural servants. It was in the 14th c. B.C. that Zeph-net-Phœnich, the biblical Joseph, introduced the ryot tenure to Lower E., the land-tenants paying a fixed rent of one-fifth. It is not clear whether the biblical Pharaoh was king of Memphis or of Bubastis. The Hebrew immigrants, called *Shemmo*, or 'strangers,' were placed in Goshen ('upper lands') and the town of Succoth ('the tents'). Memphis and Thebes are again brought together by the marriage of Thothmosis II. to Nitocris, but a striking difference is still to be observed between the architectures of Upper and Lower E., between excavated tomb and pyramid, between the work of free men and that of slaves. The Egyptians knew at this time the wedge, the lever, the inclined plane, but not the screw, the pulley, or the wheel and axle. They had, however, two-wheeled carriages in place of the primitive boards strapped on the backs of two asses. From 1322 to 990 B.C. we have the Theban kings supreme in E. The horizon of history widens in the reign of Thothmosis III., whose warlike and commercial expeditions to Nubia and Syria are chronicled on the sandstone wall at Karnak. King Amunothph II. is probably the Pharaoh under whom Moses led out the Israelites, who, identified with the old Phœnician invaders, had latterly been treated with severity. Thothmosis IV. (builder of the Great Sphinx) was succeeded by Amunothph III. (lord of Mendes, and called by the Greek epitomists Memnon), whose name is found very often in the granite district of the Second Cataract. He built the musical Colossus at Luxor, and married Tii, a foreign woman painted pink. He cultivated the cat-headed goddess Bast, and tried to introduce from Ethiopia the worship of Atennefru, 'the most lovely disk' of the sun. The next king persecuted all religion except the solar, and drove out the Greek settlement at Sais, which had flourished there for centuries, and whose movement gave rise to the legends of Erechtheus, Cadmus, and Danaus in Greece. Rameses I. (first king of the nineteenth dynasty) is succeeded by Seti or Oimenephthah I., whose alabaster sarcophagus, discovered by Belzoni, and now in the Sloane Museum, is the most beautiful of Egyptian monuments. Rameses II. warred against the Khita (Gr. Bactrians), supposed by Gladstone to be the Ketæi of the Odyssey. See the Sallier Papyrus (British Museum), called the 'Iliad of Egypt.' Besides the Memnonium and the Hall of Columns, he built the well at Contra Pselcis for the gold-miners who crossed the desert with their asses to Gebel-Ollaki. He sent his negro prisoners to the N., and his Asiatic prisoners to the S. The names on the monuments of Oimenephthah II. suggest among his enemies the Sharutana or Sardinians, the Turska or Etruscans, the Shakalusha or Sicilians, the Luka or Lycians, and the

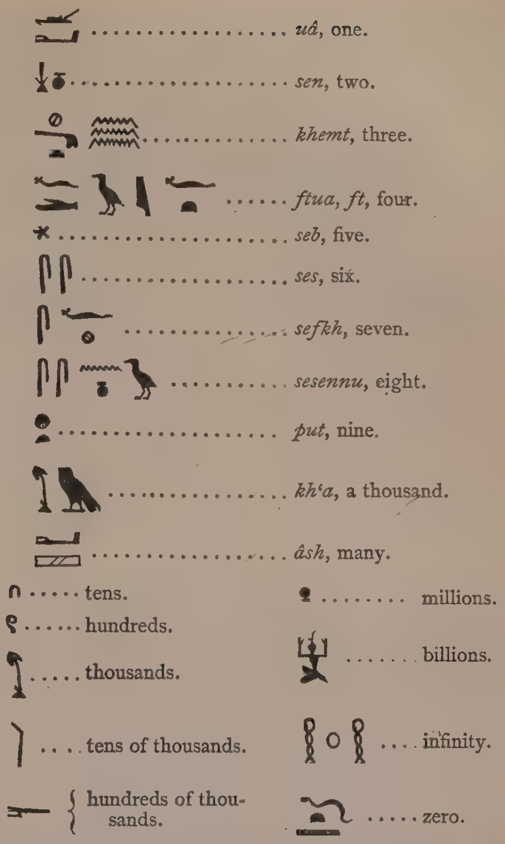
Ruins of the Temple of Quorneth, at Thebes.

Akaiwsha or Greeks (formerly called Hanebu or Ionians). This king is supposed by some to be the Pharaoh of the Exodus. A new route has been suggested for the Israelites, viz., by the isthmus between the Mediterranean and the Lake Serbonis, full of seaweeds and reeds. See Brugsch Bey's lecture before the International Congress of Orientalists, 17th September, 1874 (*Academy*, 26th September, 1875). After a period in which the Harris Papyrus indicates the presence of a Syrian usurper, Rameses III., the Solomon of E., called by Herodotus Rampsindus, with the help of his Council of Thirty, reorganised the social classes. His lists of victories refer to the Pulusata (Pelasgi), Tsekkarin (Teucrians), Uashasha (Osci). Rameses XII. is connected with the worship of Khons (the Moon), whose temple contained the *Cynocephali*, or living apes. The College of Sacred Tribes (*rekhkhet*), and the doctors of magic (*rekhgetamon*, 'those acquainted with hidden words,' the *chartummins* of Exodus), sent the ark of Khons to cure a princess in Bakhtan (thought to be Ecbatana). By this time additional gods had appeared—in Nubia, Chem, the god of generation, who carries a whip; Sebek or Seb, the crocodile—in the Delta the sun was called, not Amen-Ra, but Atham and Mando; Neith was the queen of heaven, who gave kings and sages inspiration through the sacred acacia-tree. The period (B.C. 945-697) is marked by the rise of Tanis and Bubastis and the E. of the Delta, the decay of Thebes, civil wars, and the Ethiopian invasion. At Thebes the Ramessid dynasty is succeeded by the high-priests of Amen, who were conquered by Shishank (Gr. *Sensonchoses*) of Bubastis, an ally of the Jews. Amid many striking differences of custom (*e.g.*, the Egyptians worshipped animals, the priests shaved the head, the people marked their bodies, food was placed in tombs, trees were planted in temple-yards), both Egyptians and Jews practised circumcision, abhorred swine-flesh, and reckoned sunset as the beginning of the day, and much religious ceremony is common to the two nations. Shishank gave the military class freedom from taxation. For two centuries there seems now to have been great confusion. Tanis, the seat of the export trade in corn, linen, and drugs from E., rose into importance, to be succeeded by Sais, on the Canopic branch of the Nile, where Bocchoris the Wise enacted the law that no debtor should be put in prison, and that there should be a written acknowledgment of every debt. Sais itself, as well as Thebes and Memphis, succumbed to the Ethiopian king Piankhi. There is some confusion between this expedition and that of Sabaco or So, whom Manetho makes the first of the twenty-fifth or Ethiopian dynasty. The Assyrian cuneiforms now throw light on Egyptian history, and Tirhakah, the third Ethiopian king, is the contemporary of Hezekiah, and the opponent of Sennacherib and Esarhaddon. The latter organised a portion of E. into a subject state governed by twenty small kings. Tirhakah or Rutamen renewed the contest with Assur-bani-pal, and after this we find a line of native kings (distinguished by basalt monuments) consolidating power at Sais in the W. Delta (B.C. 697-523). Among them Psammetichus I. is prominent. Necho developed the Egyptian navy, and after his conquest of Syria had been nullified by Nebuchadnezzar of Babylon, he constructed the great trench from the Bitter Lakes to the marshes at Pelusium, and by one account anticipated the Periplus of Hanno by sending his ships round the Cape. Another Psammetichus (B.C. 588) was the friend of Zedekiah, and probably in his reign Jeremiah wrote his Lamentations at Hieropolis. Hophra (Gr. Apries) and Aahmes continued to encourage Greek influences in both trade and the army. Amasis, who owed his elevation to a revolt of the old army (the Calasiries and Hermotybies, all tenants of six acres of crown-lands, serving compulsorily for three years) against the mercenaries, made Naucratis the chief port of E. Amasis also established the power of E. in Cyprus. After his death Cambyses reduced the whole country, and from 523-332 B.C. the Persian rule is broken by successive rebellions. By the laws of the Sais supremacy, death was inflicted for murder and perjury and even for killing a slave; killing a child was punished by three days' imprisonment with the dead body. Whereever possible, the punishment fell on the guilty limb. The accumulation of interest was limited to double the sum originally lent. Parricide was punishable by burning. There was no limit to the number of wives permitted by law; only the priests were monogamists. The priests were in four classes—the Soteno, wearing the tall ball-topped linen cap; the Nowto, wearing the flat ring or plate of gold; the Othphto ('dedicated,' Gr. *katochoi*), under monastic vows of seclusion; the Bachano, or hired servants of the rest. The number of local names given to products shows the vigour of industry, viz., ammonia, from the oasis of Ammon; syenite, from Syene; natron and nitre, from Mount Nitria; alabaster, from Alabastron; topaz and sapphire, from the islands of Topazion and Sapirene in the Red Sea; emerald from Mount Smaragdus, &c. In sculpture, critics already distinguish the Ethiopic, Assyrian, Greek, and later Egyptian or Saitic schools. The first is marked by unnatural stoutness, the second by clumsy action, the third by tasteless show of anatomical knowledge, the fourth by grace and strength, without the awful majesty of the early monuments. No clay models were used, and respect for the dead prohibited an intimate knowledge of the human muscles. E. under Darius formed part of the African satrapy, paying as tribute 700 silver talents, the revenues of Lake Mœris, and 120,000 measures of corn. After three native *meleks* or Satraps, Mandophth took advantage of the Persian disasters in Greece to assert his country's independence (B.C. 487), but the tyranny of Xerxes or Kshairsha (who absorbed the army of E. into his own) succeeded, and after the more successful revolt of Marus, who hired Athenian troops, and Amyrtæus in Lower and Upper E., Artaxerxes Longimanus reconquered E. in 440 B.C. About 400 B.C. Nepherites of Mendes (first of thirtieth or Sebennyte dynasty), allying himself with Sparta under Agesilaos, again broke the Persian rule, which, in spite of the attacks of Artaxerxes Mnemon, was not re-established till 349 B.C., when Artaxerxes Ochus destroyed the kingdom of the Copts. At this time Anaxagoras visited E., and Herodotus; and later came Eudoxus the astronomer, who formed the *octaëterid* (period of eight years or ninety-nine months); Chrysippus the physician, and Plato. In 332 B.C. Alexander the Great entered E., meeting with little resistance. He respected the native religion, and divided the country into two monarchies or judgeships, both of which were filled by Egyptians. The reign of Ptolemy Soter extends from 322-284 B.C., the early part of it under the nominal sovereignty of Philip Arrioæus and Alexander Ægus. The defeat of Perdiccas was followed by the conquest of Jerusalem, Phœnicia, Coele-Syria, and Cyprus, and by the defeat of Antigonus. Ptolemy's rule was beneficent, but he kept the two races asunder by declaring that the children of mixed marriages were barbarian. In return for the knowledge which the Greeks brought to the Museum or College of Philosophy at Alexandria, they got the use of papyrus, a great multiplier of books, for which only linen, wax, bark, or tree leaves had been used before. Ptolemy introduced a proper coinage in gold, silver, and bronze into E. His drachma weighed about 55 grs., so that the silver talent was about £150 in value. The chief coins were the gold tetrastater (8 drachmas) and the silver tetra-drachma. Under Ptolemy Philadelphus (B.C. 284-246), the son of Soter and Berenice, a connection springs up between Rome and E. Philadelphus built the Pharos lighthouse and the troglodytic Berenice on the Red Sea, which was joined to Coptos by a road that passed Smaragdus (rich not only in emeralds but in porphyry and *breccia verde*), and was furnished with four great inns or watering-houses. Arsinoë (near the modern Suez) and the Temple of Isis on the island of Philæ (properly Abou-lakh, 'city of the frontier') were also built. The population of E. was estimated at 7,000,000, the army at 220,000, maintained on a revenue of 14,800 talents (£2,250,000) and 1,500,000 artabas of corn (5,000,000 bushels). The Museum Library contained 200,000 Greek papyri. Its directors were the accomplished Demetrius Phalereus and Zenodotus, one of the earliest editors of Homer. There, too, was Ctesibius, the inventor of the water-clock; Theocritus, the Sicilian idyllist; Callimachus, writer of elegiacs and professor of poetry at the Museum; Strato, the physicist, a pupil of

Theophrastus; Timocharis, the astronomer, who by observation of the fixed stars prepared the discovery of Hipparchus that the equinoctial point had moved; Aristarchus, who anticipated the Copernican theory. The king caused Manetho, a priest of Heliopolis, to write his list of kings from the hieroglyphs. The following list of alphabetics in common use may be here inserted:—



The phonetic names of the numerals are as follow. It would appear that up to 10 the vertical bar was repeated as required, but after that other characters were used:—



uâ, one.
sen, two.
khemt, three.
ftua, *ft*, four.
seb, five.
ses, six.
sefkh, seven.
sesennu, eight.
put, nine.
kh'a, a thousand.
âsh, many.
tens.
millions.
hundreds.
billions.
thousands.
tens of thousands.
infinity.
hundreds of thousands.
zero.

The empire of E. included parts of Pamphylia, Cilicia, Lycia, and Caria. The reigns of Ptolemy Euergetes, Philopator, and Epiphanes occupy the period, B.C. 246-180. Some of the exploits of the 'Benefactor' in Syria and Ethiopia are chronicled in the famous bilingual inscription at Canopus. The Museum flourished. Aristophanes, the grammarian, the inventor of the long and short marks, the aspirate, and the accent, put new life in the public readings, and Eratosthenes, 'the surveyor of the world,' by his theory of shadows laid the foundation of astronomical geography. He also wrote a history of E. in correction of Manetho. Apollonius of Perga first taught conic sections, and Archimedes, the friend of Conon, invented his *cochlea*, or screw-pump, so useful in Egyptian irrigation. By the battle of Raphia, Philopator recovered the Syrian provinces which Antiochus the Great had seized, but during the minority of Epiphanes (the Illustrious), notwithstanding the tutorship undertaken by Rome, they were again lost to E. The love of letters still lived in the Ptolemies, but along with it a fatal moral corruption. Ptolemy Philometor Eupator and Euergetes II. fill up the space from 180-116 B.C. Roman intervention saved the whole empire from being seized by Antiochus Epiphanes, and assisted at the divisions between the two brothers. Philometor, who gave some of the highest state offices to Jews, offended his own Coptic subjects by putting Greek inscriptions on the new temples. A change is noticeable in the architecture of the time. The screen in front of the great portico is almost removed by having a doorway made in it between every pair of columns. Corporations of monks begin to appear, and from the contemporary documents we find that sales of slaves and gifts to the Church for the benefit of the dead were common. Euergetes, who recognised the independence of the Maccabees, and warred in Syria against his sister Cleopatra, was a monster of cruelty and sensuality. As regards literature, the honour done to critics (such as

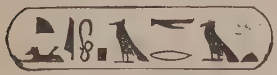


FIG. 1.—Cleopatra.

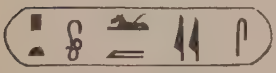


FIG. 2.—Ptolemy.

Aristarchus) is symbolized in the sculpture called the 'Apotheosis of Homer.' The leading figure of the time is, however, Hipparchus, who, with an instrument having a plane parallel to the equator and a gnomon parallel to the earth's pole, observed the equinox and its precession, which he said was along the ecliptic, and not the equator. With him we may put Hero, the ingenious mechanic, whose pneumatic toys are still admired. Agatharcides has left an intelligent account of his survey of the Red Sea, and some attempts were made at a passage to India. Dioscorides was reached. From 116-51 B.C. we have the reigns of Cleopatra Cocce with Ptolemy Soter II., and then, with Ptolemy Alexander I., Cleopatra Berenice, Ptolemy Alexander II., and Ptolemy Neus Dionysus. The period is one of intrigue, civil violence, and vice in high places. The Alexandrian Jews begin to count for something in the political world. Lucullus, the Roman ambassador, finds the Old and the New Academy in debate at Alexandria. Diodorus Siculus is astonished by the fervour with which, outside Alexandria, snakes, crocodiles, cats, ibises, and bulls are still worshipped. The Egyptians still believed in a creation by Ra, the Sun, acting on the river Nile, and in a bodily resurrection, which explains the importance of embalmment. They still buried with the mummy *The Book of the Dead*, explaining the method of judgment passed upon souls. King, priest, and soldier were still the only landholders, and the thirty judges of the three great cities still administered the eight books of the law. Caricature begins to appear on the monuments. According to Strabo bad government had reduced the revenue to 12,500 talents, and the population to 3,000,000. Cyrene and Cyprus successively fall into the hands of Rome, and along with commerce literature also declined. The reign of Cleopatra and her brothers, with the episodes of Julius Cæsar and Mark Antony, occupies the period, B.C. 51-30. The Museum was burned, but the equally large library of Pergamos was placed in the Temple of Serapis. During the three centuries of the rule of the *Lagidæ* changes had occurred in the religion. Ptah and Serapis had become the chief gods; and the moon, which had formerly appeared on the heads of gods, now takes a separate individuality under the name of Soh. The new hieroglyphic characters were the cameleopard, mummy on a couch, ship with sails, and chariot with horses; more words are spelled with letters; and with the papyrus the enchorial or demotic writing with few symbols was gradually displacing the hieratic. From this time to A.D. 640, E. is a Greek province of the Roman Empire. The equestrian prefect was not amenable to the senate. A vigorous judicial system was set on foot. The chief native magistrates were the keeper of the records, the police judge, the prefect of the night, and the *exegetes* or interpreter. Even these officers, however, were not Roman citizens; they were merely imperial freedmen. No municipal government was allowed. The Julian civil year of 365¼ days, beginning on 29th August, was introduced, so that E. had three calendars—the Julian; the popular year, beginning on 18th July, the day of the heliacal rising of the Dog-star; and the astronomical year of 365 days with a moveable first day. Augustus was anxious to prevent oppression by the tax-gatherers, and by his orders the canals were cleared, and the Nilometer at Elephantine built, which shows a maximum rise of twenty-five royal cubits and four handbreadths. Strabo (who travelled to E. under the prefecture of Gallus) describes the wealth and business of Alexandria. The Roman Empire did not extend beyond the *dodecaschœnos* (70 miles) beyond Syene, and this frontier was often troubled by the Ethiopian Arabs of Queen Candace. The worship of Isis and Serapis penetrated to the court of Rome, and Virgil distinctly teaches the Egyptian millennium. Afterwards there was a law against the Egyptian and Jewish superstitions. The pretensions of Caligula to divine honours formed the pretext of an attack by the Greeks on the Alexandrian Jews, whom they wished to deprive of civil rights; the embassy of Philo proved less powerful than that of Apion the grammarian, and not till the time of Claudius did the Jews regain their privileges. Claudius also stopped the oppressive practice of Roman citizens travelling through E. free of expense; he restored an independent coinage. The trade with India in silk, precious stones, ginger, spices, and that with Africa in ivory, rhinoceros teeth, hippopotamus skin, tortoiseshell, apes, and slaves, converging on the Coptos-Berenice route, grew rapidly. The linen trade of Upper and the cotton trade of Lower E. were large, and Alexandria was the largest granary in the world. The excellence of Egyptian chemistry is shown in the Arabic name *al-chemi*, the Egyptian art. Their colours were prepared by the use of a mordant liquid, and their ink (used chiefly on the mummy cloths) was made of nitrate of silver. Naphtha, or rock-oil, bears an Egyptian name. The trade in papyrus in all its varieties, from Hieratic and Fannian down to emporetic (used for wrapping parcels), increased its area. In the reign of Nero (A.D. 55-68) Christianity makes many converts in Alexandria—Jews, Egyptians, and Greeks. Wild Arab tribes from Lower Ethiopia, especially the 'headless' Blemmyes, infested the frontier. The prefect's decree issued on the accession of Galba illustrates the revenue-tyranny which it was intended to stop. Vespasian, whom the Alexandrian Greeks called Cybiosactes ('the scullion'), owed his reception in Alexandria very much to Dion Chrysostom, the rhetor, and Apollonius of Tyana, the impostor; for the philosophers now constituted an important class. In Domitian's time we have from Juvenal a satirical account of E. He testifies to the military oppression, and says the people left nothing unworshipped except the goddess of chastity. Plutarch's narrative of the same age describes the habits of the priests in shaving the whole body, wearing only linen, and refusing some meats as impure. The intellectual creed was then becoming Manicheeism, and less regard was paid to external observances. Serapis was the supreme ruler, and the other members of the triangular trinity, Isis and Horus, were invested with more pleasing human attributes. Trajan (A.D. 98-108) rebuilt the Bitter Lakes Canal on a new route from Memphis. In consequence of civil war between the Cyrene Jews and Alexandria he also deprived the former of citizenship. The philosophical reputation of the capital was sustained by Justin Martyr and Athenagoras, both converts. The beginning of the reign of Antoninus Pius (A.D. 138) is remarkable as the end of the Gothic period of 1460 years, which was called the 'Return of the Phœnix.' This happened when Claudius Ptolemy, the author of the *Syntaxis* or *Almagest*, containing the record of eclipses for eight centuries, and the name-father of the old solar system of cycles and epicycles, was the leading savant of Alexandria. The *Itinerary* of Antoninus gives a description of the six great roads in E., and this is supplemented by the *Periplus* of Arrian, who notes the appearance of glass and sugar in the Red Sea trade. The reign of Aurelius (A.D. 162-181) is without political events except the rebellion of Cassius, but the Library was then in its glory, and was attended by many grammarians, with Athenæus the Deipnosophist at their head. They give employment to the two trades of 'quick writers' and 'book writers.' Lucian, then secretary to the prefect, darts his humour at the immoveable superstitions of the country. At this time the orthodoxy of the old religion seems to have centred at Canopus (a town which gave its name to the jars for holding the soft parts taken from the mummy). There, in the sacred processions, the singer repeated the *Book of Hymns* and the rules for the king's life; the soothsayer, with his hour-glass and palm-branch, repeated the books on the moon's phases and the fixed stars and their risings; the scribe, with his flat rule, knew the geography of the world and the books concerning the planets and the furniture of the temple; the robe-master, with the sacrificial vase and rod of justice, knew the books concerning the sacred heifers, education, first-fruits, and the order of worship and of festivals; the prophet or ventriloquist, with the great water-pot or speaking-bottle, knew the hieratic books concerning the laws, the gods, the temples, the revenue. These were thirty-six of the Books of Thoth; the other six, on diseases and medicines, were learned by the Pastophoroi, who carried an image of the god in a small shrine. At Alexandria, on the other hand, the Eleusinian mystery (of a serpent carried in a basket) was well known; and it is thought the priesthood had generally an *esoteric* faith which, by such names as the 'Secret of Abydos,' they endeavoured to conceal. In spite of persecution the catechetical school of Clemens was continued by Origen, and shortly after Caracalla built a temple to Isis at Rome, and Egyptians entered the Roman senate. The great names of Saccas, Plotinus, Longinus, and Porphyry, which adorned Alexandria during the beginning of the 3rd Christian c., are elsewhere described; and the numerous changes and struggles of Christian doctrine, of which E. was the scene, belong to the history of the Church. In the feeble reign of Gallus (A.D. 251) famine induced a plague, ulcer of the tonsils, which greatly reduced the population. For a short time (A.D. 260) E. was independent of Rome under the soldier Alexander Æmilianus. In A.D. 270 Zenobia of Palmyra made an attempt to gain E., which, after a few months' success, was defeated by Aurelian, but both Saracens and Palmyrans continued to assail the province, and Firmus, a wealthy paper-merchant, with the help of Arabs and the Coptic population, made himself independent for a time in Upper E. Frequent rebellions of lesser size were followed by the great one of Achilleus against Diocletian, who had just resigned Nubia to the native tribes. With the rise of Byzantium the Greek element begins to yield to the native Egyptian; theology displaces philosophy; Iamblichus seems insignificant by the side of Arius and Athanasius. Indeed, after the division of the Empire the Patriarch or Bishop of Alexandria seemed at times almost independent of Constantinople. The paralysis of political power is shown in the system of patronage by which towns without charters paid a government official for his unauthorised protection. When Jovian restored Christianity (A.D. 363), the monastic system was already in full vigour among the Cœnobites, the Anchorites, and the Remoboth. About A.D. 379 the Saracens approach the N.E. frontier, and being many of them Christians, side with the Egyptian Homoousians against the Arian Greeks. The radical policy of Theodosius did not entirely destroy the Pagan worship, still practised in secret at Canopus, but it did destroy the great Serapis Library of 700,000 volumes. The lamp of philosophy was still held up by Proclus and his followers. The government divided E. into Upper Libya or Cyrene, Lower Libya or the Oasis, the Thebaid, Ægyptiaca or W. Delta, Augustanica or E. Delta, and Heptanomis or Arcadia. The tax-gatherers were called 'counts of the sacred largesses,' and had a great crowd of *numerarii* (clerks). About A.D. 450 a Nubian invasion almost extinguished Christianity in Upper E. On the other hand a series of ecclesiastical quarrels, in which the national mind was interested, was settled by the edict called 'Henoticon,' issued by the Emperor Zeno in A.D. 477, which passes by the decrees of Chalcedon, calls Mary the 'Mother of God,' and admits that the decrees of Nicæa and Constantinople contain everything necessary. In the reign of Anastasius (A.D. 501) the Persians under Kobades overran Syria, and laid waste the greater part of the Delta up to the very walls of Alexandria. Under Justinian a singular strife went on between the Coptic patriarchs, who were Jacobites, and the Melchite or Royalist patriarchs, who were armed with the authority of civil prefects. This lasted till the Persians took Antioch, and the defence of the Egyptian frontier was practically left to the monasteries on the Elanitic Gulf. A change in the government was made by the thirteenth edict of Justinian, from which it appears that the Augustalian Cohort of 600 men was charged not only with the defence of the province, but with supervising the collection of the 800,000 artabæ (4,000,000 bushels) of corn. In the reign of Heraclius (A.D. 618) the Persian Chosroes became master of the whole of E. for ten years. He even built a palace in Alexandria. Heraclius drove out the Persians, but for several years he paid a tribute to the Caliph Omar, and in A.D. 638-640, Amrow, the son of Ase, partly through the treachery of some native Egyptians, overcame the brave resistance of the Greek garrisons. The terms of the Moslem conqueror were:—'Pay tribute, embrace the Koran, or die.' At first E. paid two gold pieces for every male of military age. By Omar's famous order the Library was used for heating the baths. The history of E. now becomes part of the history of Arabia and the Arabs. It was governed from a new city, Musr or Cairo, between Memphis and Heliopolis, and these cities were pulled down to build mosques and other public buildings. In A.D. 868, the local governor of the Abbaside caliphs usurped the sovereignty, and founded the Tooloonide dynasty, which lasted till A.D. 906. The power of the caliphs was again interrupted by Mahdee, the governor of E. Africa (A.D. 912-934), and Mohammed, a Turkish officer in the Arabian service (A.D. 936-970). The descendants of the former founded the Fatimite line of caliphs, who till A.D. 1171 ruled at Cairo independently of Bagdad, taking a large share in the wars of the Crusades. The Eyubite dynasty was succeeded by a race of Baharite sultans, or Meleks, consisting of Turkoman Mamlukes, who joined Syria to E., and held the Abbasides in subjection. The Circassian Mamlukes (A.D. 1382-1517) were crushed by Sultan Selim I. at Heliopolis. The conqueror organised an independent government of E. by a Pacha and twenty-four Beys, headed by the Sheik of Belad. The army and power of taxation, subject to certain conditions, were left with the Mamluke aristocracy. Under this arrangement there was frequent revolt. When Napoleon went in 1798 to free E., Britain intervened on behalf of the sovereign rights of the Sultan, but its success was neutralised by the *coup d'état* in 1811 of Mehemet Ali, who murdered nearly all the Mamluke Beys (some escaping into Dongola) and reigned till 1848, the Hatti Sheriff of 1841, guaranteed by the Great Powers, confirming the succession to his heirs. Ali's government was a contrast to the savage oppression of the Beys. He established regular courts of justice, and introduced European manufactures and machinery. But there was only the form of representative government, and the wars in which the Vali (or Viceroy) and his son Ibrahim took part made necessary an enormous taxation and a heavy conscription. The leading class under this military regime was the Osmanlis. Ali took part in the Greek war of independence, and after the conquest of Syria in 1835 might have got rid of his nominal superior, the Sultan Mahmoud II. But in 1840 the Quadruple Alliance intervened in favour of Abdul Medjid. He died in 1849, and was succeeded by his son, Ibrahim, and by Abbas Pacha, superseded in turn by Saîd Pacha in 1854. By his co-operation M. de Lesseps commenced the construction of the Suez Canal, which was opened in 1869. Saîd was succeeded in 1863 by his nephew, Ismaïl, who was deposed in 1879. His son, Mohamed Tewfik, succeeded him. He placed the finances of the country under the joint control of England and France, and this so exasperated the military party that they step by step became absolute masters of the government and resources of the country under the leadership of Arabi Pacha. England could not tolerate the existence of a military despotism in Egypt, and as France declined to co-operate, England sent its own fleet (June-July, 1882) under Lord Alcester, and an army of about 10,000 men under Lord Wolseley, to restore the authority of the Khedive and to secure its highroad to India. The fleet bombarded and destroyed the forts of Alexandria, then occupied the city. The army occupied Ismailia on the Suez Canal for its base. It pressed on thence to Kassassin, where the army was massed and delivered its great blow at the enemy in his entrenchments at Tel-el-Kebir so effectually on 12th September that Arabi's power was ruined. The British army then entered Cairo, and British authority was promptly recognised throughout Egypt. The departure of the British troops was, however, countermanded on account of the war in the Sudan. Mohamed Tewfik died on January 7th, 1892, and was succeeded by his son Abbas. By an Anglo-Turkish Convention, signed May, 1887, it was agreed that the British troops should leave in three years, but it was not ratified by the Sultan, and the question of the British retirement from the protectorate of Egypt remains unsettled.

Egyp′tian or **Al′pine Vul′ture,** a species of *Vulturinæ*, distinguished (as are other members of the genus *Neophron*) by the long bill with the nostrils situated at its middle, by the third quill being the longest of the wings, by the wedge-shaped tail, and by the front of the head, throat, and cheeks being destitute of feathers. This bird, sometimes named 'Pharaoh's chicken,' is coloured of a general white, the quills of the wings being dark brown. The sexes are coloured alike, the plumage of the young being brown. This bird is carefully protected from injury in Egypt by laws, and subsists on carrion of all kinds. The nest is made upon a rock, and the eggs are three or four in number, and of grey colour. It inhabits S. Europe, N. Africa, and Asia.

Ehr′enberg, Christian Gottfried, an eminent German naturalist, was born at Delitsch, in the province of Saxony, Prussia, 19th April, 1795, and studied at the universities of Leipzig and Berlin. He graduated in medicine in 1818. His devotion to botany soon gained him a high reputation, and caused him to be sent along with Hemprich in an expedition despatched to the East in 1820 by the Academy of Sciences. In spite of fatigues to which Hemprich succumbed, E. travelled through Syria, Egypt, Abyssinia, and other parts of Africa, and returned to Berlin in 1826 with a great collection of hitherto unknown plants and animals. The results of his labours were seen in several valuable works. E. set out with Humboldt in 1829 on his Ural and Altai expedition, and here he laid the foundation of his great work, *Organisation, Systematik, und Geographisches Verhältniss der Infusions-thierchen* (completed in 1838 at Leipzig). Some of E.'s conclusions regarding Infusoria are now disputed, but he was the first to study their organisms scientifically. In 1847 he was appointed Ordinary Professor of Medicine. He died at Berlin, 27th June, 1876.

Ehrenbreit′stein ('Broad stone of honour'), a town and fortress in the province of Rheinland, Prussia, on the right bank of the Rhine, connected with Coblenz, on the opposite bank, by a bridge of boats and a beautiful railway bridge. The town has two Roman Catholic churches, a synagogue, and a mineral spring celebrated as early as the 14th c. There is a trade in wine, corn, tobacco, &c. The fortress, the 'Gibraltar of the Rhine,' is accessible only on the N.W. side, which is protected by a triple line of formidable defences mounted with 400 guns. On the top of the rock is a platform used as a parade ground, under which are arched cisterns capable of holding a water-supply for the garrison for three years. E. was originally a Roman fort. The French reduced it in 1799 by famine, and dismantled and blew it up at the peace of Luneville in 1801. Prussia was put in possession of it by the Congress of Vienna in 1814, and it is now one of the most formidable fortresses in the world. Pop. 5800.

Eib′enstock ('Place of yews'), a town in Saxony, 16 miles S.S.E. of Zwickau, with manufactures of tin, tobacco, chemicals, lace, and muslin. Pop. 6626.

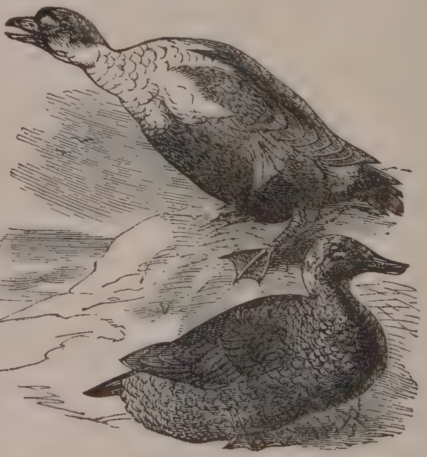
Eich′horn, Johann Gottfried, the most eminent of the Rationalistic theologians of Germany in his time, was born at Dörenzimmern, in the principality of Hohenlohe-Oehringen, 16th October, 1775. He studied at Göttingen, and was Professor of Oriental Languages at Jena (1775-88), and at Göttingen from 1788 till his death, 25th June, 1827. He was the first among professional theologians to deal with Scripture freely on the footing of a mere literary work; the principle on which he studied the Bible being expressed in his apostrophe to the writers:—'However great my respect for you, ye holy men, never let me fall into the superstitious idolatry already deprecated by yourselves, or deem it irreverent to submit your productions to the strictest rules of human criticism.' His *Einleitung in das Alte Testament* (Leipz. 1780-83), which was the first work entirely devoted to the subject, and which was received with extraordinary favour, produced a great effect both on the manner of treating the subject generally, and on the prevalent views in regard to the particular subjects on which he touched. Of his *Einleitung in das Neue Testament* (Gött. 1804-10), the most prominent part was his theory of an 'urevangelium,' or original gospel, in which the same process of grouping and comparison which had been applied to the various readings in order to purify the text is used in regard to the variations of the narratives for the purpose of arriving at the true original gospel. E. also wrote voluminously in political as well as literary history.

Eich′stadt, formerly **Aichstädt** (*i.e.*, 'oak-town'), a town of Bavaria, 30½ miles S. of Nürnberg, in a deep valley on the Altmühl. It is a bishop's see, is well built, and has an ancient appearance. The principal buildings are the palace of the ducal family of Leuchtenberg, with its beautiful park, the cathedral founded in 1259, with the grave of St. Wilibald, the town-house built in 1444, and the old castle of St. Wilibald, which has been converted into a barrack. There are manufactures of cloth, pottery, and ironmongery. There are besides several breweries. E. has had municipal rights since 908. Pop. 7508.

Eich′wald, Eduard, Russian naturalist, was born at Mitau, Courland, 4th July, 1795, studied at Berlin from 1814 to 1817, and after having travelled in France and England, was appointed Professor of Zoology and Midwifery at Kasan in 1823, travelled during 1825-27 through the countries around the Caspian Sea and the Caucasus, and in 1829 explored the W. of Russia. In 1838 he was named Professor of Zoology and Mineralogy at the Medico-Chirurgical Academy of St. Petersburg. He afterwards studied geology and palæontology, and undertook scientific expeditions to Esthonia, Finland, the Tyrol, Italy, Sicily, and Algeria. E. was a voluminous author.

Ei′der, a river of N. Germany, which rises about 12 miles S. of Kiel in Holstein, and after a course of 100 miles enters the North Sea at Tönning, the capital of the district of Eiderstedt. Throughout the greater part of its course it divides Slesvig from Holstein. It is navigable to Rendsburg, whence ships can pass to Kiel Bay on the Baltic, by means of the Slesvig-Holstein, or E. Canal. Much of its course is bordered with costly dykes to protect the adjacent land from inundation.

Ei′der-Duck, a well-known genus of *Anatidæ* or ducks, but included in the sub-family of the *Fuligulinæ* or Pochards (q.v.). The genus *Somateria* has the bill divided at its base by feathers, and the front of the bill is flat, whilst its *laminæ* or 'fringes' are very wide. The wings have their first and second quills longest. As in the pochards, the hinder toe is short, with a broad membranous web. The common E.-D. is found in the N. parts of Britain, but comes further S. in winter. It averages rather more than 2 feet in length. The male is white on the neck and back, the primary and secondary feathers being dull black, and the tertiary feathers



King Eider-Ducks.

white, whilst they droop over the darker wings. The breast and belly are black, with white patches in the flanks. The top of the head is deep black, the sides of the head being white. The bill and legs are green. The colour of the female is a ruddy brown, marked with darker tints. The nest is placed in detached rocks and islands. The eggs are five or six, and are pale-green in colour, and the E.-D. produces two broods annually. The king E.-D. is rare in Britain, but common in Greenland. It has a black and white body, and red beak and legs; and the male possesses a warty protuberance on the base of the upper bill. These ducks afford the 'down' used in making quilts and some articles of dress, which is obtained from the nests, and is plucked by the parent birds from their own breasts to cover and warm the eggs during incubation. The eggs and down are successively removed from the nest, the bird laying fresh eggs and supplying new down; whilst ultimately the male bird is called upon to supply down from his breast; and on his darker down being seen in the nest, the fowlers cease their operations. The eggs are very palatable, and the flesh is not unpleasant to taste. About half a pound of down is stated as the quantity obtainable annually from a single nest. The down is imported in the form of balls, weighing each 3 to 4 lbs. These ducks can be domesticated, especially in marine localities. The islands of Britain, Fern Island, Norway, and Sweden, are the chief haunts of the E.-D. in Europe, whilst it is also plentiful on the North American coasts.

Eigg or **Egg Island,** a small hilly island, 6 miles long and 3 broad, belonging to Inverness county, and 12 miles W. of Arisaig. The highest point, the 'Scuir of E.,' is 1339 feet above the sea. E. has a manse and schoolhouse, some Danish remains and two hamlets, Laig and Kildonan. Pop. 233.

Eight-Foil, in heraldry, eight leaves issuing from a central ball; sometimes called a double quatrefoil.

Ei'kon Basil'ike (Gr. 'the royal image'), a book issued in 1649, professedly written by Charles I., whose policy it explained. It was divided into twenty-eight sections, each ending with prayer, and was the work of John Gauden, Bishop of Exeter.

Eil'enburg ('the town on the island,' Celt. *eilean*, 'an island'), a strong town of Prussian Saxony, on an island of the Mulde, here spanned by two bridges. It has manufactures of woollens, cotton, tobacco, and wax, tileworks, and a trade in cattle. Pop. 11,506.

Eim'beck, properly **Ein'beck,** an ancient town of Prussia, 38 miles S.S.E. of the town of Hanover, on the Ilme, near its confluence with the Leine. Its chief industries are stocking-weaving, tanning, spinning, and manufactures of tapestry and cloth. It was formerly one of the Hanse towns, and in the Middle Ages was famous for its beer.

Einsied'eln, a town in the Canton of Schwyz, Switzerland, 3000 feet above the sea-level, is noted for its Benedictine Abbey, containing a black image of the Virgin, to which miraculous powers are ascribed, and which annually attracts 150,000 pilgrims. Zwingli was parish priest of E. in 1516. The existing abbey dates from about 1720. It has a library of 28,000 volumes and 840 MSS. Pop. 8502.

Eire, or **Eyre, Justices in.** These were originals of the present justices of assize. They were first appointed in A.D. 1176, with a delegated power from the king to make circuits once in seven years. Under Magna Charta the circuit was made annual. The office having become a sinecure, was abolished by 57 Geo. III. c. 61.

Eis'enach (Lat. *Isenacum*, Ger. *eisen*, 'iron'; 'the place on the water impregnated with iron'), a walled town, the capital and residence of the Grand Duke of Sachsen-Weimar-Eisenach, 45 miles W. of Weimar, is romantically situated in the Thuringian forest. It is a station on the Sächsisch-Thüringisch Railway, and is easily reached from any part of Germany. Among its principal buildings are the Grand-Ducal residence, the gymnasium, originally a Dominican cloister, where Luther received part of his education, and the churches of St. Georg and St. Nikolaus, the latter built in the 12th c. It has manufactures of woollens, fustian, worsted, linen thread, pottery, and sealing-wax, dye-works, and many flourishing mills. E. is the birthplace of Sebastian Bach. The castle of the Wartburg (q.v.), where Luther remained in hiding for ten months after the Diet of Worms, and translated a considerable portion of the Scriptures into German, occupies a wooded height in the vicinity. Pop. town 21,399; district 31,915.

Eis'enberg ('iron hill-fort'), an old town in the Duchy of Sachsen-Altenburg, on an affluent of the Elster, 2½ miles from Krossen, on the Weissenfels-Zeitz-Geraer Railway, with manufactures of leather, woollens, linens, shoes, porcelain, and stoneware, and a trade in corn and wood. Among the most noteworthy buildings are the castle of the Grand Duke and a beautiful church in the New Italian style, erected between 1676 and 1692. Pop. 5814.

Eis'enerz ('iron ore'), a town in a deep valley of Upper Styria, separated from the market-town of Nordenberg by the lofty Erzberg, 5010 feet high. This mountain forms the centre of the iron and smelting trade of Styria. The mines have been worked for 1000 years. The ore is now quarried rather than mined—the sides of the mountain being cut away in some places to a depth of 30 fathoms, in others even to that of 90 fathoms. The ore is rich, and from it is manufactured a steel unsurpassed in Europe. Pop. town 5719; district 7969.

Eis'enstadt ('iron town,' Hung. *Kis Marton*), a small free town of Hungary in the county of Oedenburg, 7 miles N.N.W. of the town of that name. It possesses a Franciscan monastery, containing the burying-place of the Esterhazy family, who have also a magnificent palace in the vicinity, built in 1683, and enlarged in 1805. In its noble park, on the slope of the Leitha Hills, are splendid greenhouses and orangeries.

Eis'leben (Lat. *Islebia*), a town of Prussian Saxony, 18 miles W. of Halle, and a station on the Halle-Nordhausen-Kassel Railway. Luther was born and died here. Two days before his death he founded the existing Royal Gymnasium. The house in which he was born has been turned into a school, where orphans receive free education. Pop. 23,175.

Eisteddfods (pron. *eisteff'ods*), the name applied to the periodical assemblies of Welsh bards for competition in native music and song. They are of great antiquity, reaching back as far as the time of Howel Dha. At present they keep alive a certain kind of national feeling, but attempt to reanimate a dead literature.

Ejec'tion and Intru'sion is a term of Scotch law, E. denoting the violent taking possession of land or a house, and I. denoting entry into the void possession of the subject without permission of the owner or order of a judge. A tenant illegally remaining in possession was liable to an action of E. and I., and unless his defence could be instantly verified, he was required to find security for the violent profits. Summary petitions for removing or for ejection have now in practice taken the place of the older actions of E. and I. The liability for the violent profits remains as before.

Eject'ment. By the Common Law Procedure Act of 1852, former procedure in E. was abolished in England. The process is now by writ (called 'Recovery of Land' since the Judicature Act) directed to the person to be ejected and to all entitled to defend possession of the property claimed. No pleadings are allowed in this action. When half a year's rent is in arrear, and the landlord or lessor has a right to reenter for non-payment, he may bring action of R. of L., and on proof that there were not sufficient goods to satisfy Distress (q.v.), he shall recover judgment and execution. But on the tenant paying rent and costs before trial, proceedings are to cease. Where the term is under seven years and the rent under £20 per annum without fine the landlord or lessor may obtain possession by summary proceedings before two justices of the peace, and before the County Court where the value of the holding or the rent does not exceed £50, and where the tenant has paid no fine or premium. Any sort of E. may be decided by the County Court when the value of the property is not more than £20 per annum.

Ekaterinburg′, or **Jekaterinburg**, a town of Russia, government of Perm, on the E. side of the Ural Mountains, and 160 miles S.E. of the town of Perm, with which it was connected by rail in March, 1878. It occupies a hilly plain on the high-road to Siberia, is the centre of the mining industry of the Ural Mountains, the largest town in the government and in the Ural region, and has broad straight streets, splendid buildings, including two cathedrals and ten churches, gardens, parks, &c. There are also a museum of mineralogy and an imperial mint. The cutting and polishing of precious stones is a principal branch of industry, but the prosperity of the town is due mainly to the rich mines in its vicinity. At a short distance are the iron-foundries of Issetsk; 7 miles off are the gold-mines of Beresovsk; and 16 miles distant is Pyschinsk, where the gold is separated from the earth by amalgamation. The town was founded in 1722, and named after the wife of the Czar Peter the Great. Pop. 33,405.

Ekaterinodar′, or **Jekaterinodar′** ('Catherine's gift'), a town in Russia, the capital of the Kuban or Black Sea Cossacks, in a swampy district on the Kuban, 100 miles above its mouth. Most of the houses are of clay, though some are of wood, and thatched with straw. E., built in 1792, is the seat of the Cossack Hetman. It has a wooden fort or *kreport*, in the enclosure of which stand the Hetman's residence, the military hospital, and the cathedral. Pop. 42,623.

Ekaterinoslav′, or **Jekaterinoslav**, a government in S. or New Russia, between Kharkov and Pultava on the N., Kherson on the W., Taurida on the S., and the Sea of Azov and the country of the Don Cossacks on the E.; area 26,148 sq. miles; pop. 1,978,400. From the southern exposure of the land, apricots, peaches, cherries, mulberries, almonds, figs, vines, melons, and water-melons thrive in the open air. Agriculture and the breeding of silkworms, of Merino sheep, and of cattle are successfully pursued. There are magnificent coal-beds, occupying an area of upwards of 1300 sq. miles.

Ekaterinoslav, the capital of the government, on the right bank of the Dnieper, 250 miles N.E. of Odessa, founded in 1784 by Potemkin, as a summer residence for Catharine II. It has broad streets, but is filthy, and has an unfinished appearance. It is a bishop's see, has extensive cloth manufactures, and is the emporium of the trade to Odessa. Pop. 51,572.

Ek′logite, a kind of garnet rock, composed of light-green smaragdite enclosing crystals of pale garnet. It occurs in the Sau-Alp in Styria, in the island of Syra, and at Münchberg in Bavaria. It is a tough firm rock, and when polished is employed for ornamental purposes.

Ekouk Tank, an irrigation work on the borders of the province of Bombay and the Nizam's dominions in India, 4 miles N. from Sholapur and 205 S.E. from Bombay. A dam of earthwork, with masonry flanks, 7200 feet long and 72 feet high, is thrown across the Adela river, a tributary of the Kistna. The lake thus formed has an area of 6½ sq. miles, and five villages have been submerged; but 35,840 acres have been brought under irrigation. There are three distributaries—two on a high level, 4 and 18 miles long respectively, for monsoon crops; and one, 28 miles long, for perennial irrigation. The water was first distributed in 1871.

Elæag′nus, a genus of Exogenous plants belonging to and forming the type of the natural order *Elæagnaceæ*. In this latter group the plants are trees or shrubs, with exstipulate leaves and unisexual flowers. The fruit is a shelled *achene*. The genus E. itself is represented by the oleaster of S. Europe and the Levant, and by the small-leaved oleaster, which bears clusters of red edible berries, mottled with scaly leaves. The former species is often cultivated in Britain for its silvery foliage. It is sometimes named the 'wild olive.' *Shepherdia argentea* of N. America is also included in this group, and yields an edible fruit.

Elæocarpa′ceæ, a group of Exogenous plants, elevated by some botanists to the rank of a natural order, but by others included in the natural order *Tiliaceæ*, or the Linden (q.v.) order. The typical genus, *Elæocarpus*, is represented by *E. cyaneus* and *E. serratus*. These trees are chiefly East Indian species. The fruit of *E. serratus* is eaten in Ceylon. *E. cyaneus* inhabits Australia. In E. plants the petals are deeply cut, and the anthers dehisce or open at their apices.

Elæococc′a, a plant genus belonging to the *Euphorbiaceæ* (q.v.) or 'spurgewort' order. The seeds afford oils (hence the name), the oil obtained from *E. verrucosa* being used for food in Japan.

Elæoden′dron (Gr. 'oil-tree'), a genus of Exogenous (Polypetalous) plants belonging to the order *Celastraceæ* or the 'spindle-tree' order. The fruit of E. is a stone-fruit or *drupe*, and that of some species (such as *E. Kubu* of S. Africa) is eaten. The fruit of *E. Argan* of N. Africa affords oil. *E. croceum* of S. Africa affords a timber known as 'saffron-wood,' much used in building and for making furniture.

Elagab′alus, or **Heliogab′alus**, the first Roman emperor of Asiatic extraction, was born at Emesa about A.D. 205. His original name was Varius Avitus Bassianus; he adopted that of E. as pontiff and favourite of the Syro-Phœnician Sun-god so named (Syr. *ela*, 'a god,' and *gabal*, 'to form'; 'the forming or plastic god'), which was worshipped at Emesa. Through the intrigues of his grandmother, Julia Mæsa, he succeeded Macrinus, the destroyer of Caracalla, after his rival had been defeated at Antioch (A.D. 218) and subsequently slain. The reign of E., who assumed the name of Marcus Aurelius Antoninus, lasted for three years nine months and four days, and was deeply stained by heartless cruelty and by vices of the most loathsome nature. E. was murdered, and his body cast into the Tiber, A.D. 222.

Eland, a genus of *Antilopidæ* or Antelopes (q.v.), distinguished by having the horns—each about 18 inches long—spirally keeled, but of nearly straight conformation; by the equal-sized limbs, and the presence of a short mane on the neck. Its colour is a light or greyish brown. The tail is tufted and the muzzle broad. The E. is the largest of the antelopes of S. Africa, and may attain the size of a large ox or cow. Its food consists of grasses and herbage, and it is noted for its powers of long abstinence from water. The flesh is accounted very palatable. The E. is gregarious in habits.

Eland.

El′anet, certain species of Raptorial birds belonging to the genus *Elanus*, and nearly allied to the kites or *Milvinæ*.

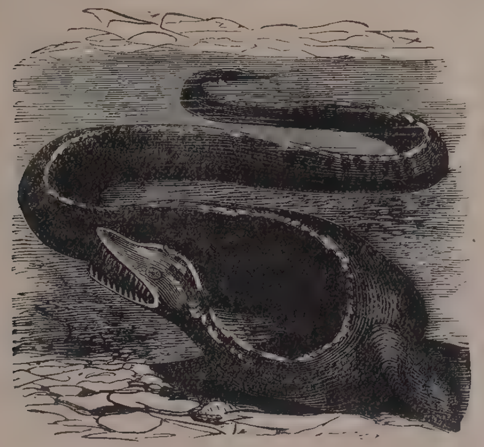
Examples are found in the black-winged falcon, and in the black-shouldered hawk. The former occurs in Africa and Asia, and in New Zealand, the latter in America. These birds have the bill broad at its base. The wings are long, and the second quills are the longest. The tail is long and forked, and the outer toe is much shorter than the inner. The genus *Elanoides* is nearly related to *Elanus*, and is exemplified by the swallow-tailed falcon of America. The wings have the second and third quills longest, and the hinder toe is elongated.

Elaph'rium, a genus of plants belonging to the natural order *Connaraceæ* (q.v.), which is sometimes included in the nearly-allied order *Amyridaceæ* or 'myrrh' order. The genus is represented by the *E. tomentosum*, which yields a resin named *Tacamahac*, whilst Mexican Elemi (q.v.) is obtained from *E. elemiferum*.

E'laps, a genus of poisonous Colubrine (q.v.) snakes, forming the type of the family *Elapidæ*, in which group the head is square, the snout short, and the front teeth of the jaws longest. In the genus *E.* (represented by the bead-snake of N. America), no smooth teeth exist behind the fangs. The Cobra di Capello (q.v.) belongs to the *Elapidæ*.

Elasmobran'chii, an order of *Pisces* or fishes, represented by the Shark (q.v.), Dog-fish (q.v.), Ray (q.v.), Skate (q.v.), and their allies. The order is distinguished by the skull and lower jaw being well developed. No distinct cranial or skull bones can be distinguished, and the skull is cartilaginous in its nature. The spine may be osseous, cartilaginous, or represented by a soft Notochord (q.v.). The scales consist of bony plates, granules, or tubercles, often furnished with spines. The pectoral and ventral fins are developed, the latter being abdominal in position. No clavicles exist. The heart has a *bulbus arteriosus*, which is rhythmically contractile, provided with striped muscular fibres, and possessing several rows of valves. The gills exist in the form of pouches, which open externally by slits (as in sharks), or by a single gill-aperture (as in *Chimæra*). The order is divided into the *Holocephali*, represented by the *Chimæra* or 'king of the herrings'; and the *Plagiostomi*, represented by the sharks, rays, &c. The former group has a single gill-aperture, or persistent notochord; the first ray of the dorsal fin forms a spine, and the mouth is placed at the extremity of the head. The latter subdivision has the transverse mouth placed on the under surface of the body, and the gills open by numerous gill-slits.

Elasmosaurian, a large marine reptile, the remains of which have been found in England and America among the chalk formations of the Secondary or Mesozoic period. It would appear that the E. was a kind of reptilian whale, possessed of vertebræ of the size of an ordinary elephant's, of a long and flexible neck, of short paddle-like fins, of a long, narrow, flat muzzle. Spout holes were near the eyes, and the long sharp teeth were eminently adapted for catching and feeding on fish. The E. must have been at least 45 feet long.



Elasmosaurian (restored).

Elasti'city, in physical science, is the property possessed by probably all kinds of matter, in virtue of which they tend to recover their original form or dimensions after disfigurement by some external force. No substances, however, are perfectly elastic, *i.e.*, can of themselves perfectly regain their original condition after having been subjected to an appreciable strain. Those which most nearly approach this ideal perfection are the gases, whose E. is defined as the ratio of the increment of pressure to the compression produced by it. The same definition holds for liquids, but their E. is of little practical importance on account of their generally small compressibility. In both liquids and gases the E. is wholly one of volume, form and figure being not of the least consequence. Not so, however, with solids. Here change of form constitutes distortion, and distortion is not necessarily accompanied by change of bulk. It is found that within certain limits the law is practically accurate that the distortion is proportional to the force, or, as Hooke first enunciated it, *ut tensio sic vis;* but for every solid substance there is a certain limiting strain, beyond which E. ceases to act, the *rigidity* or resistance to change of form is overcome, and *fracture* ensues. (See STRAIN.) Plastic solids are those whose E. of figure is very imperfect; and they pass by insensible gradations into *viscous* fluids, which have only E. of volume. Continuous rise of temperature, as a rule, renders solids more and more plastic, till they become liquid and ultimately gaseous; and therefore rise of temperature diminishes E. of figure and increases E. of volume. All these phenomena follow as a direct consequence of the molecular theory of the constitution of matter, when it is considered that the difficulty of permanently altering the relative positions of contiguous particles is greater the closer they are, and especially so if, when condensed, the particles are subject to mutually attractive forces, which are of little moment, on account of the introduction of new dynamical conditions, when the particles are sufficiently separated.

Elasticity, in physiology. Many of the structures of the body possess the property of E., by which movements are effected without the expenditure of force in muscular contraction. Thus there is a strong elastic band termed the *ligamentum nuchæ* in the back of the neck of the large ruminants and pachyderms, stretching from the spinous processes of the dorsal vertebræ to the occiput, by which the heavy head is sustained without muscular fatigue. The larger arteries of the body possess a highly elastic coat, by the agency of which the jet-like pulsation communicated by the heart to the blood is converted into a continuous uniform motion. The lungs and walls of the chest, by their E., assist in ordinary expiration without any muscular action. Muscles are highly elastic, so that after contraction they return to their former length. Finally, elastic structures are found in the neighbourhood of all joints, so as to break the shock in such movements of the body as walking, running, leaping, &c.

El'ater, the name given in botany to the *spiral elastic fibres* contained within certain vegetable cells, and which by their elasticity aid in scattering the spores or germs of such lower plants as horse-tails or *Equisetaceæ*, &c. In many cases these E. are hygrometric, that is, are affected by the varying effects of dryness and moisture.

Elater, a genus of *Coleoptera* (q.v.) or Beetles, forming the type of a distinct family (*Elateridæ*), in which the body is hard, the antennæ short and serrated, and the head sunk in the thorax as far as the eyes. The limbs are also short. They are sometimes named 'spring-beetles,' from the fact that when laid on their backs they can spring into their normal position. Many are luminous in the dark. See CLICK-BEETLES, WIREWORM, &c.

Elat'erite, or **Elas'tic Bitu'men,** is a flexible or elastic mineral substance allied to bitumen, possessed of a blackish-brown colour and a resinous lustre. It burns readily with a yellow flame, giving out a bituminous odour, and as it effaces pencil-markings, it has been called mineral caoutchouc. It was found originally in an old lead-mine in Derbyshire, but it is nowhere abundant.

Elate'rium, a drug used in pharmacy, and obtained from a green mucous or glutinous matter surrounding the seeds of *Ecbalium purgans*. It is prepared by allowing the juice of the ripe fruit to stand until it deposits a sediment, which is dried and collected. It is of a pale-greenish colour, and is a powerful hydragogue cathartic or purgative, and is used in dropsy, &c. Its properties depend on a crystalline substance called *elaterin*. As a drug it was employed by the Greeks and Romans. It varies much in strength, and should be administered at first in $\frac{1}{16}$-grain doses until its proper effect is ascertained.

Elatina'ceæ, or 'water-pepper' order, a group of Exogenous plants, occurring in all quarters of the globe, and distinguished by their being small annuals growing in marshes. The leaves are stipulate and opposite, and the flowers are small and axillary. The sepals and petals vary in number from three to five. The seeds are exalbuminous, and attached to a central placenta. The natural order E. is allied to the *Rutaceæ*. The type-genera are *Elatine*, *Bergia*, and *Anatropa*.

El'ba (Fr. *Elbe*), an island of Italy in the Mediterranean, is included in the province of Livorno, and lies between Corsica and Tuscany, being separated from the mainland by a strait (Piombino) about 5 miles wide. It is the Ilva of the Romans, and the Æthalia of the Greeks, the latter of which names is supposed to have been suggested by the smoke of its many iron-smelting furnaces. About 18 miles in length, it varies in breadth from 2½ to 10 miles, while the coasts are bold and deeply indented with good harbours. It is mountainous, and rises to a height of 3,500 feet in Monte della Campana. Among the productions are iron, loadstone, marble, wine, wheat, olives, and Southern fruits. The capital is Porto Ferraio (pop. 5652). The Treaty of Paris designated E. as the residence of Napoleon I., who, however, only remained here from 14th May, 1814, till his escape on the 26th February, 1815. Area, 90 sq. miles; pop. 22,315.

Elbe' (Lat. *Albis*, Bohem. *Labe*), the largest river of N. Germany, has its source in numerous springs on the Bohemian side and in the highest part of the Riesengebirgs, 4538 feet above the level of the sea. It flows in a sweeping curve through the N. of Bohemia, past Königgrätz, Melnik, Theresienstadt, and Leitmeritz; then, after making its way through the Mittelgebirgs of Bohemia, it enters the kingdom of Saxony, passing Pirna, Dresden, and Meissen. It then flows past Torgau, Wittenberg, and Madgeburg in Prussian Saxony, and further on it forms the boundary of Hanover and Mecklenburg, Lauenburg and Holstein, passing Hamburg, Altona, and Glückstadt, and falling into the German Ocean at Cuxhaven, after a course of 720 miles. Close on its embouchure its breadth varies from 9 to 13 miles. It drains an area of 55,590 sq. miles, and receives in its course more than fifty affluents, of which the most important on the right are the Iser, the Elster, and the Havel; on the left, the Moldau, Eger, Mulde, and Saale. It becomes navigable at Melnik for the large E. wherries at Pirna, and at Hamburg, by the help of the tide, for the largest merchant vessels. Its navigable course is 520 miles long, 340 of which belong to Prussia. Steamboats carrying freight sail regularly between Hamburg and Magdeburg; passenger steamboats ascend the river from Dresden through Saxony and Bohemia. The development of the trade of the E. was long checked by oppressive tolls and imposts. The Elbe Navigation Act of 25th June, 1821, greatly relaxed these. Other ameliorations followed, till at length, 1st July, 1871, all existing tolls were abolished.

El'berfeld, a town in the circle of Düsseldorf, Rheinland, Prussia, on the Wupper, a little to the S.W. of Barmen, and 30 miles S.S.W. of Köln by railway. It is one of the principal manufacturing towns in Europe, and has a beautiful town-hall, an academy of design, one Roman Catholic, and four large Protestant churches, &c. Its chief manufactures are European and Asiatic silks, half-silk fabrics, ribbons, cottons, linens, carpets, india-rubber, cloths, paperhangings, patent leather, buttons, chemicals, machinery, pianofortes, and organs. It is celebrated for the tint and permanence of its Turkey-red dye. There are numerous weaving and spinning factories, with steam-engines, mechanical looms, and hand and power looms, employing some 10,000 men and 3000 women, and producing goods to the value of about £2,000,000 yearly. In addition, there are dye-works, large cotton-printing establishments, extensive bleaching-fields, machine factories, other metal works, breweries, brandy distilleries, &c. Many French artists are here employed as pattern-designers. E. is the seat of several large commercial companies. Pop. 125,899.

Elbeuf, or **Elbœuf** ('new town,' from Fr. *bœuf*, 'a dwelling,' from the Norse *by* or *biggen*), a town in the department of Seine-Inférieure, France, on the left bank of the Seine, 75 miles N.W. of Paris by railway. It has been noted since the 16th c. for its manufactures, which are now in a more flourishing state than ever, embracing the production of double-milled cloths, woollens, waterproofs, flannels, billiard-table covers, &c. Its chief buildings are the churches of St. Etienne and St. Jean Baptiste, both of which have beautiful stained-glass windows. E. has an active river trade with Paris, Rouen, and Havre. Pop. of commune, 21,404.

El'bing, a town in W. Prussia, on a navigable river of the same name, 3 miles S. of its entrance into the Haff, and 35 E.S.E. of Danzig by railway. It is modern in appearance, and has ten Protestant churches, a Roman Catholic church, a synagogue, a gymnasium (since 1536), a public library of 28,500 vols., and an institution (*Cowlesche Stiftung*), founded by Cowle, an Englishman, for the upbringing of 400 poor children. Its manufactures are cottons, linens, hosiery, colours, leather, tobacco, beer, chemicals, gold and silver wares, and there are also several large works for the production of machinery and locomotive engines. The exports by water are chiefly wheat, rye, oats, and timber. Kahlberg, a beautiful bathing place, on the Neerung, is the great summer resort of the Elbingers. E. was founded by Hermann Balk, a German knight, together with colonists from Lübeck, in 1237. It was an important member of the Hanse League, and became Prussian in 1772. Pop. 41,576.

El'bow. This is formed by the junction of the lower end of the humerus with the upper ends of the radius and ulna. See ARM.

Elburz', a lofty mountain range, extending along the whole southern shore of the Caspian Sea in the Persian provinces of Ghilan, Mazandarin, and Dahistan. The highest summit is believed to be Demavend (q.v.). Elburz or Elbruz is also the name of the highest summit of the Caucasus (q.v.) range.

El'che (anc. *Illici* or *Elice*, Basque *illia*, 'a town,' 'the town on the hill'), an interesting old town of Spain, in Valencia, 16 miles S.S.W. of Alicante, in a sterile, hilly district, surrounded by a plantation of about 70,000 palm-trees, which lends to the place the appearance of an African oasis, and which is itself surrounded by maize-fields, and by plantations of olive and carob trees. Pop. 22,703, who manufacture leather, and carry on a good trade in dates and blanched palm-leaves for processions. To the west of E. is the town of Crevillente (pop. 8016), with many tanks and subterranean aqueducts of Moorish construction.

Elch'ingen, a village of Germany, Bavaria, on the left bank of the Danube, 8 miles below Ulm, and the seat of a once famous Benedictine abbey. Near this spot on the 13th October, 1805, the Austrians were defeated by the French under Ney, upon whom the title of Duke of E. was afterwards conferred.

El'cho, Lord, the Right Hon. Francis Wemyss-Charteris-Douglas, eldest son of the eighth Earl of Wemyss, was born 4th August, 1818, and was educated at

Eton and Christ Church, Oxford, where he graduated in 1841. In the same year he entered Parliament as representative of East Gloucestershire, attaching himself to the party of Sir Robert Peel. Having become a convert to free-trade principles, he resigned East Gloucestershire in 1846, but in the following year was returned as a 'Liberal Conservative' for Haddingtonshire, where his family have great local influence. He continued to represent the same constituency till 1883, when he was elevated to the House of Lords on the death of his father. He has not at any period of his career taken a foremost place in the great political movements of his time. He has, however, identified himself with, and laboured with praiseworthy devotion in the furtherance of, some of the most urgent social questions of the age. He may be said to have created the volunteer movement in 1859, and has assiduously laboured for the efficiency of this arm of the national service. He succeeded his father as Earl of Wemyss and March in 1883. His son (the present Lord E.), born in 1857, represented Haddingtonshire (1883-85), and Ipswich (1886-95).

El'der, literally one of the older men, who in ancient times were naturally appointed to public offices requiring wisdom and experience, was afterwards a person, of whatever age, who held such an office (Gen. l. 7). It was to the elders of Israel that Moses declared his commission (Exod. xii. 21). Seventy were chosen, along with Aaron, Nadab, and Abihu, to attend Moses on Mount Sinai (Exod. xxiv.); and other seventy were appointed to help him as judges (Num. xi.). When the nation was settled in Canaan, the elders administered the law in the cities (Deut. xix. 12); and the office continued under the judges (Judges ii. 7), the kings (1 Sam. xxx. 26, 1 Chron. xxi. 16), the captivity (Ezra x. 14), and after the restoration (Ezra v. 5, vi. 14). Under the Maccabees, at which time, probably, the Sanhedrim (q.v.) was instituted, they are still mentioned as a separated class (1 Macc. vii. 33). In the time of Christ they are mentioned along with the scribes, chief priests, and council as one of the classes from which the Sanhedrim was chosen; see Luke xxii. 66, in which passage they are spoken of as a body—*presbutĕrion.* An E. in the Christian Church, into which the title and office were adopted, was a kind of overseer, whose duties were to preach (Titus i. 9) and visit the sick (James v. 14). The order even included the apostles (1 Tim. iv. 14, 2 Tim. i. 6, 2 John 1, 3 John 1), although elsewhere the apostles are distinguished from them (Acts xv. 6). (See BISHOP.) Elders are also lay officials in Presbyterian churches who act with the presbyters or ministers in the administration of Church discipline and government, having an equal vote with the latter in all Church courts. They are sometimes called *ruling* elders, as distinguished from the *teaching* elders or pastors, as the name, which is a translation of the Gr. *presbuteros*, belongs more properly to the latter than to the former. In the Church of Scotland, the duties of an E., as specified in the *Buik of the Polecie of the Kirk*, ratified at the Assembly of Glasgow, 1581, are as follow:—(1) To watch diligently upon the flock committed to their care, both publicly and privately, that no corruption of religion or manners enter therein. (2) To be careful in seeking the fruit of the seed (of the Word) sown among the people by the pastors and doctors. (3) To assist the pastors in examination of them that come to the Lord's table, and in visiting the sick. (4) To cause the Acts of the Assembly to be put in execution. (5) To be diligent in admonishing all men of their duty, according to the rule of the gospel. (6) To bring things that cannot be corrected by private admonition before the eldership (kirk-session). (7) Their principal office is to hold assemblies with the pastors and doctors, for establishment of good order and execution of discipline. See *Autobiography and Diary of James Melvill.*

Elder, a genus of Exogenous plants, belonging to the natural order *Caprifoliaceæ*, or 'honeysuckles.' The species of E. are small trees or shrubs, with pinnate leaves, and small flowers, arranged in umbellate and racemose cymes, the corolla being wheel-shaped and five-cleft, whilst the pistil has the ovary partly adherent to the calyx, and possesses three stigmata on the ovary. The fruit is a berry. The common E. is a well-known shrub, the young wood of which contains a large amount of soft or cellular pith. It occurs in Europe, N. Asia, and N. Africa, and is found equally at home under a tropic sun and an arctic cold. The flowers yield a volatile oil, and the berries are used in making 'E.-flower wine.' Both leaves and inner bark have a purgative action. The flowers also yield a distilled water used in perfume-making and also in confectionery, and known as 'E.-flower water.' E.-flower wine is made in England chiefly at Christmas-time, the berries being gathered mostly in Kent, where there are large plantations of E.-trees. The old wood of E. is hard, and used for making parts of fishing-rods and other instruments. The younger wood is easily wrought, and is used in the manufacture of toys. Other species of E. are the scarlet-berried E. of S. Europe and Siberia, the juice of whose berries possesses narcotic properties. The dwarf E. furnishes a purgative from its inner bark, and its flowers are employed in making E.-flower water. The latter is made by adding 2 gallons of water and 3 oz. rectified spirits to 10 lbs. of E.-flowers. About 1 gallon of E.-flower water is distilled from these ingredients.

El'don, Baron, John Scott, an eminent English lawyer, was born 4th July, 1751, at Newcastle-upon-Tyne. His father, William Scott, was a humble man, who at various times was a coal-dealer and a public-house keeper, and made so much money by speculation, that he was able to give his sons, William (afterwards Baron Stowell) and John, a good university education. John was trained at Newcastle and University College, where he gained a fellowship. The most remarkable event in his college career, however, was his elopement with Miss Elizabeth Surtees, a Newcastle lady, and their marriage at Blackshiels in Scotland, 19th November, 1772. 'Bessy,' as Scott always called her, proved to be an excellent wife, and nothing could equal his affection for her. At first, owing to the dislike shown to the marriage by 'Bessy's' relatives, the pair were in straitened circumstances, and Scott abandoned his study for the Church (for which he was originally educated) for the study of law, and was called to the bar in 1776. By his extraordinary perseverance and industry, and aided by help from his own and his wife's relatives, with the latter of whom he had become reconciled, he acquired in 1787 a great practice at the equity bar. He entered Parliament, and his promotion under the auspices of Pitt was very rapid. He filled in succession the posts of Solicitor-General and Attorney-General, and Chief Justice of the Court of Common Pleas. Finally, in 1801, as Baron E., he became Lord Chancellor, an office which he held till 1827 in the Addington, Pitt, and Liverpool administrations. In 1821 E. was made an earl, and did not retire from public life till 1835. His wife died in 1831, and he himself followed her, 3rd January, 1838, leaving a large fortune. E. was a man of sagacious, astute, and vigorous intellect. He was not a wise or deep thinker. He had no living grasp of moral principle, but he knew thoroughly what would work for the time; and therefore, in spite of an absence of any strong convictions, theological or political, he was a determined opponent of parliamentary reform and Catholic emancipation. With the public and in society he was extremely popular through a certain charm of manner; and although he could not write grammatically, his judgments are still greatly valued. See Lord Campbell's *Lives of the Chancellors*, and Twiss's *Life of Lord E.*

El Dora'do (Sp. 'the golden or gilded land,' from the Lat. *aurum*, 'gold'), an imaginary region in America, supposed to lie between the Orinoco and the Amazon, whose riches were believed to eclipse the treasures of Mexico and Peru. Its capital, Manoa, was said to be partly built of gold, and to stand on a great lake with golden sands, called Parima. The whole country was believed to glitter with veins of gold. Humboldt found a belief in E. D. among the tribes of the Upper Orinoco, and describes a Lake Parima whose rocks of sparkling mica-slate may have given rise to the story. Francisco Orellana, one of Pizarro's companions, descended the Amazon to the sea in search of E. D., and spread a belief in it through Spain, where men became seized with a mania to find the fabulous city. Numerous expeditions sought it, one party setting out as late as the year 1770. Walter Raleigh made his ill-starred expedition to Guiana in the hopes of reaching this Utopia, which was as imaginary as the Greek Hesperides. The name is now applied to an auriferous district in N.E. California.

Eleat′ic School, derived its name from Elea, on the W. coast of Lower Italy, where its founder, Xenophanes, of Colophon, settled about 560 B.C. It included Parmenides, Zeno, Melissus, and to some extent, Empedocles. Before them the two great Greek schools had been (1) the Ionian, or physiological, which explained the production of the world from a primitive substance, such as air or water; and (2) the Pythagorean, or mathematical, which asserted that number, with its two elements, odd and even, combining in unity, was the true cause or principle of all particular existences. The Eleatic criticism on this was that 'out of non-being being cannot come,' and that 'non-being cannot exist.' If, then, being existed, it must embrace all existence. The dependence of real things was assumed to be not only rational (in the sense of corresponding to the general notions formed by the human mind), but even verbal, for the Greeks were then unacquainted with foreign languages, and confounded Greek thought with human. The Eleatics, therefore, resorted to the most abstract and elementary concept—God or the All, the one self-existent, eternal, intelligent, immoveable being, not a person distinct from the created world, but underlying and interpenetrating the world and all possible worlds as their true substance and life. The dogma of the system was elaborated by Parmenides. He distinguished between truth, or ideas obtained by the intelligence, and opinions, or ideas obtained by the senses, and therefore modified by organization. The Eleatic is the great type of consistent Pantheism.

Elecampane.

El′ecampane, a genus and species of Composite plants, of an aromatic kind, and which possesses tonic and diuretic properties. It is not common in Britain, but occurs in marshy spots in S. Europe. The root is the valued part of the plant, and seems to depend for its properties on the possession of a starchy principle named *Inuline*. The E. belongs to the *Corymbiferæ* or chamomile section of the *Compositæ*, in which the florets of each flowerhead are similar and usually tubular.

Elec′tion, the Doctrine of, was developed from the apostle Paul's view of the relation to each other of the two great divisions of mankind, the Jews and the Gentiles. In the Epistle to the Romans he seeks to explain a material and historical fact, to wit, the repugnance of the majority of the Jews to the gospel, a repugnance which would deprive them of the advantages anciently promised to them, and in a manner give the lie to God, who had promised them salvation. But this partial hardening of Israel, which, as revealed by the fact, entered into the secret counsels of God, was destined to become the occasion of the conversion of the Gentiles. When these should be brought in, then all Israel would also be saved. Meantime individual Jews were sacrificed to the great designs of God, but what were these in comparison? (Rom. ix. 20-24). Judaism in the time of the apostle proclaimed the E. of the Jews and the reprobation of the Gentiles. To oppose this notion, St. Paul, in his illustration of Jacob and Esau (Rom. ix.), insisted on this, that Jacob was elected without his merit in order to make the Jews feel that their national privileges would not necessarily make them partakers of the true grace of God, far less give them a monopoly of it. And in following out this idea to its last consequences, he had to set forth that reprobation arose, not from demerit, but from the free will of God. Augustine applied this conception purely to individuals, and made the decree of God unconditional, or entirely independent of the human will. His theory differed from all previous views in respect of the imputation of Original Sin (q.v.), concerning which he held that the will of the natural man is only *free* to do evil, his opponent Pelagius holding that man, though needing the aid of the grace of God, has the power of choosing between good and evil. In the Scholastic period the Pelagian controversy was revived between the Thomists (q.v.) and the Scotists (q.v.). After the Reformation, Roman Catholics, Arminians, and especially Socinians, endeavoured to reconcile the divine decrees with human liberty. Calvinists and Lutherans denied all co-operation on the part of man, although the latter restrict predestination to the elect, and the former in general assert the freedom of the will. See Hodge's *Systematic Theology*.

Election, in law. In England, one is said to have an E. when he has two or more alternatives, but having made his choice, he is bound by it, and may not act inconsistently. For Scotch law see APPROBATE and REPROBATE.

Election Laws, Parliamentary.—Procedure at an E. is regulated by several statutes, viz., the Reform Act of 1832, the Representation of the People Act of 1867, the Ballot Act of 1872, the Representation of the People of the United Kingdom Act of 1884, and the Redistribution of Seats Act of 1885. The most important of these is the Ballot Act, by which secret voting was for the first time introduced into municipal and parliamentary elections in the United Kingdom. The Act makes provisions for the time and place of elections, for the nomination of candidates, for the form and official marking of the ballot paper, for the sealing of the ballot boxes at the close of the E., and for opening and counting the votes, in presence, if desired, of the agents of the candidates. This Act also defines *treating* to be the candidate or his agent paying or being accessory to paying for any meat, drink, or entertainment to any one, to influence his vote. *Undue influence* is defined to be threats of any force, violence, or restraint, or any abduction or fraudulent device by which the exercise of the electoral franchise is impeded or prevented. These offences are punishable by fine or imprisonment, and votes so influenced are void. By the Acts of 1884 and 1885 further restrictions were passed against bribery; the expenses of candidates were defined and greatly reduced. See BRIBERY.

Election of Scottish Peers.—The sixteen representative peers must be elected from the Scottish peerage. No British peer created since the Union has a title to vote or to be elected; and in the case of the Duke of Queensberry, which occurred immediately after the Union, it was resolved in the House of Lords that a Scotch nobleman created a British peer subsequent to the Union was not entitled to vote in the election of representative peers; and in the case of the Duke of Hamilton, in 1711, it was determined that a Scottish nobleman created a British peer after the Union was not entitled to sit in the British House of Lords. (See statute 6 Anne c. 23.) These resolutions were, however, subsequently reversed. (See statutes 10 and 11 Vict. c. 52, 14 and 15 Vict. c. 87, and 15 and 16 Vict. c. 35.) When a new Parliament is summoned, the peers of Scotland are called by proclamation to meet and elect their representatives, who, of course, do not retain their seats beyond the life of that particular Parliament. The E. takes place at the palace of Holyrood. The court of review in all questions connected with the representation of the peerage of Scotland is the House of Lords.

Elections, Parish.—At the E. of guardians and all other elections, the votes are to be taken in *writing*, and the rights of voting in owners and ratepayers are assimilated by 7 and 8 Vict. c. 101. Besides this statute there are others, as well as the Election of Guardians Consolidated Order of 1877, which deal with the same matter. A plurality of votes is allowed;

thus, if rated at less than £50, one vote; between £50 and £100, two votes; between £100 and £150, three votes; between £150 and £200, four votes; between £200 and £250, five votes; and if it amount to or exceed £250, six votes. When a person is owner and occupier, he may vote in both capacities.

Elec'tors (Ger. *kurfürsten*, from *kur* (obsolete), 'an elector,' and *fürst*, 'a prince') were at first in Germany seven great feudatories—the King of Bohemia, the Duke of Saxony, the Markgraf of Brandenburg, the Count-Palatine of the Rhine, and the Archbishops of Trier, Mainz and Köln—who were intrusted to choose the mediæval Roman emperors. The office of Cæsar was in theory open to every baptized man above the rank of a serf, but became bound up with the German kingdom, which was thus likewise rendered elective, after the accession of Konrad I., in 911. The place of election was Frankfurt-on-the-Main, and vote could be given by deputy. The E. were entitled to hold the chief offices under the emperor, to possess the royal dignities except the title of majesty, to retain several electorates at once, to obtain new allodial estates and imperial fiefs without special permission, and to form a distinct college in the diets. Their choice was commonly the heir or a relative of the late emperor, and was generally bought by large concessions, especially if they made an emperor's son King of the Romans in his father's lifetime. In 1648 an eighth elector was added; in 1692 the Duke of Braunschweig-Lüneburg received the dignity; and in 1803 the electorates of Würtemburg, Baden, Hesse-Cassel, and Salzburg were added, and those of Mainz and Trier set aside. The office was abolished in 1806, but the title elector was held by the Elector of Hesse-Cassel till 1866.

Electors, Qualifications of. Parliamentary Electors may be divided into (1) County Electors; (2) Borough Electors, and (3) Electors for the Universities.

(1) A person may claim to be entitled to the county franchise either as owner or occupier—as *owner* of freehold, copyhold, or leasehold; or, as *occupier* of lands and tenements, payer of rates and (sometimes) resident. Such a *freeholder* must be one of inheritance of an estate of the value of 40s. per annum; or must be a freeholder not of inheritance but for life or lives, where the clear annual value above all charges is not less than £5, or if he be an actual and *bonâ fide* occupier of the same, or if he be a possessor of the same through devise, promotion, or marriage settlement. Such a *copyholder* must be a possessor of lands, for one life or any larger estate, where the clear annual value above all charges is not less than £5, and of which he has been in actual possession, or of which he has received the rents and profits during six calendar months next previous to the 15th July in the year in which he claims, unless he has become owner within that period through devise, promotion, or marriage settlement. Neither freeholder nor copyholder can vote for the county where his estate entitles him to vote for a borough. Such a *leaseholder* must be a lessee, or an assignee, or a sub-lessee of any lands of any tenure, originally of a term of not less than 60 years, where the clear annual value above all charges is not less than £5—or a lessee, assignee, or sub-lessee of any lands of any tenure, originally of a term of not less than 20 years, where the clear annual value above all charges is not less than £50. Actual possession of premises or receipt of rent and profits for his own use for twelve calendar months next previous to the 15th July in the year in which he claims. Such an *occupier* must be on the 15th July in any year, and must have been during twelve months next previous to the same 15th July, an occupier as owner or tenant of some land or tenement within the county where the clear annual value is not less than £10, and must have been rated and have paid his poor rate during that period or someone else must have paid it for him.

The owner or tenant of some dwelling house may be entitled to the county franchise as an *inhabitant occupier*, provided he has not been absent from, or has not let to another person, the house for which he claims, and has been rated and has paid his poor rate on or before 20th July, which has been due in respect of his premises up to the preceding 5th January. Joint occupiers may claim under the £10 qualification. A *lodger* may also be entitled to the county franchise when he has occupied, separately as a lodger, lodgings within the county for the whole of the twelve months next previous to the 15th July in the year in which he claims, and provided he has not been absent more than four months during that period and then only on duty in connection with any office or employment taken by him, and provided the clear annual value of the lodgings, if let unfurnished, is of £10 or upwards.

(2) A person may claim to be entitled to the borough franchise either as a £10 occupier; or as a householder; or as a lodger; or as a freehold tenant of a city or town which is a county in itself, or as a freeman and liveryman of the City of London, or a freeman or burgess in a city or borough other than the City of London. Such a £10 *occupier* must have occupied, as *owner* or *tenant*, land or tenement within the borough where the clear annual value is not less than £10, and where he has resided, or within seven miles of it, during six months next previous to the 5th July in the year in which he claims (four months' absence allowed on duty) and provided he has been rated and paid his poor rate for the twelve months next previous to the 5th July in the year in which he claims, and assessed taxes, due before the 5th January, on or before the 20th July. Such a *householder* must be on the 15th July in the year in which he claims, and must have been during the twelve months (four months' absence on business allowed) next previous to that 15th July, an *inhabitant occupier*, as *owner* or *tenant* of some dwelling house or part of such separately occupied within the borough, provided he has been rated and paid his poor rate (for twelve months next previous to the 5th January) on or before the 20th July. Household franchise in counties and boroughs are now the same under the Act of 1884. Such a *lodger* must have occupied separately as a lodger, during the twelve months next previous to 15th July in the year in which he claims, *lodgings*, part of a dwelling house within the borough, where the clear annual value, if let unfurnished, is of £10 or upwards. He is allowed four months' absence on business. The county and borough lodger franchise are now the same under the Act of 1884.

(3) A person may claim to be entitled to the University franchise—at *Oxford*, as a *member of Convocation, i.e.*, Chancellor, Vice-Chancellor, Doctor of Divinity, Civil Law, Medicine, or Master of Arts, having his name on the books of a College or Hall—at *Cambridge*, as a *member of the Senate, i.e.*, Chancellor, Vice-Chancellor, Doctor of Divinity, Science, Law, Medicine, Letters, Bachelor of Divinity, Master of Arts, Law, Surgery, having his name on the Register—at *London*, as a *member of Convocation, i.e.*, being a person on the register of graduates, of full age, and not legally incapable—at *Dublin*, as a Fellow, Scholar, or Full-Graduate *on the books*.

Electric Bell consists of a hammer, which, being moved backward and forward by an electro-magnet that alternately attracts it and releases it, strikes a bell. A current is provided by a battery of one or two Leclanché cells placed on the circuit. There is a *push* piece which on being pressed completes the circuit. Then the current flows along and round the electro-magnet, which thereupon attracts the soft iron placed upon the lever, at the other end of which is the hammer. The current passes through the lever and leaves it where a spring tipped with platinum has rested against the platinum end of a screw; a wire connects this screw with the zinc pole of the battery. When the lever is attracted the circuit is broken, because the spring ceases to be in contact with the screw, and the current no longer flowing, the electro-magnet no longer attracts the armature, whereupon the lever and hammer resume their former positions, contact is re-established, and the hammer is again attracted.

Elec'tric Clock is a timepiece whose direct motive power is electricity. The name is, however, frequently applied to an ordinary clock which is regulated by electric currents transmitted at intervals from a standard clock. As examples of purely electric clocks we may mention those of Alexander Bain (of Edinburgh) and C. Shepherd (of London). About

1843, Bain, availing himself of Œrsted's discovery of the action upon a magnet of a continuous electric current, invented an electro-magnetic pendulum, and employed it to drive a clock-train. The bob of this pendulum consists of a hollow coil of insulated wire, whose terminals are connected with two insulated springs fixed at the point of suspension of the pendulum. The N. poles of the two permanent bar-magnets project, one at each side, into the horizontal bore of the coil, and over them the pendulum oscillates freely. When the coil is traversed by a current, it becomes magnetised, and is repelled by the one bar-magnet and attracted by the other, the pendulum thus marking one half oscillation. By this motion the current is broken by a sliding bar moved by the pendulum, and the bob returns through the action of gravity. Its momentum carries it and the slider sufficiently far so as to complete the circuit and remagnetise the coil, and thus the oscillation is maintained and the clock-train driven in the usual manner. In Shepherd's E. C. an ordinary pendulum is maintained in vibration by the constant impact of a small weight. An armature of soft iron, movable on a pivot, is raised at every right-hand oscillation of the pendulum by an electro-magnet, and the armature transmits its motion by levers to the weighted arm, which on the breaking of the circuit is retained by a detent. The left-hand oscillation of the pendulum releases the weight, and in falling it gives a steady impulse to the pendulum. The wheelwork and hands are propelled by distinct electric currents, whose circuits are completed by the pendulum touching contact springs. Powerful batteries are required for Shepherd's E. C., and these call for much attention. As a timekeeper it surpasses Bain's, but experience has proved that in all clocks propelled directly by electricity, without the intervention of a regulating clock, there abides an element of uncertainty of action that is unsatisfactory, and that has influenced their rare adoption. Much greater success has attended the application of electricity to regulate ordinary clocks, and to keep them in perfect accord with a standard clock. This is accomplished by the transmission at regular intervals of an electric current from the standard clock to the pendulum of the subsidiary clock, which is thereby retarded or accelerated as the case may be, and made to beat second for second with the standard clock. Any number of secondary clocks may thus be controlled by a standard clock. The controlling system of Jones (of Chester), in which a modification of Bain's pendulum is employed, has been in successful operation in many towns of the United Kingdom since 1857. It is on this principle that the great national regulating system is worked. The standard clock at Greenwich, which itself is regulated by astronomical observation, is connected with one or more clocks in all the larger and more important towns throughout the country, and by a very perfect combination of batteries, relays, and electro-magnets retards and accelerates these as the case may be, and fires time-guns at certain hours.

Electric Fishes. See Electricity, Animal.

Electric Light. The energy lost by a current in overcoming the resistance of the circuit is transformed into heat. By proper adjustment the heat so generated at one part of the circuit may be made so great as to cause the material there to glow. All forms of E. L. depend on this principle. In Swan's, Edison's, Lane-Fox's, Crooke's, and Maxim's so-called *incandescent* lights, the current traverses a very thin filament of carbon, which is enclosed in a hermetically sealed vacuum globe, so as to prevent rapid dissipation. In all forms of the *arc-light*, again, it is the air that acts as the highly resisting part. The circuit is completed by bringing into contact and then separating two carbon points, when an intense light at once springs into existence, provided the current is strong enough. The expense involved in keeping a sufficient number of galvanic cells in good order long hindered the practical application of electric lighting; but with the improvement in magneto-electric machines, such as the Gramme, the Siemens, the Brush, &c., a new era began, and already the E. L. has been most successfully applied to the lighting of streets, railway stations, lighthouses, theatres, large halls, steamers, railway trains, private houses, &c. These machines must be driven by a steam or gas engine, so as to attain a rapidity of motion sufficient to give a strong current. To describe all the forms of E. L. now in use would be impossible here. Some, however, merit mention. Thus in Jablochkoff's electric candle the carbons are set in side by side, being separated by a thin non-conducting strip. As the anode always wears away faster than the kathode, this form of light requires an alternating current, so that both carbons burn down at the same rate. The Brush Light, the Siemens, the Serrin, the Jamin, and others, are all of one type, in which the carbons are adjusted in the same vertical line, and are kept in position by a special mechanical device. By an Act of 1888 powers were given for the electric lighting of the metropolis and large towns in the provinces. At present the Houses of Parliament, the reading-room of the British Museum, most of the theatres, many of the large business houses, public institutions, railway termini, residences, and a few of the main thoroughfares in some towns both in this and other countries, are lighted by electricity. In the Faure Accumulator and other improved forms of Plante's secondary or storage battery, an important step towards the problem of storing electricity for future use has been taken. At the present time (1895) there are 105 E. L. works in operation in the United Kingdom, which represent at least 88,000 horse power.

Electric Railway. See Railways.

Electric Telegraph. See Telegraph.

Electric Telephone. In 1861 Reiss succeeded in transmitting sounds electrically and through an imperfect telephone conveyed musical tones, &c. In this telephone a thin strip of elastic platinum was attached to a tympanum, which acted as a contact-breaker, and was so framed as to take up sound-vibrations. The strip of platinum at each vibration made or broke contact, partly or entirely, as it beat against the tip of a wire of platinum—the current proceeding from a battery connected with the tympanum. The receiver was an iron wire secured to a sounding board and encircled by coiled insulated wire, part of the circuit. Now, because the pitch of a note depends on the quick repetition of vibrations, the pitch of a musical note despatched from the transmitter was reproduced by the iron core as it was magnetised and demagnetised rapidly. Also when the vibrations were caused only by speech, a good transmitter effected a reproduction of the speech at the farther end, yet rather imperfectly, when the contacts of the parts were light and the speech was loud. Later, Reiss invented another receiver consisting of an electro-magnet and an iron armature which became attracted by the former and thus vibrated under the continually interrupted current. In 1876, the magneto-telephone was invented by Graham Bell. By this instrument the vibrations of a thin plate of iron, caused by a person speaking to it, are transmitted by electric current and identically to a similar instrument at the farther end, which sends forth sounds identical to those produced by the speaker. No battery is required, as the transmitter is so formed that it generates the induced currents. In Edison's telephone the vibrations of a voice, actuating a diaphragm of mica, cause it to compress a button of prepared lamp-black placed in the circuit. The varying pressures make the button offer a varying resistance to the current flowing from a battery also in the circuit. In this way the strength of the current is varied which is received in an electro-magnetic receiver and there produces corresponding vibrations. Edison discovered that the friction becomes lessened on the passage of a current between them, if a platinum point be allowed to press against a rotating cylinder of moist chalk; and also that an elastic disk is thrown into vibrations which correspond to the fluctuating currents, flowing from the speaker's transmitting instrument, if the platinum point be attached to the disk. By application of these facts, Edison has invented a telephone receiver of peculiar power. Varley and Dolbear have succeeded in inventing telephone receivers, where the production of sounds is promoted by the attraction between the oppositely-electrified armatures of a condenser.

Electri′city. Among the ancients, the properties possessed by certain bodies, when rubbed, of attracting small pieces of light material was generally known. The phenomenon obtained its name from the substance by which it was first observed, *elektron*, or amber; but it is now recognised that every kind of matter is similarly affected, that friction is always attended with the production of E., but that, in many instances, the peculiar molecular condition which constitutes the electrified state is so speedily lost that all trace of electrification is gone before there is time to make the necessary search. Viewed as an exact science, E. is appropriately termed *electrodynamics*, which naturally divides into *electrostatics* and *electrokinetics*. The former treats of E. in equilibrium, and discusses all phenomena which are usually included under the name *frictional E.*; and the latter treats of E. in motion, and is synonymous with the term *galvanism*.

Electrostatics.—The first thing to be considered is *electrification*, and this may be effected in several ways, as shown by the following experiments (see Thomson's *Electrostatics and Magnetism*, and Maxwell's *Electricity and Magnetism*):—*Experiment I.*—Take a piece of glass and a piece of resin, neither of which exhibits any electrical phenomena; rub them together and then separate them. They will be found to attract each other. Take another pair, treat them similarly, and suspend them so as to have as free motion as possible in azimuth. It may then be observed—

1. That the two pieces of glass repel each other.
2. That each piece of glass attracts each piece of resin.
3. That the two pieces of resin repel each other.

Bodies which exhibit these phenomena are said to be *electrified*; and those which, like the glass, repel the glass and attract the resin are vitreously or *positively* electrified, while those which attract the glass and repel the resin are resinously or *negatively* electrified. The indication of these two kinds of E. by opposite signs is very appropriate, but the application of the positive sign to one rather than to the other is purely arbitrary. Electrified bodies always act upon each other in accordance with the law indicated above, that like kinds repel each other, unlike kinds attract. If a small light pith ball be suspended by means of a silk thread, it may be electrified by contact with either the glass or the resin, and may then be employed as an electroscope, or instrument for showing the kind of E. with which a given body is charged. *Experiment II.*—Suspend by a silk thread from the lid of an unelectrified metallic vessel, also suspended by means of silk threads, an electrified piece of glass, so as to hang freely in the inside of the vessel without touching it; then it may be shown that the outside of the metallic vessel is vitreously electrified, and that the electrification at any point is quite independent of the position of the glass in the interior, and disappears if the glass be removed without touching. The outside vessel in this case is electrified by *induction*. No force, either of attraction or repulsion, can exist between an electrified body and a body not electrified; and hence when bodies not previously electrified are acted upon by an electrified body, it is because they have become electrified by induction. If the glass had been suspended outside the vessel instead of inside, inductive effects would have been apparent; but in this case the outside surface nearer the glass would have been resinously electrified, and the further portion of the surface vitreously electrified; whereas in the original case the whole exterior was charged with vitreous, and the whole interior with resinous, E. *Experiment III.*—Let things be as in Experiment II., but further let a second metallic body be suspended by silk threads near the first. Bring now a metal wire similarly suspended, so as to touch simultaneously the exterior surfaces of the two bodies. The first will then be found to have lost some of its electrification, while the second has become positively electrified—electrified by *conduction*. If a silk thread or a rod of glass or resin had been used instead of the metal wire, no transfer of E. would have occurred. Hence we have two groups into which matter may be divided, *conductors* and *non-conductors* or *insulators*—or, more correctly, good conductors and bad conductors, for all substances resist the passage of E., and all conduct E., though in very different degrees. The metals are good conductors; air, gases generally, resins, glass, rubber, paraffin, silk, &c., are good insulators. If in the above experiment the wire connecting the metallic bodies be removed, and the glass taken out of the vessel without touching it, this vessel will be found to be negatively, while the second body is positively, electrified. If the connection between the bodies be renewed, all electrification will disappear, thus showing that the electrifications are equal and opposite. *Experiment IV.*—Let there be two insulated hollow metallic vessels, A and B, the first as in Experiment II., and the second having the resin, from friction with which the glass was electrified, freely suspended in its interior. The exterior surfaces of A and B will be respectively vitreously and resinously electrified. Connect A and B by means of a metal wire, and all electrification will disappear, thus showing that the charges are equal and opposite. Remove the wire, and take the glass and resin out of their respective vessels; then A will be found to be resinously, and B vitreously, electrified. These charges also are equal and opposite, as may be shown either by reconnecting the bodies with the wire, when all electrification will disappear, or by introducing them both without touching into a large hollow conducting vessel, when no electrification will be apparent in its exterior surface. We may thus charge a vessel with a quantity of E. exactly equal and opposite to that of a given electrified body without diminishing the charge on the latter. *Experiment V.*—Charge the vessel B, as above, with a certain quantity of positive E., which we may call for convenience a unit, and introduce it into the interior of a larger insulated conducting vessel, C. If B be made to touch the inside of C, it will be found upon removal to be completely discharged, while C will be charged, with a unit of positive E. Recharge B, and repeat the same operation (C being still charged), and the charge on C will be doubled. By repetition of this process, C may be charged with any number of units below a certain limit. From this experiment we observe further that electrification exists only at the surface of the conductor; that an uncharged body introduced into the interior of a conductor remains uncharged, and therefore cannot be attracted or repelled by the electrical forces, and that therefore these electrical forces must be in equilibrium at every point in the interior of a conductor.

Since forces of repulsion or attraction exist between electrified bodies according as they are similarly or oppositely charged, the question naturally arises, upon what does the intensity of the force depend? To solve this problem Coulomb invented his Torsion Balance (q.v.), by means of which, from numerous experiments, he established that the force between two electrified bodies was directly proportional to the charges, and inversely proportional to the square of the distance separating them.

When an uncharged conductor is brought near a positively-charged conductor, a negative charge is induced on the nearer surface of the former. As they are brought closer and closer, the inductive action becomes stronger and stronger, and the electric densities of the charges greater and greater, till at last the resultant forces may become so intense as to overcome the insulating power of the air, and give rise to a disruptive discharge through the air between the surfaces. This discharge usually takes the form of a spark, by which almost the whole electrification is discharged at once; but in certain circumstances other forms, such as the electric glow and the electric brush, are produced. The electric glow takes place in the air surrounding a sharp point of an electrified conductor, when by the inductive reaction of another conductor the electric density is increased till it overcome the insulating power of the air. The air in the immediate vicinity of the point becomes really a conductor; but at a certain distance insulation predominates, and here the glow terminates. If the particles of air were stationary, the charge would be retained; but the particles being free to move, are electrified and driven off, and are then replaced by new unelectrified particles. These are, in their turn, electrified and repulsed, chiefly along the line of intensest force, which extends in a direction straight out from the point, and is made evident by the appreciable current of air which exists. This glow may be seen sometimes during a thunderstorm round the extremities of lightning-conductors, whose virtue lies in their pointed character; for the induced E. is so condensed that it draws, as it were, the E. from the clouds by a gradual process, and not by a series of sudden discharges, as would otherwise be the case. The electric brush is produced round a blunt point or small ball, and consists of a succession of discharges, ramifying into the air, and producing a sound whose pitch depends upon the rapidity with which the discharges take place. No current of air, however, accompanies this discharge. When a series of successive discharges has taken place through the air, a peculiar odour may be made sensible. This odour is now known to be due to the formation of ozone, an interesting and in many ways peculiar allotropic form of oxygen.

When two oppositely-charged conductors are separated, an attractive force has to be overcome, and work, therefore, must be done. Accordingly every charged conductor possesses Energy (q.v.) or power of doing work, in virtue of its electrification; and this energy is proportional to the charge multiplied by another quantity which is called the *potential*. Now the energy evidently falls off as the distance from the conductor is increased, and therefore the potential also must diminish, becoming zero at infinity. The potential of a charged conductor at a given point may be defined as the work which must be done to remove unit of negative E. from that point to an infinite distance, supposing the distribution not to be influenced during the operation. Accordingly the work done in removing this unit from one given point to another may be represented by the difference of the potentials at these points. The ratio of the charge on any conductor to its potential is termed the *capacity* of the conductor. This quantity, potential, in electrical science, has exactly the same relation to E. which temperature has to heat, which pressure has to fluid, and is as important in electro-dynamics as these are in their respective sciences of thermo-dynamics and hydro-dynamics. Fluid, heat, and E. all tend to pass from one place to another, if the pressure, temperature, and potential respectively be greater in the first place than in the second; and no such transfer occurs unless such difference exist. The charge on a conductor is numerically equal to the capacity multiplied by the potential; the potential is the charge divided by a distance; and the capacity, therefore, must be of the same dimensions as distance, *i.e.*, linear. Further, the potential at any point due to a system of conductors is the sum of the potentials due to each conductor. When an accumulator, a Leyden jar for instance, has been electrified for some time and then discharged, it is found, for certain dielectrics, to become recharged, and may again be discharged. This recharge, which is always much less than the actual charge, is called the *residual charge*, and upon Faraday's widely-accepted theory of action through a medium is to be referred to the polarization of the dielectric, which constitutes induction, and which is the 'essential function both in the first development and consequent phenomena of electricity.'

Electrokinetics.—The friction of two different substances is always attended with the production of E.; but in certain instances, probably in all, simple contact and separation are sufficient to give rise to a difference of potential. For example, if a disk of copper and a disk of zinc be placed in contact and then separated, the zinc is found to be positively electrified, and the copper negatively. While they are in contact, an electro-motive force, due in some hidden way to the chemical affinity of the substances, seems to act from one to the other so as to produce a difference of potential. This same difference of potential is produced if the contact be made not directly but by means of any metallic connection, provided the system be at a uniform temperature. Thus if a disk of iron be introduced between the zinc and the copper the difference of potential between the terminal pieces will be exactly the same as if simple contact were made without the presence of the iron; and further, this difference is equal to the sum of the difference of potential between the zinc and iron and the iron and copper. Accordingly a circuit formed of a number of different metals at the same temperature will be in electrical equilibrium as soon as each has acquired its proper potential. From such an arrangement a current cannot be obtained. If the junctions, however, be at different temperatures, the contact forces will not generally balance, and, as first discovered by Seebeck, there will result a current whose energy finds its equivalent in the thermal energy expended in rendering the temperature of the circuit unequable. (See THERMO-ELECTRICITY.) If the disks of copper and zinc, after having been placed in contact and separated, are immersed in a compound liquid, they are at once reduced to the same potential. This loss of electrical energy has its equivalent in the work done in decomposing a certain quantity of the liquid. Bring the metals into contact again, and the same set of operations may be repeated. This successive differentiation and equalising of potentials may be made to take place simultaneously by connecting the immersed disks by a metal wire. Let Z be the zinc and C the copper, connected above by a wire, and immersed below in a compound liquid. In virtue of the metallic contact, Z becomes positively and C negatively electrified. In the liquid, however, they are reduced to the same potential, and therefore there must be a passage of E. through the liquid in the direction of the arrow from the place of higher to the place of lower potential, accompanied by a simultaneous flow of E. through the wire from C to Z, in order to restore the difference of potential at the point of contact. This is the fundamental principle of the Voltaic Battery, under which heading a description of the various kinds now in use, and a consideration of the electrolytic processes (see ELECTROLYSIS) which attend their action, will be found. Since the current must set, upon this theory, from the copper to the zinc through the circuit, the copper is termed the anode and the zinc the kathode.

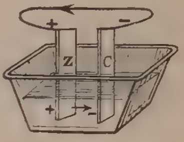


Fig. 1.

If a conductor be connected with the poles of a battery, a current is set up, whose strength is measured by the number of units of E. which pass through every section in the direction between the electrodes in unit time. This current is due to the difference of potentials of the poles, or the electro-motive force of the battery. Now every conductor offers resistance to the passage of a current; and according to the law given by G. S. Ohm in 1827, and known as *Ohm's Law*, this resistance (R) is connected with the electro-motive force (E) and the intensity of the current (I) by the formula $E=RI$, or, the electro-motive force, acting between the extremities of any part of a circuit is the product of the intensity of the current and the resistance of that part of the circuit. The most delicate experiments, of which modern science is capable, fully bear out this law, which offers a method for comparing the resistances of different conductors by observing the different intensities produced for the same electro-motive force. If a number of wires of the same substance, but of different lengths and cross-sections, be taken and compared as to their resistances, it is found that the resistance is directly proportional to the length, and inversely proportional to the cross-section, a relation which has a close analogy in the flow of water through tubes. The current in overcoming this resistance must, in accordance with the conservation of energy, do internal work, and the equivalence of this internal work we find in the heat generated throughout the circuit. Joule, Lenz and Jacobi, and Riess, working independently, established by experiment that the heat developed is proportional to the square of the current; and Joule further, by careful measurement of all the quantities involved, verified the equation, which may be obtained from theoretical considerations, $JH=I^2Rt$, where J is Joule's equivalent, H the heat developed, I the intensity, R the resistance, and t the time during which the current flows.

In making measurements of resistance, it is necessary to have a definite and convenient *unit*. The unit now almost universally employed is that fixed by the British Association in 1863, sometimes called the B. A. Unit, but more commonly an *Ohm*. This unit is professedly a resistance which, expressed as a velocity, is ten millions of mètres per second; but in reality it is the resistance of a wire formed of an alloy of silver and platinum of a definite length and cross-section, and at a certain temperature. From a comparison with this, permanent coils of any number of units of resistance may be formed, and these may then be employed for the determination of any unknown resistance. The determination of resistances can be made by either of two ways, in which the result is independent of the variations of the electro-motive force and internal resistance of the battery. The one method is by means of the differential galvanometer, an instrument which will be described when we come to treat of electro-magnetism; but the most convenient method, for which an ordinary mirror galvanometer is all that is necessary, is by means of an arrangement of conductors known as Wheatstone's Bridge, after the name of the contriver. It consists essentially of six conductors connecting four points.

The resistances of metallic conductors vary considerably, and it is interesting to observe that if the metals be arranged in the order of their electric conductivities, the table agrees exactly with a table drawn up in a similar manner for heat conductivities. Beginning with the best conductor, the following list, according to Regnault, indicates the relative positions of the commoner metals—silver, copper, gold, cadmium, zinc, tin, palladium, iron, lead, platinum, mercury. The resistance is also considerably affected by temperature. In the case of copper, palladium, and platinum, and probably all pure metals except the magnetic ones, the resistance would appear to vary directly as the absolute temperature. From experiments made by Tait and his students it would appear that the rate of increase of resistance of iron with temperature undergoes a peculiar and sudden change at about a dull red-heat—the same temperature at which iron loses its magnetic properties, and at which also the *reglow* during cooling occurs, first observed and described by Barrett. Nickel presents the same peculiarities, but at a much lower temperature. The electric resistance of insulators being so great, is only determinable approximately, and a rise of temperature seems to diminish the resistance. In experimenting, care must be taken that the effects of surface conduction, which is often much greater than true conduction, are thoroughly eliminated. In investigating the resistance of liquids, great difficulty is experienced in overcoming electrolytic action.

In 1820, while lecturing to a few advanced students at Copenhagen, H. C. Œrsted observed that a wire connecting the poles of a voltaic cell affected a magnet in its vicinity. Subsequent experiments showed that the magnet always tends to set itself perpendicular to the direction of the current. To get the direction in which the magnet will turn under the action of the rectilinear current + — (Fig. 2), suppose a person to place himself facing the magnet in the line of direction of current so that the current passes from his feet to his head. The magnet will turn so that the pole which points north will move to the left. A current in the same direction below will turn the magnet round the opposite way; and a current in the opposite direction the same way. Accordingly, if we bring the circuit right round the magnet, as shown in Fig. 3, the effect will be increased. The tangent of the angle through which the magnet turns is directly proportional to the strength of the current; a simple relation which at once suggests an easy method for the measurement of current intensities. By coiling the wire which forms the circuit round several times in succession, each distinct coil being carefully insulated by india-rubber or silk coating from its fellow, the action is rendered more intense. Instruments constructed on this principle are called *galvanometers*. The tangent galvanometer is simply a magnet suspended freely in the centre of a multiple coil over a graduated circle, the numbers on which give at once the tangents of the corresponding angles. The mirror galvanometer is essentially the same instrument, but the magnet is very small, and is fixed to the back of a circular mirror of small mass, which is suspended by a silk fibre in the heart of a compact multiple coil. A beam of light thrown through a small aperture upon the mirror is reflected upon a screen, thus indicating by its position the deflections of the mirror and magnet due to the electric currents through the coil. The distance of the light spot on the screen from the centre or point directly in front of the instrument is really the tangent of *twice* the angle of rotation, for the beam of light is necessarily turned through double the angle which the mirror describes. The differential galvanometer has two independent coils, such that when currents are made to flow in opposite directions they act in opposite directions on the needle, the resultant effect on which may be thus reduced to zero when the currents bear a certain ratio to each other depending upon the resistances in the two circuits. By this means, as mentioned above, resistances of conductors may be compared.

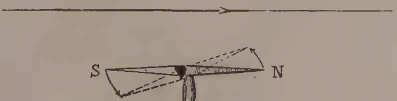


Fig. 2.

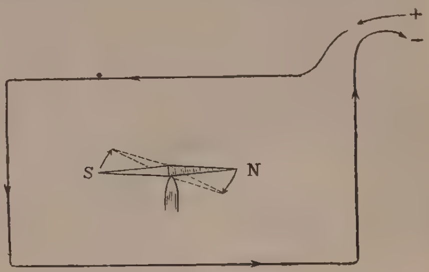


Fig. 3.

Closely connected with the action of a current upon a magnet are the striking discoveries of Ampère regarding the mutual actions of currents. Let there be a given rectilinear current flowing in a given direction, and let a second current be brought near. If the second current be moving in the same direction as the first, it is attracted; if in the opposite direction, it is repelled. If it flows at right angles to the first and away from it, it is urged in the direction of the first current; and if it flows towards the first current, it is urged in the opposite direction. From his investigations on closed circuits, Ampère established four experimental facts, with the aid of which and one assumption he developed his theory of the mutual action of currents. These data are—(1) The reversal of either current reverses the mutual effect. (2) A sinuous current has the same effect as a straight or continuously curved one from which it nowhere deviates much. (3) A conductor traversed by a current, and moveable only in the direction of its length, is not set in motion by a contiguous closed circuit. (4) Equal currents in similar circuits produce equal forces. The one assumption which Ampère made was that the force between two small elements was in the straight line joining their middle points. This assumption cannot be tested experimentally, for it is not possible to form a small current element without at the same time forming a whole circuit. The attractive and repulsive phenomena of currents are very beautifully shown by means of Ampère's *solenoids* of conducting wire, which act in a manner precisely similar to magnets. A solenoid is virtually a helix, but so arranged

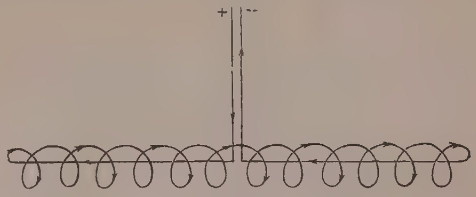


Fig. 4.

that the current passed through it has no resolved effect *along* the axis of the helix. One simple manner of effecting this is shown in Fig. 4, where the current along the rectilinear portions completely neutralises the axially-resolved portion of the current in the helix. Such a system tends, when suspended so as to have freedom of rotatory motion in a horizontal plane, to set itself in the magnetic meridian; and two solenoids show polar attractions and repulsions exactly similar to magnetic phenomena. If a person set himself so as to look directly at one end of a solenoid, the current will appear to be flowing round, say in the positive direction (*i.e.*, opposite to the hands of a watch); if he then similarly regard the other end, the direction of the current will be negative. The former end it is which corresponds to the north pole of a magnet, while the other end acts as a south pole. For convenience we shall call these ends the north and south poles respectively of the solenoid. Let two solenoids (A, B, in Fig. 5) be placed so that the north pole of A faces the south pole of B. That is, when A is looked at from B, the direction of the current through A is positive; and when B is looked at from A, the direction of the current through B is negative. A mere inspection of the figure shows that at every point on the terminal circuit of A, the current flows in the same direction as for the corresponding point of B; and consequently, in accordance with the fundamental law of the mutual action of currents, the solenoids *attract* each other. If two north poles or two south poles had been similarly placed, the solenoids would have been repelled. The special application of these results to the production of *electro-magnets*, and Ampère's ingenious theory of magnetism suggested by these phenomena, are discussed under the article MAGNETISM.

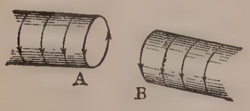


Fig. 5.

Œrsted's discovery of the motive influence of a current upon a magnet, when taken in connection with the principle of the conservation of energy, has been shown by both Thomson and Helmholtz to lead to Faraday's striking discovery of the *induction* of electric currents in a conductor moving relatively to a magnet. (See MAGNETISM.) The mathematical analysis indicates the existence of a new electromotive force, that of the induced current, which always acts opposite to that which has set the magnet in motion, and which, being quite independent of the intensity of the original current, must be produced by the relative motion, even if no such current existed. To the same class of phenomena belongs Arago's discovery of the *damping* effect of a copper plate upon a magnet oscillating over it, in virtue of which the magnet is brought to rest much more rapidly than it would be if no plate were there. The energy of the currents induced on the plate is obtained from the magnet's kinetic energy, which accordingly suffers loss, while the induced currents, in accordance with Œrsted's discovery, react upon the magnet, forcing it round in the direction opposite to that in which it is moving until it comes to rest. These isolated cases remained inexplicable, until the genius of Faraday unravelled the mystery, and established a new and most important branch of electro-kinetics.

Let there be two conducting circuits, known respectively as the *primary* and *secondary*. Let the primary be connected with the poles of a voltaic battery, in such a manner that the current may be produced, maintained, stopped, or reversed at pleasure. In the secondary closed circuit let a galvanometer (sufficiently distant from the primary as to be unaffected by it) be introduced, and then set two rectilinear portions of the circuits beside each other. At the instant of *making* the primary current, the galvanometer needle will be deflected—indicating by its direction that there has been produced in the secondary circuit a current flowing in a direction *opposite* to that of the primary current. Maintain the primary current constant, and the needle returns to its normal position—the secondary current has ceased. *Break* the primary circuit, and at that instant the needle is again deflected, but to the other side—indicating a secondary current in the *same* direction as the primary. Every variation in the primary produces electromotive force in the secondary, generating a current in the same or opposite direction as the primary, according as the intensity of the primary suffers decrease or increase. When there is no variation, there is no electro-motive force. While the primary current is being maintained constant, let it be approached to the secondary circuit. During the approach a secondary current will flow in the *opposite* direction to the primary. If the primary be moved away, there will be a secondary current in the *same* direction as the primary. The same phenomena are observed if the approach and separation be accomplished by the motion of the secondary current. These inductive effects are very closely connected with Ampère's discovery of the mechanical action of currents, as shown by the following law, enunciated by Lenz in 1834:—*If a constant current flows in the primary circuit A, and if, by the motion of A, or of the secondary circuit B, a current is induced in B, the direction of this induced current will be such that, by its electro-magnetic action on A, it tends to oppose the relative motion of the circuits.* This law, established before the modern theory of energy was dreamed of, affords one of the most remarkable confirmations of the conservation principle. The effects of induction by variation of the primary current are increased when the circuits are placed nearer, and the most effective methods of arranging the circuits is by forming them into circular or spiral coils, and packing them as close together as possible. The introduction of an iron rod or bundle of wire into the interior of the coils has a powerful intensifying effect upon the secondary current. The current induced at the *making* of the primary current is found from experiment to be exactly equal and opposite to that induced at the *breaking* of the primary. If the primary, then, be made and broken in rapid alternation, as rapid a succession of direct and inverse secondary currents will be produced. The secondary current further is always more intense than the primary, and sparks of considerable brilliancy can be obtained by breaking at any one point the metallic connection in the secondary circuit. Ruhmkorff's *induction-coil* affords, in this way, beautiful illustrations of transformation of energy. It consists essentially of two coils, the thicker internal one being the primary, and the thinner but longer external one the secondary. Inside the interior of the inner or primary is a bundle of iron wires, terminated at its extremities by disks of soft iron. When a current is passed through the circuit, the iron core becomes an electro-magnet, attracts a small iron disk which forms the extremity of one arm of a lever, whose other extremity is consequently displaced, and by its displacement breaks the primary circuit. The current accordingly ceases to flow, the soft iron core loses its magnetism, and the lever returns to its original position, thus completing the circuit, and permitting the current anew to flow. The same cycle of operations takes place, and thus an automatic or self-governing arrangement is produced, by which the current can be made and broken in rapid succession. But at each *make* and *break* of the primary, the secondary current, rendered the more intense by the presence of the iron core, is induced, and a rapid series of sparks may be obtained between the terminals. The spark may be varied considerably, as regards its luminous and heating powers, by altering the distance between the terminals, or it may be made to traverse the rarified gas of a Geissler tube, and produce beautiful and striking combinations of stratified and coloured lights. When the current in the coil of an electro-magnet is stopped by breaking the contact between the extremities of two wires held one in each hand, a smart shock will be felt. This Faraday showed to be due to the *induction of the current on itself*. Here the inductive action, due to the cessation of the primary current, is exerted on the same conductor which carries the current, and is more powerful than on a neighbouring conductor because the wire is nearer to itself than any other wire can possibly be. The phenomenon is best observed with the coil of an electro-magnet because of the intensifying effect of the iron core; but it takes place on all occasions when a circuit is broken, for the spark which is seen when a break is made in the circuit is due to the more intense secondary current set in operation at the moment the primary is broken.

It is impossible for one to study these varied electric phenomena, static and kinetic, without in some way striving to get a glimpse of their true nature. What is E.? is a question which has existed from earliest historic times, which has occupied the attention of every electrician, and which yet remains unanswered. The consideration of the various theories that have been mooted will naturally come under notice in a brief historical sketch of the progress of the science. In a most valuable and original treatise on the magnet, published by Dr. Gilbert in 1600, we have the first step towards a philosophical combination and generalisation of the phenomena as then known. He showed that electrification can be produced in many other bodies than amber, and is accompanied by the same attractive manifestations in all cases. Boyle, Otto de Guericke, Newton, and other philosophers of that century, contributed several new facts, and the formation of the Royal Society of London roused a somewhat general spirit of inquiry in this direction; but it was not till the present century that the unity, which characterises a true science, came to be recognised in what had previously been regarded as merely isolated phenomena. As early as 1733, however, the elementary facts of frictional E. were known; for in that year Dufay published his theory of two electric fluids, *vitreous* and *resinous*, which permeate matter, and give rise to all the known phenomena of attraction, repulsion, and induction. Matter which showed no electrification was neutral, because the two fluids were present and mixed in equal quantities. Friction was supposed to produce a separation of the electricities in the rubbed bodies; and when any substance, in which the one kind predominated, was brought near the unelectrified body, it separated the electricities in it by repelling to the further side its own kind, and attracting to the nearer side the opposite kind. The assumptions necessary for this hypothesis were the existence of two imponderable fluids, each of which should attract the other and repel itself. In 1752 Benjamin Franklin filled a Leyden jar from the clouds, thus proving the identity of lightning and E., originated the names of *positive* and *negative*, and enunciated his single-fluid theory. This fluid is imponderable, attracts matter, but is self-repellent. Unelectrified matter contains a certain quantity of this fluid; and friction of two substances has the effect of transferring some of the fluid from the one to the other—thus rendering the one positively and the other negatively electrified. A further assumption, however, has to be made, to the effect that particles of matter which do not contain this fluid in sufficient quantity repel one another. At first sight this would seem a serious objection, for what would become of the law of gravitation? But it must be remembered that gravitation exists between non-electrified bodies, *i.e.*, bodies which contain upon this hypothesis just sufficient fluid to counterbalance by its attraction upon the material particles the repulsion existing between them. Every known phenomenon in frictional E. is explained as simply by the one hypothesis as by the other; and the only scientific objection which can be brought against either is that relating to the necessary assumption of an *imponderable*, incompressible fluid, exhibiting attractive and repulsive properties. The nomenclature suggested by these theories still in great part remains, and will always, no doubt, be retained on account of its great convenience. The phrases, transference or passage of E., separation and recombination of the electricities, are continually met with in our modern treatises; but they must not be taken as in any way upholding either of the fluid hypotheses. The great advance made in recent times in electrostatics is the development of the theory of the *potential*. As a mathematical quantity in the theory of attractions it was recognised by Laplace; but its vast importance was only first fully appreciated by George Green in 1828, in his essay *On the Application of Mathematical Analysis to E. and Magnetism*, in which it is called Potential Function. This essay, long unknown, was only brought to light by Sir W. Thomson (Lord Kelvin), after the more important theorems which it contains had been rediscovered independently by himself, Chasles, Sturm, and Gauss. The first-observed phenomenon in contact E. was the peculiar sensation in the tongue, noticed by Sulzer in 1762, when silver and lead were brought into contact with it and each other. In 1791, after careful investigation of the phenomena attending the convulsions of the muscles of a frog when placed in contact with two metals, Galvani laid the foundation of *galvanism* or electrokinetics; and in 1800 Volta published the account of the voltaic pile—a series of disks of zinc and silver, with moistened cardboard between every other pair. Succeeding years were chiefly employed in improving the galvanic battery, till in 1820 Œrsted, by his discovery of the action of a current upon a magnet, laid the foundation of electro-magnetism. Then followed the brilliant researches, experimental and theoretical, of Ampère, which entitle him to the name of the 'Newton of E.' In 1827, Ohm enunciated his law of resistance; and about the same time Faraday began his investigations, establishing the induction of electric currents in a conductor moving relatively to a magnet, in 1831; the law of electrolytic action, in 1834; and the inductive effects of electric currents, in 1835. These brilliant discoveries have resulted in the invention of magneto-electric machines of every description; and have done more to unite electric phenomena into one grand whole, and to demonstrate the high probability of the greatest of modern generalisations, the conservation of energy, than the life-work of any other investigator; while they more than ever tend to raise the question as to the real nature of E. W. Weber, by a very beautiful but in some points objectionable hypothesis, deduced all the known laws of electric action, even to the induction of currents. He supposed that the forces exerted on each other by *moving electric particles* differ from those exerted when they are at rest—that is, their mutual potential energy is a function of their relative velocity. At first sight this would seem to be contrary to the conservation principle; but the formula given by Weber satisfies the necessary mathematical criterion for the existence of a potential, and this is all that is required so as to be consistent with the doctrine of energy. Faraday, in his researches, had always regard to what he called *lines of force* emanating from the conductor in every direction through space. The direction of the line of force passing through a given point represented the direction of the resultant action at that point, so that lines of force are everywhere perpendicular to equipotential surfaces. Thus Faraday looked for the seat of electrical action, not merely in the conductor itself, but also in the surrounding medium. On the same principle, Sir W. Thomson explained the kinetic energy of a current as being not in the matter of the wire itself but in surrounding space, giving rise to a rotatory motion round the lines of force as axes. J. Clerk Maxwell worked up the conception into a complete theory of electrical action. The medium which transmits light and heat is thrown into a state of motion in the neighbourhood of a magnet, as indicated by the effect of magnetism on polarized light. Now, every current is surrounded by lines of magnetic force, so that a certain inertia has to be overcome in starting the current, and a certain momentum must exist in the current when started in virtue of the kinetic energy of the medium. In this inertia and momentum, by the application of Lagrange's dynamical equation to the moving system, Maxwell discovered the known laws of induction and the mechanical action of currents.

It has now been generally recognised that the application of E. as a motive power results in the avoidance of many losses attendant upon the use of steam, compressed air, or hydraulic method. And, besides, whereas in the case of any one of these three a certain proximity of the prime mover to the spot where the power is to be used is absolutely indispensable, with E. no such necessity exists. Thus, at a comparatively great distance the conductor conveys the electric current from the dynamo or generator to the distributor, which disperses it in the various directions required, in such power, that in addition to lighting a district, it will work ventilators, lifts, cranes, pumps, drills, lathes, centrifugals, mining-excavators, turn-tables, traversing-platforms, dock gates, refrigerators, &c. In Mexico, the town of Quadalajara is lighted by means of E. conveyed from a generating station 17 miles distant, on the Rio Grande. Again, by a system of storage, E. will now produce the locomotive power for launches, tram-cars, railway-cars, road vehicles, &c. A launch capable of carrying 60 persons has been successfully propelled by E. alone.

Electricity, Animal. Organised beings, as masses of mere matter, are subject to the laws which determine electrical equilibrium and electrical disturbance. But the physiological changes which occur in the tissues of an animal cause electrical variations. The investigations of these phenomena constitute A. E. Certain fishes have special organs for the development of electricity, by means of which they can communicate a shock to other animals, thus paralysing their prey, or acting in self-defence. These electric fishes are—(1) The torpedo, a species of ray found abundantly in the Mediterranean, occasionally in the Atlantic, and rarely in the North Sea; (2) the *Gymnotus electricus*, an eel-like fish, common in the lakes and rivers of S. America, especially in Guiana; (3) the raasch or thunder-fish of the Arabs, a native of the Nile and other African rivers; (4) the *Mormyrus longipinnis*, a kind of pike found in the Nile; (5) the *Rhinobatiss electricus*, a ray from Brazil; (6) the *Tetraodon electricus*, a species of globe-fish found in the Nile; (7) the *Gymnarchus electricus*, an eel also found in the Nile; and (8) the *Trichiurus electricus*, a ribbon-like fish found in the Red Sea and Indian Ocean. Some have also asserted that the common skate of the British coasts possesses an electric organ. The electricity generated by these fishes has considerable tension, is capable of developing a spark, of magnetising steel, and of affecting a galvanometer. It would appear that in the structure of these fishes the nerves are always distributed to the positive side of the electrical plate. But in these animals there is always a special apparatus for the evolution of electricity alone. Such arrangements in the animal kingdom are rare, and the electricity produced far exceeds in amount and tension that which may be obtained from any living tissue, such as muscle, by means of a delicate galvanometer. The present state of our knowledge of A. E. will be best understood by a slight sketch of the rise and progress of this department of science. The discovery of A. E. dates from 1786, when Galvani, who was then Professor of Anatomy and Physiology in Bologna, had his attention directed to the convulsions produced in frogs' legs by the working of an electrical machine in their vicinity. It must, however, be acknowledged that Swammerdam had experimented in the same direction so early as 1678. Recognising the fact that the skinned hind-limbs of a frog may be used as a delicate electroscope, Galvani attempted, on 20th September, 1786, to employ them in experiments on atmospheric electricity. He suspended a number of frogs' legs from the iron trellis-work surrounding the balcony of his house, by means of copper hooks, and saw, when the legs were blown about by the wind so as to cause them now and again to touch the iron, that they were convulsed. After many experiments he concluded that the convulsions were not due to electricity from the atmosphere, but to an inherent A. E. This discovery, announced by Galvani as that of a nervous fluid which, if not life itself, was something akin to it, soon attracted great attention, and wild speculations were put forth, in which it was asserted that the entire source of life was attributable to this new principle, which, in honour of its discoverer was called *galvanism.* In 1791 Alexander Volta, Professor of Natural History in the University of Pavia, repeated Galvani's experiments, and devised numerous others, the result of which was that he asserted that the contractions in the frog's legs were not due to an inherent A. E., as Galvani had supposed, but to the action of the juices of the frog's limb on the metals with which it was connected. These investigations led to the discovery of the production of electricity by the contact of dissimilar metals, to the invention of the well-known *voltaic pile*, and to *voltaic* (often termed *galvanic*) *electricity*, to which the world is so much indebted. Volta's experimental criticism and denial of Galvani's fundamental position led to a bitter controversy, in which most of the scientific men of the time took part. Galvani, aided by his nephew Aldini, showed that under special circumstances muscular contractions might be obtained without the aid of any metal at all, by simply allowing the sciatic nerve of an insulated frog's leg to drop on the muscles and come into contact with them externally. This experiment Volta and his followers objected to on the ground that the contact of such dissimilar substances as muscle and nerve, aided by a little blood or serum, was quite sufficient to produce the electrical current which caused the muscles of the leg to contract. The discovery of the voltaic pile, and the great practical consequences flowing from it, caused the world to forget for a time the subject of A. E. For twenty-eight years after the death of Galvani, which happened in 1798, little was heard of the matter, and *animal magnetism*, as it was called, was held in contempt. But in 1826 Nobili, by means of a delicate galvanometer, demonstrated the existence of an electrical current in the frog, which he stated passed from the feet to the head of the animal. Nobili attributed the current thus obtained to Thermo-Electricity (q.v.), an opinion which has since been proved to be erroneous. In 1837, Matteucci, then Professor of Physiology in Pisa, obtained a current in a similar way, and made the important announcement that 'the interior of a muscle, placed in connection with any part whatever of the same animal, such as nerve, surface of skin, or surface of muscle, produces a current which goes in the animal from the muscular part to that which is not so.' He further worked out many of the details of the subject, and must be regarded as the founder of all our modern views. In 1841 Emil Du-Bois-Reymond, the distinguished Professor of Physiology in the University of Berlin, repeated Matteucci's experiments and further investigated the subject with the aid of most delicate galvanometers, and other ingenious apparatus specially contrived for the kind of work. He was at length able to announce the law of the muscular current, as at present understood, viz., 'Any point of the natural or artificial longitudinal section of a muscle is positive in relation to any point of the natural or artificial transverse section.' Thus it may be stated in general terms that the surface of a muscle is always positive to its transverse section, so that when one terminal (*A*) of a galvano-

The Thunder-fish.

Gymnotus electricus.

meter is connected with the longitudinal section or with the surface, and the other terminal is connected with the transverse section (*B*), a current flows through the coils of the galvanometer from *A* to *B*. The same is true of nerve. Du-Bois-Reymond also showed that there is no current peculiar to the frog, as Matteucci supposed. Currents may also be obtained from the human being by placing both hands or other parts of the body, with special contrivances, in connection with the terminals of a galvanometer. It may be stated generally that all living textures, when connected with a galvanometer sufficiently delicate, indicate the existence of electrical currents; and an electrical change takes place, and a current is developed in a muscle whenever it enters into contraction. As regards nerve: 'during the passage of a nervous impulse the natural nerve current undergoes a negative variation. But a nerve in its absolutely natural condition appears to be, like a muscle, isoelectric; hence we may say, that in a nerve during the passage of a nervous impulse a current of action is developed. This *current of action* may be shown either by the galvanometer or the rheoscopic frog. It should be mentioned that Hermann (of Zurich), almost alone among physiologists, denied the existence of any inherent current in animal tissues, and he attributed all the phenomena observed to death of part of the muscular or nervous structure exposed, leading by chemical changes to differences of potential, and consequently to a current.'

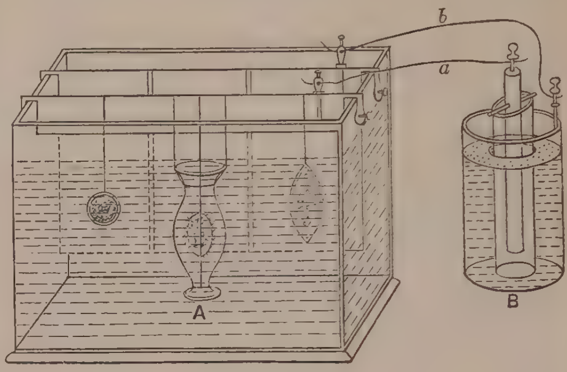
Electricity, Medical. Electricity has been employed as a curative agent from very remote times. Paracelsus ascribed curative power to the loadstone; but it was not till 1748 that Jallabert applied the electrical machine to the cure of paralysis. Franklin used it for the same purpose. Cavallo in 1780, Poma and Arnaud in 1787, employed it in paralysis, chronic rheumatism, chorea, epilepsy, &c. In 1789 Galvani made the discovery which immortalised his name, and the new voltaic and galvanic instruments superseded the electrical machines. The discovery of induced galvanic electricity by Faraday, and the invention of the rotary magneto-electric apparatus of Pixii in 1832, formed the next great advance in electro-therapeutics. The varieties of electricity depend upon its mode of development, which may be by friction or mechanical action, by contact or chemical action, or by induction from these sources or from magnetism. Frictional electricity, generated by the machine, is of a low degree of intensity, but is produced in large quantity and of great decomposing energy. It is still employed as a stimulant to sensory nerves, as a counter-irritant, a sudorific, and in the treatment of paralysis, and other affections, and for such purposes it is applied as the bath, the aura, the spark, and the shock. Galvanic or voltaic electricity is developed by the contact and chemical action of dissimilar substances. Galvanism applied to the skin excites more or less inflammatory action, accompanied with a sense of burning, the sensation varying from a slight tingling to an almost intolerable pain, and, if maintained for a sufficient length of time, it may produce ulceration and destruction of the skin and subjacent structures. It increases and diminishes sensibility and muscular irritability, is a tonic, and increases nutrition; it stimulates the secretions and the circulation, coagulates blood, increases the activity of the lymphatics and glands, promotes the absorption of exudations, and dispersion of tumours. These effects are best marked when the constant current is used; but when the current is intermittent the contractile effects on the muscles are very much increased. The continuous gentle action of small, single, and compound voltaic apparatus has been employed successfully in paralysis, amaurosis, neuralgia, &c., by application to the surface of the body over the parts affected, or by needles thrust into them (galvano-puncture). By galvano-puncture aneurism has been cured by the coagulation of the contents of the sac; attempts have been made to dissolve calculi in the bladder; and surgical cauterization of otherwise inaccessible parts has been successfully performed. The apparatus employed for the production of interrupted or induced currents are the magneto-electric and the electro-magnetic coil machines. The former consists of a bar of iron (round which thin iron wire is coiled), and a horse-shoe magnet. Electricity is evolved by the iron bar being maintained in a constant whirling motion before the poles of the magnet. The machine is not self-acting, and its currents pass in opposite directions. The electro-magnetic machine has the advantage of being self-acting; but the objection to it is that it requires a battery to keep it in action, and, of course, the use of acids. By later improvements, however, since the introduction of the carbon electro-negative, and the solution of the bisulphate of mercury, it has been made portable, and also effective. The electro-magnetic machine has now almost entirely superseded other electric machines in therapeutics, more especially since the publication of the work of Duchenne (of Boulogne), with whom it was a favourite instrument. Our limits do not permit of a detailed description of the apparatus. Electricity is administered by including a portion of the body between the two excitors or electrodes, thus causing it to form a part of the established circuit. Much of the results of electricity is due to the kind and quality of the current used, the method of application, and the direction of the current. When it traverses from the centre to the periphery, it is termed the direct or descending current, and when from the periphery to the centre, the inverse or ascending current. A descending current may be made to pass to or from a painful spot; in the former case, if the kathode be placed over it, and in the latter, if covered by the anode. In the former case there is increased action at the point of treatment, and in the latter diminished action. Different opinions have existed regarding the directions in which the currents should run in their therapeutical employment. The beneficial effects of electricity in the treatment of many diseases are firmly established.

Electrol'ysis is the decomposition of a chemically compound substance by means of an electric current. If two pieces of platinum, connected with the poles of a voltaic battery, are immersed in a quantity of slightly-acidulated water, and if, at the same time, the electromotive force of the battery be sufficiently strong, an electric current will pass and decompose the water into its constituent parts, hydrogen being given off from the platinum connected with the kathode, and oxygen from the platinum connected with the anode. The liquid so decomposed is termed the electrolyte; and the platinum or other metal surfaces by which the current enters and leaves, the electrodes. The electrode by which the current enters is called the anode, and the electrode by which the current leaves the kathode. The products of the decomposition are known as the Ions—the Anion appearing at the anode, the kathion at the kathode. These names were invented by Faraday with the aid of Whewell, and are now in general use. The fundamental law of E., as established by Faraday and confirmed by Beetz, Hittorf, and others, is that the quantity of electrolyte decomposed in a given time is proportional to the strength of the current; and the same current decomposes chemically equivalent quantities of different electrolytes in the same time. In many cases of electrolytic action, the actual ions are not given off, but instead substances formed by the chemical action of the ions upon the electrolyte. For instance, the products of the decomposition of a solution of sodic sulphate are oxygen and hydrogen at the anode and kathode respectively—exactly the decomposition in the case of acidulated water or dilute sulphuric acid. Careful experimental examination of the phenomenon shows that at the anode there is sulphuric acid as well as oxygen, and at the kathode caustic soda as well as hydrogen. If the electrodes, after E. has been going on for some time, be disconnected from the battery poles, and joined to the terminals of the coil of a delicate galvanometer, a current will be evident—flowing in the direction opposite to that which produced the E., but soon disappearing. This is due to what is known as the *polarization of the electrodes*, in virtue of which their potentials are rendered different, and the existence of an electro-motive force made possible. No polarization takes place when the electrodes are formed of the metal which enters as one of the chemical constituents of the electrolyte. Thus zinc electrodes in sulphate of zinc do not become polarized. It is this polarization that renders the measurement of the electric resistance of electrolytes so difficult. It seems, however, that Ohm's law of the relation between resistance and length of current holds for electrolytes as well as for metallic conductors; but that, unlike metallic conductors, electrolytes have their resistance diminished with increase of temperature. Experiments have also been made by various physicists to investigate the change of resistance due to change of density of the solution of a given electrolyte. Beetz, Kohlrausch and Nippoldt, and Paalzow investigated this subject in different ways, endeavouring by more or less ingenious devices to eliminate the error due to polarization.

The phenomena of E. are not yet fully explained, and cannot be till a more exact knowledge of the molecular constitution of bodies is obtained. According to Clausius, dissociation is constantly going on in a compound liquid—that is, the compound molecules, which are constantly changing their relative positions, become broken up into their component molecules on account of the continually occurring collisions, so that each individual atom may be supposed to be continually changing its partner from time to time. This process Clausius supposes to go on always, and indifferently in all directions; but when a current is passed through the liquid the molecules become influenced by the electro-motive force, so that each molecule of the kathion struggles towards the kathode, pairing for a time with each molecule of the anion which it meets struggling in the opposite direction towards the anode. Accordingly at the electrodes free ions collect, and these are charged, each kathion positively and each anion negatively. Upon this theory polarization is due to the collection of positively-charged ions at the negative electrode, whose potential is thus raised, and an electro-motive force contrary to the electrolysing current generated. Now the ions deposited on the electrodes tend to become free, escaping as gas, diffusing through the liquid, or precipitating as a solid, so that here we have the explanation of the dissipation of polarization. This theory further shows how only liquids can act as electrolytes, the molecular conditions necessary for the process not existing in solids and gases; but it cannot fully explain why compound liquids are not *all* electrolytes. E. is yearly being practically applied in numerous and important ways. Among these may be mentioned the manufacture of secondary batteries, bleaching, and sewage purification. In the last named process all the offensive matter is thrown down as mud by E. applied with iron electrodes. The effluent becomes pure and clean. The mud is disposed of as manure. E. is also used in physical laboratories and as a means of testing the accuracy of and calibrating instruments.

Electro-Metallurgy is the art of depositing or precipitating in a metallic state various metals or alloys from their solutions by means of electrical currents. It is one of the most useful of all the applications of electricity, and since its discovery, within comparatively recent years, it has been applied to innumerable useful and important metallurgical operations, and has indeed revolutionised many processes. The history of the discovery is inseparably bound up with the gradual development of knowledge and experience in electricity, so that it is difficult to apportion the honour of first discoverers among the numerous claimants to that distinction. Jacobi of St. Petersburg announced in 1839 that he had discovered a means of 'converting any line, however fine, engraved on copper, into a relief by galvanic process.' In the same year Spencer communicated an elaborate paper to the British Association on working in metals by voltaic electricity, in which he gave details of numerous experiments performed by him, commencing in September, 1837. Spencer successfully obtained by electro-deposit of copper, impressions from engraved plates, facsimiles of medals, and stereotype plates. C. J. Jordan also claimed that he had successfully conducted similar experiments previous to the announcement of Jacobi's investigations. From 1839 dates the practical working of metallurgical operations by electro-deposit, and, as usual, a host of patents were applied for and obtained, each claiming some new process or application, the deposition of particular metals, special forms of batteries, or new solvents for the metals to be deposited. The most successful of the patentees from a commercial point were George R. and Henry Elkington, who, in March, 1840, secured a patent for 'coating, covering, or plating metals' with gold and silver. The patent of the Elkingtons was the foundation of the now enormous industry in electro-plate carried on in Birmingham and Sheffield, as well as at many foreign centres.

The practical operations of E.-M. as conducted at the present day may be divided into (1) electro-depositing, in which any metal—as, for example, copper—is precipitated on a mould and so formed into the substantial ground of any article useful or ornamental; and (2) electroplating, or the coating of any metal with a different metal or alloy. The processes by which the metals in both cases are deposited are quite the same, but in the one case a mould is placed in the plating-vat, while in the other it is the article to be plated or covered which is so treated. In the preparation of electrotype copies of art metal-work, which constitutes one important branch of E.-M., both processes are usually employed; the body of the article, a jug or vase for example, being deposited in copper on a mould, and subsequently electroplated with silver or gold. The deposition of metals from solutions of their salts is due to the electrolytic action of the current (see ELECTROLYSIS), in virtue of which the electrolyte is decomposed, and the metallic component appears at the negative electrode. The moulds having been prepared, they are placed in a trough or vat (A) filled with an acid solution of blue vitriol (sulphate of copper), and opposite the moulds are suspended plates of metallic copper. A wire (*a*) passes from the metal rod on which the mould is hung to the zinc pole of a Daniell's cell (B), that being the battery originally employed, though now generally superseded; and the circuit is completed by connecting the rod from which the plates of metal depend with the copper of the battery cell by another wire (*b*). As the action proceeds, copper is by slow degrees reduced from the solution and deposited on the prepared moulds, the amount so taken up being replaced by a similar quantity dissolved from the plates of copper. The process of deposition may go on till any desired thickness of copper is attained, and neither is there any limit to the size of the object deposited. The objects when taken from the bath are treated like ordinary castings; and to many of them, in common with nickel-silver and Britannia-metal articles, the process of electroplating, or coating with silver (and sometimes gold), is next applied. In the early years of plating the expense of the process prevented works of great size from being undertaken by E.-M. as each pound of copper deposited required the expenditure of 1 lb. of zinc and 1½ lb. of sulphuric acid. Now in all large works the Daniell battery is superseded by Wilde's or Gramme's magneto-electric engine, which deposits at less than one-tenth the cost of galvanic electricity, and works of large dimensions, such as full-size statues, are produced by electro-deposit. Besides such works and reproductions of art manufactures, electro-deposit is very extensively employed for copying wood-engravings and for preparing electrotypes for



Electric Battery.

printing, as well as in cheap jewellery and button-making, and a great variety of minor metallurgical operations.

Electroplating.—This operation is most largely employed for preparing imitations of silver plate for table use, the basis of the best quality of which is nickel or German silver, while for an inferior class of wares the Britannia metal is used. When Britannia metal is to be plated, it has first to receive a thin coating of copper, as silver or gold will not adhere to that particular alloy. The articles to be plated are first 'buffed,' or smoothed on leather to give them a proper surface to receive the coating of precious metal. They are then successively dipped in an alkaline solution, a weak acid, and in pure water, after which cleaning they are plunged in a solution of cyanide of mercury to prevent any oxidation taking place. The articles are now ready to be placed in the silvering vat (if silver is to be deposited), which contains a solution of cyanide of silver, and in which plates of silver also are hung. When the silvering is complete the plated goods are washed and brushed with a metallic wire brush. Electro-gilding is conducted on an analogous principle, the bath being prepared with chloride of gold, cyanide of potassium, and carbonate of potash.

A great number of metals in addition to those mentioned can be deposited by electricity, and even an electro-deposit of brass is obtained in practice. The deposit of nickel has also been conducted on a commercial scale; and especially in America that metal is now very extensively employed for plating iron objects, fittings of harness, door and other knobs, hat-pegs, and many similar objects. Tin has also frequently been deposited by electricity, and the separation of tin and iron in old tin plate is largely accomplished by similar means.

Electrostat'ic In'struments are of three kinds—(1) those which produce, (2) those which accumulate, and (3) those which measure given charges of electricity. To the first kind belongs the common frictional machine, in which a glass wheel or cylinder is made to revolve and rub against a leather surface coated with an amalgam of zinc and mercury. Each portion of the glass surface as it moves away becomes positively electrified, and upon coming opposite a set of sharp metal points in connection with an insulated conductor, known as the *prime conductor* of the machine, induces in them a negative charge. If the machine is in working order a discharge takes place through the air between the glass and the points, and the glass loses a portion of its electricity, which is transferred to the prime conductor. To make a continuous production possible the negative electricity on the coated leather surface must also be removed, and this is effected by connecting it, directly or through the agency of its prime conductor, with the earth. The first machine of this kind was Otto de Guericke's rotating globe of sulphur, which was electrified by friction with the hand. In Lord Armstrong's *hydro-electric* machine, the electricity is produced by the friction of the minute drops of water upon the walls of the apertures through which steam is sharply driven at considerable pressure. Volta's *electrophorus* consists of two equal-sized plates, the one of ebonite or resin backed with metal, the other of metal. The former has a metallic pin which, when the plates are in contact, connects the metal plate with the metallic back of the ebonite plate. The ebonite plate is first negatively electrified by rubbing it with cat-skin, and then brought near the metal plate, whose potential is thus rendered negative by induction. When they are sufficiently near, a spark passes between the metal plate and metallic pin, and upon the separation of the disks the metal is found to be positively electrified. Since the ebonite long retains its electrification, especially if the air is dry, this process may be repeated again and again, and a conductor fully charged by successive additions. The energy of the electrification has its equivalent in the excess of work spent during the separation over the work done by the electrical forces during the approach of the plates. The induction machine of Holtz is on the same principle. It consists of two parallel concentric glass wheels, one fixed, the other capable of rapid rotation. Near the exterior surface, and at opposite sides of the rotating wheel, are placed two metallic combs, each connected with an insulated conductor. On the fixed wheel two pieces of pasteboard are fastened facing the combs. One of these is electrified negatively by contact with a rubbed piece of vulcanite, and acts inductively through the disks on the comb opposite, which discharges electricity on the surface of the revolving disk, becoming itself negatively charged, as does the second comb, with which it is connected meanwhile. When the positively charged portion of the disk comes opposite the second comb, discharge takes place between them; and after a few turns the positive electricity on the glass disk exceeds the negative on the comb, so that the discharge is followed by the positive electrification of the conductor of this comb. Brilliant and long-continued sparks are produced on breaking the connection of the conductors.

Of electric accumulators the most important is the Leyden jar, so named from Leyden, where its accumulating power was first observed and investigated by Kleist, Cuneus, and Muschenbroeck about the year 1746. It consists usually of a cylindrical glass jar, coated internally and externally with tin-foil, and having a metallic rod in connection with the interior coating, rising a few inches above the top of the jar and terminated by a brass knob. The jar is charged by collecting electricity from the prime conductor of a machine by means of this knob; while the external layer is kept at zero potential by being put in connection with the earth. (See ELECTRICITY.) An *electric battery* consists of a number of charged Leyden jars, with their external surfaces connected, as also their internal surfaces, by means of metallic rods joining the knobs. It is necessarily very dangerous to handle, and is only employed in experiments which require large charges.

The first instrument which was used to *measure* forces due to charges, and therefore charges of electricity, and the first instrument accordingly which deserved the name of *electrometer*, was Coulomb's torsion balance. Formerly, however, before electrometers had reached their present development and importance, the name was given to what were nothing more than *electroscopes*, or instruments for *showing* the presence and nature of electrification. The best known of these is the so-called *gold-leaf* electroscope, which consists of an insulated vertical metallic rod, with a knob or disk at its upper and two gold leaves suspended from its lower extremity. The gold leaves are free to move, and of course show repulsion when the rod becomes electrified either by induction from, or contact with, a charged conductor. Electrometers for the direct measurement of differences of potential, between two conductors, have been of recent years carried to a high degree of perfection, both in theory and construction, especially by Lord Kelvin. His absolute electrometer is an improved form of the attracted-disk electrometer of Sir W. Snow Harris. The principle is that when two small disks at different potentials are placed face to face, with a small space between them, the electrification will be nearly uniform on the opposed faces, if no other conductor be near. One of Lord Kelvin's chief improvements is the addition of the *guard-ring*, which does away with much of the disturbing effect of the case containing the disk. The instrument, thus improved, consists essentially of two parallel plates at different potentials, one of which is divided into two portions, a central circular and movable portion, and an outer immovable ring, which is the so-called guard-ring. No part of this movable portion is accordingly near the edge, and its electrification is practically uniform. The lower surface of the guard-ring is plane and parallel to the upper opposed surface of the other disk. The movable disk, which just fills the aperture of the guard-ring, is suspended from an arm of a delicate balance, and is adjusted by means of a weight on its upper surface so as to have its lower surface in the same plane as the lower surface of the guard-ring. If the potentials of two conductors are to be compared, they are placed in connection each with one of the disks. The weight on the suspended disk is then removed, and the lower disk screwed up until its attraction brings the suspended disk down to exactly its original position. The attractive force between the disks must then be equal to the weight removed, and is therefore known as well as the distance between the disks, so that the difference of potential is at once determinable. The necessity of adjusting the lower disk for each observation is an inconvenience, which, however, does not exist in electrometers of the *divided-ring* construction. The extremely delicate and refined quadrant electrometer of Lord Kelvin is constructed after this method, the principle of which will be evident from the following short description. A cylindrical conducting box is divided into four quadrants, separately insulated. The opposite quadrants are united, thus forming two pairs, each pair being kept at the same potential throughout. The one pair (*A*) is usually connected with the earth, and the other (*B*) with the body whose potential is to be measured. There is another conductor (*C*) suspended close below the quadrants so as to have free azimuthal motion round a vertical line, which coincides with the axis of the cylindrically-arranged quadrants. This conductor is kept at a high potential by being connected with the inner coating of a Leyden jar which forms the lower portion of the instrument. If the potential of *B* be of the same sign as that of *C*, *C* will tend to move from *B* to *A* with a nearly uniform force, which will be ultimately equilibrated by the torsion of the suspension apparatus. Within certain limits the deflexions are connected with the potentials by a simple formula. A voltmeter has lately been designed by Lord Kelvin on the principle that two adjacent bodies at different potentials mutually attract each other. Of the two conductors in this instrument one is movable and the other fixed. The maximum potential difference it is capable of indicating is 12,000 volts.

Various methods are adopted to protect persons and their property from a dangerous connective contact with any part of electrical apparatus. A 'cut-out' checks the undue strength of the electric current, and in that way protects the wire, lamps, &c. The names of Killingworth Hedges, Napier Prentice, and Cardew may be mentioned in connection with these devices. For the various instruments connected with electric telegraphs and cables, see TELEGRAPH. See also articles, HUGHES, KELVIN, MAXWELL, and MORSE.

Electroto'nus, in Physiology, is the condition into which a living nerve passes while it is traversed by a continuous electrical current. While in this condition its properties are changed, so that in the neighbourhood of the anode its irritability and rate of conductivity are diminished, and its power of producing a current of electricity is increased, while in the neighbourhood of the kathode the reverse is the case. The part near the anode is said to be in an *anelectrotonic*, and that near the kathode in a *cathelectrotonic* state. See NERVE.

Elec'tuary, a medicinal preparation in which the active ingredients are incorporated with some conserve, such as honey, molasses, or syrup. Such medicines are usually insoluble and of large bulk, as sulphur. They are frequently called *conserves*. *E. lénitif* is almost identical with *E. sennæ comp.*

Ele'git is an English law-term denoting a writ of execution (statute 13 Edw. I. c. 18) directed to the sheriff, commanding him to take in execution, but not to sell, the lands, but not the goods (see Bankruptcy Act of 1883), of a debtor. These the creditor holds until he gets satisfaction for his debt, during which time he is *tenant by E.* Any estate vested in a mortgagee or purchaser, any glebe (or churchyard), part of an ecclesiastical benefice, any advowson in gross cannot be so taken in execution.

El'egy (Gr. *elegos*, from *è è* and *lĕgein*, 'to cry woe') radically signifies a lament without reference to metrical form. Among the Greeks the word was early applied to a poem written in distichs of alternate hexameters and pentameters, and devoted either to the praise of valour, as in Callinus and Tyrtæus, or to the inculcation of moral precepts, as in Solon and Theognis. This measure soon came to be regarded as the fittest vehicle for sustained emotions and tender sentiments, and with Simonides and Mimnermus the sad E. attained the highest excellence. Catullus and Gallus were the first successful writers of Roman E., which reached its highest perfection in the tender Tibullus, the brilliant Propertius, and the sensuous Ovid. The term E. may now be applied to any serious piece pervaded by a melancholy tinge, without regard to the measure. The quatrain of Gray's *Elegy*, however, has come to be regarded as the representative form in English, and as, on the whole, the best fitted for mournful themes.

Elegy, in music, a name occasionally given to a composition expressing the same ideas as the poetic E.

Elemen'tal Spirits were, in mediæval superstitions, the spirits of the elements fire, air, earth, and water, and were named respectively salamanders, sylphs, gnomes, and nymphs or undines. The gnomes, spirits of the earth and the underworld, were mischievous and malevolent in their relations to human beings; while the sylphs, the spirits of the air, were a species of benevolent fairies. The literary 'machinery' supplied by these fanciful creatures, personified types of the powers of the elements in which they have birth and life, has been employed with excellent effect by modern writers. The conduct of the story of Pope's *Rape of the Lock* is managed chiefly by sylphs—

> 'The light militia of the lower sky.'

Baron Fouqué is indebted to the E. S. of water for his beautiful *Undine;* while in the graceful tales of Lessing and Tieck the creatures of the elements are invested with the rarest beauty, and are described with much suggestive meaning.

El'ements, in astronomy, are the numerical quantities necessary for computing the place of a planet or satellite in the heavens. The major-axis and eccentricity fix the size of the elliptic orbit; but besides these we must also know the inclination of the orbit to the ecliptic, the longitude of the ascending node, the longitude of the perihelion, and the time of its perihelion passage. The longitudes are measured from the line of equinoxes. The dimensions and masses of the bodies themselves are also tabulated as E. See Herschel's *Outlines*.

Elements, Chemical. All researches into the composition of matter have shown that it consists essentially of two kinds—that which is capable of decomposition or resolution into two or more distinct substances, and that which is capable of no such change. To the first of these kinds the name of compounds has been given, to the second that of elements. All compounds are formed of the elements, the nature of the compound depending not alone upon the elements which it contains, but also upon the proportions in which these are present. Numerous as the compounds are, they yet contain comparatively few elements, science up to the present time having revealed the existence of but sixty-six of the latter, if gallium, argon, and helium be included in the list. The elements vary in their appearance, physical state (under ordinary conditions), and in their properties. They are divided into two groups—the metals and the non-metals. Of the former all are solid at ordinary temperatures, with the exception of mercury or quicksilver, which is liquid. They are all opaque, and for the most part exhibit the peculiar appearance termed metallic lustre. They are, as a rule, good conductors both of heat and electricity. Many are soft, such as lead, copper, silver, iron, &c., either at ordinary temperatures or when heated, and these can be rolled and hammered into various shapes, and drawn into wire. Others, however, are brittle under all conditions, such as cobalt, titanium, &c., and as a consequence are neither malleable nor ductile. The distinguishing chemical character of a metal is that it forms at least one compound with oxygen which is a base, *i.e.*, a substance capable of combining with an acid to form a salt. Of the non-metals five are gaseous under all conditions, viz., hydrogen, oxygen, nitrogen, argon and helium, one gaseous under ordinary conditions, but capable of condensation to a liquid when submitted to extreme pressure and intense cold, viz., chlorine. Bromine is the only liquid non-metal at ordinary temperatures; the remainder are solid. Many of the non-metals are transparent, others opaque; some are opaque in one condition, transparent in another. Carbon, for instance, is opaque in graphite and charcoal, transparent in the diamond. Metallic lustre is not a special character of the metals; it is possessed by several of the non-metals. Thus graphite, tellurium, and selenium, as far as their appearance goes, might readily be mistaken for metals. The non-metals are generally bad conductors of heat and electricity. None can be said to be ductile or malleable.

El'emi, a fragrant and resinous substance, obtained from plants belonging to the natural order *Amyridaceæ*, or 'Myrrh order.' E. was formerly obtained from Egypt, but is now chiefly brought from Manilla and America. It is obtained from the *Icica Icicariba* of Brazil. E. consists of the juice of the trees, which exudes from punctures made in the bark. It is used in making ointments and plasters. It contains a volatile oil, and is soluble in alcohol.

El'ephant (Gr. *elephas*), the name given to two species of large mammalia, regarded in modern zoology as included in a special order of Placental or higher mammals, named *Proboscidea*. The characters of this order are found firstly in the elongation of the nose to form a sensitive, highly muscular, prehensile proboscis or trunk; secondly, in the absence of canine teeth, and in the growth of the incisors to form tusks, the molar teeth being few in number; thirdly, in the feet being provided each with five toes, which are not fully indicated or completely divided from the foot externally, whilst the feet are padded with a thick skin; and, fourthly, in the absence of clavicles. Included in this order, besides the two species of living forms, are various extinct forms (mammoth, mastodon, &c.), which receive special articles, and are also referred to in treating of the palæontology of the present group. With the general form of the E. all are familiar. The skin is almost destitute of hairs, and presents a hard tanned-looking surface. Notwithstanding the apparent impenetrability of the skin, these largest of land mammalia are singularly liable to be tormented by insects, and to protect themselves against the latter, are accustomed to take mud-baths, wallowing in the mud of rivers, and thus covering their skin with a layer of clay, which renders them less exposed to the attack of their enemies. Mohr, the German explorer, informs us that he has seen the African E. dig a kind of pit or bathing-tub near a pond or river which has a steep wall in front, the pit being about the same height and breadth as himself. The animal, when about to bathe himself, sprinkles water on the sides of his bath so as to moisten the clay, and then rubbing his sides against the pit, coats his skin with the clay. These 'E. tubs' are especially numerous on the Zambesi. The pinna or outer ear is large and flat. The dorso-lumbar vertebræ, or those of the back and loins taken collectively, number twenty-three, not more than three being lumbar bones. There are four sacral vertebræ, and the tail is short. The bodies of the vertebræ are much more flattened than in any other terrestrial mammal; and the vertebræ of the neck being especially flattened, this organ is in consequence very short. The object of this arrangement is to afford strength and solidity to the spine. The skull is very large in proportion to the body; its great size being due chiefly to the development of air-cavities in the *diplöe* or middle layer of the cranium. Thus in old elephants the space between the inner and outer layers of the skull, especially in the frontal or forehead region, may be actually greater than the breadth of the cylindrical and elongated cavity containing the brain itself. The nasal bones are shortened, and the pre-maxillæ, or front portions of the upper jaw, are elongated. The radius of the fore-arm is fixed in a prone position, and crosses the ulna, its neighbour bone, in an oblique manner; this position preventing any movement of rotation such as is possessed by man. The fingers, wrist, and metacarpus or palm, are all shortened and thickened. The ilia or haunch-bones are expanded from side to side. The thigh-bones are long and slender, and when the animal is at rest, are directed perpendicularly to the axis of the trunk, and do not form an acute angle as in quadrupeds generally. The ham-muscles consequently extend to the middle of the hind-limbs, and this arrangement causes the peculiar and somewhat awkward gait of these animals, the whole leg being apparently lifted from its middle joint. The tibiæ shin-bones are short, and the foot and ankle bones are compressed. The thumb may consist of a single bone only in some cases. Two kinds of teeth only are developed—incisors and molars. The former have no enamel, and are entirely composed of dentine (or ivory) and cement. All living elephants possess incisors in the upper jaw alone, but the Dinotherium (q.v.) possessed lower incisors as well. The incisors further exhibit a peculiarity, in that, as they spring from permanent pulps, they continue to grow through the lifetime of the animal, and thus constitute tusks. The molar teeth exhibit a peculiar pattern, being essentially composed of alternating plates of enamel and cement, variously arranged in different patterns. In living elephants, only the incisors are preceded by milk teeth. The molars number six on each side in upper and lower jaws, and as the foremost molars are worn away, those behind are pushed forward to supply their place. The stomach is simple. No gall-bladder exists. The cerebellum or lesser brain is uncovered by the cerebrum or true brain, the cerebral hemispheres being largely and deeply convoluted. The males possess two large *vesciculæ seminales*, and four prostate glands. The E. goes with young about two years, and a single young one is produced at a birth.

African Elephant.

The two species of living elephants are the Indian E. and the African E. A variety of the former has been described under the name of Ceylon E., whilst the famous 'white elephants' are albino varieties of the Indian species. The Indian elephants possess tusks in the males only. No lower incisors are present, and the molars number one or two on each side of each jaw, and exhibit on their crowns a transverse or cross arrangement of the enamel plates. The forehead is concave, the ears small, the skull pyramidal; whilst the fore-feet possess five, and the hind-feet four hoofs. The colour is a pale brown, inclining to grey. The African E. has a convex forehead, very large ears, four hoofs on the front-feet, and only three on the hind-feet. Both males and females have tusks, those of the males being the larger, and weighing in large specimens 50 to 70 lbs. each. The length of full-grown tusks is about 6 or 7 feet. The Indian E. attains to 10, and the African to 12 feet in height. Both species are plant-eaters, and feed on grasses and on the leaves and bark of trees. Water is sucked up in drinking into the trunk, and is then squirted into the mouth from the proboscis. The E. without the tip of its proboscis is a very helpless animal. The trunk, composed of several hundreds of delicate muscles enabling it to move in every direction, ends in a finger-like process, where the nostrils are situated. This process aids the animal in picking up the smallest substances, and from its extreme sensibility also serves as an organ of touch. Of the two species, the Indian E. far exceeds its African neighbour in docility, intelligence, and tractability. The latter never attains a high degree of familiarity with man, and can never be so thoroughly domesticated as the Indian E. The African E. is hunted for its ivory and hide. The tusks are chiefly obtained from Senegambia, Guinea, Sofala, and Mozambique. The Indian ivory, and especially that obtained from Ceylon, is very highly esteemed. Elephants are also found in Siam, the Malay Peninsula, and Sumatra. The Indian E. is employed extensively in Asia as a beast of burden. Of its intelligence and remarkable instinct many curious tales may be related. In no part of their history, perhaps, do elephants exhibit greater intelligence than in their participation in the stratagems whereby wild members of their species are captured. These latter live in herds in the depths of forests, and apparently resort continually to one place to drink and bathe. Wild males are captured by decoy-females, who exhibit a pretence of fondness for them, while, in the meantime, the males are being stealthily secured by ropes or cables attached to adjoining trees. Left tied, the wild elephants are subdued by hunger and thirst. Whole herds may be captured by being led by decoy-elephants into large traps enclosed by firm stakes. Elephants rarely breed in a domesticated state; the African, however, breeding oftener in captivity than the Indian species.

Fossil and extinct elephants are known to geologists from numerous fossil remains. The more important of these extinct species are described under DINOTHERIUM, MAMMOTH, &c. The general distribution in time of the *Proboscidea* may in the present instance be briefly referred to. In the Miocene rocks of India six fossil species have been discovered, and a true E. (*E. antiquus*) occurs in the Pliocene rocks of Europe. The latter is found in Italian and French deposits of this age, and appears to have survived the glacial epoch. The Mammoth (q.v.) is the best-known Post-Pliocene E., and other forms of this age are the donkey E. of Malta, so named from its small size; and the pigmy E., which did not exceed 2½ feet in height. The Mastodon (q.v.) is of Miocene, Pliocene, and Pleistocene age, whilst the Dinotherium occurs in Miocene strata.

Elephan'ta (Hind. *Ghárápuri*), a celebrated island of India, in Bombay harbour, 6 miles E. of the city of Bombay, and named so by the Portuguese on account of a large stone elephant at the landing place on the S. of the island. It is 5 miles in circumference, is traversed by two long hills separated by a narrow valley, and has springs of good water. The few inhabitants cultivate rice and rear sheep and poultry for the market of Bombay. E. is chiefly famous, however, for its cave temples. At a short distance from the shore is the great temple, an artificial cavern, 130 feet long, and 133 feet broad, and of an average height of 17 feet. The rock is a kind of basalt or porphyry; and the roof owes its support to peculiar massive columns Within the entrance there is a gigantic figure (consisting merely of a bust and three heads) which serves as a pillar. This figure is 23 feet in circumference, and is supposed to represent the Hindu triad; but from the rest of the figures and the emblems on the walls, it seems probable that the temple was dedicated to the god Siva. There are also two similar temples on a small scale. Nothing whatever is known of the origin of these caves. From the mouldering nature of the stone, it may be assumed that the temples are of no very great antiquity. No religious worship is now conducted here; but it is a favourite resort of Bombay pleasure-seekers, and a semi-religious fair takes place here in February. A banquet was given here in honour of the Prince of Wales in 1875. Four caves in all have been excavated; the fifth is choked up with debris. There is no inscription legible and it is impossible to give the date of the cutting of the temples; some persons put it down at the 8th c. A.D. while others reckon it to be two centuries later.

Triad Figure, interior of Temple at Elephanta.

Elephant Fish, a name given to an Elasmobranchiate fish, nearly allied to the *Chimæra* (q.v.) or 'king of the herrings,' and included in the division *Holocephali* of the above order of fishes. It derives its name from its long snout, the tip of which is bent backwards like a hoe.

Elephant-Grass, a species of bulrushes belonging to the *Typhaceæ* or Bulrush order. This plant affords a large quantity of pollen which in Scinde is used for making a kind of bread, to which the name of *boor* or *booree* is given. The familiar name of the grass is derived from the fact of elephants feeding largely upon it.

Elephant Hawk-Moth.

Elephant Hawk-Moth, a genus of Lepidopterous insects belonging to the *Sphingina* or hawk-moths, which are distinguished by the antennæ being thickened in the middle or at their tips. The wings are long and narrow, and the trunk or proboscis is well developed. This moth has the body tinted rosy red, varied with light-green. The light-green of the wings is prettily contrasted with rose-coloured bands; and the hinder wings have a black base fringed with white. The E. H.-M. is known in France as the 'vine sphinx.' It produces two broods annually, the larvæ making cocoons on the ground by binding mosses and leaves together.

Elephanti'asis (from the Gr. *elephas*, 'elephant') is sometimes called *E. Arabum*, *Bucnomia tropica*, and Cochin or *Barbados leg*. The name is derived from a resemblance of the limbs of those affected with the disease to the huge rough limbs of the elephant. E. is a tropical disease common in India, Arabia, and Africa. The legs are the parts most frequently affected, but the disease attacks also the arms and the scrotum. In some cases the hypertrophy is so enormous that those affected are unable to walk; but although the limbs may be thus enlarged, the hands and feet are usually of normal size. There are at least two varieties of the disease. In the simplest form there is hypertrophy only, and no inconvenience is felt except from size and weight. In the more complex form there is, in addition, the product of morbid action, the parts being hard like stone, and the skin rough like the bark of a tree. The cause of the disease is not definitely known, though by some it has been attributed to the larvæ of the mosquito which are taken into the stomach with water and become absorbed into the system. It may, however, be hereditary, and may depend on some fault in dietetics. The simple form is gradual in its development, and without constitutional disturbance; but the complex or tubercular is accompanied with febrile action, and appears to be a product of inflammation. No cure for E. has been discovered. In scrotal E. the morbid growth is frequently removed by excision.

Elephanti'ne, called *Jesiret el Sag*, the 'blooming,' or *Jesiret-Assouan*, a small island in the Nile opposite Assouan (q.v.), at the foot of the first cataract. Its old Egyptian name was *Ebo*, 'the town of elephants,' *eb* being the hieroglyphic symbol for *elephant* and *ivory*. In former times it was of strategic importance from its position on the southern frontier of Egypt Proper. It was remarkable for its fertility, and was the seat of a monarchy, the only existing relic of which is a list of the names of nine kings. It formed the southern limit of the Roman empire under the later Cæsars. There are remains of temples to Kneph and Ammon, a tower with sculptures of the time of Alexander the Great, and a Nilometer, consisting of a staircase descending into the river and bearing graduated scales and inscriptions showing the heights to which the Nile rose at certain periods under the Cæsars.

Elephant-Seal, or **Sea-Elephant,** names given to several large species of Seals (q.v.), of which the best known is the *Moringa* (or *Macrorhinus*) *proboscidea*. The nose of the males is elongated to form a short proboscis. The teeth number four upper and two lower incisors, two canines, six præmolars, and four molars in each jaw. The incisors are of conical shape, and the canines are very stout and pointed. The colour of the fur is a bluish-grey in the males, deepening into dark brown; the fur of the females being darker. The length of a full-grown male nearly equals 30 feet, and they are from 15 to 18 feet in circumference at their greatest girth. The skin is prized as a 'seal-skin,' whilst the oil is also valued, the male affording about seventy gallons. These animals are polygamous, and the males fight desperately for the possession of the females. They feed chiefly on seaweeds. They are found on the Falkland Islands, Kerguelen Island, S. Shetland, and neighbouring S. Pacific Islands.

Elephant's Ear, a name popularly applied to the species of *Begonias*—plants belonging to the natural order *Begoniaceæ*—from the appearance of their oblique stipulate leaves. These plants occur in the E. and W. Indies and in S. America. See BEGONIACEÆ.

Elephant's Foot, or **Hottentots' Bread,** a genus of Monocotyledonous plants belonging to the order *Dioscoreaceæ*, or that of the 'Yams' (q.v.), and so named from the form of the shortened tuberous stem or root-stock, which is rough and tuberculate, and gives origin to a weak climbing stem. The name 'tortoise-plant' has also been given to this plant, from the shape of the stem suggesting that of a tortoise. The central cellular part of the stem is eaten by the Hottentots. The name E. F. is also applied to the species of *Elephantopus*, a genus of plants belonging to the order *Compositæ*, the radical leaves of which are of large size.

Elephant-Tusk Shell, a genus of Gasteropodous mollusca belonging to the family *Dentalidæ*, in which the shell is tubular and curved, shaped like an elephant's tusk, open at both ends, and possessing a circular aperture. The foot is pointed, and has symmetrical side lobes, from the presence of which Huxley inclined to place the *Dentalium* among the Pteropodous molluscs. The head is rudimentary, and the intestine has a neural flexure. *Dentalium arcuatum* is a familiar species.

Elephant, White, an ancient and exclusive Danish order of knighthood, in which the number of knights, other than those of the Danish royal family, was only thirty.

Elletta'ria. See CARDAMOM.

Eleusin'ian Mysteries. These venerable solemnities were begun at Eleusis by the special command of the goddess Demeter, and in connection with the suffering she endured on account of the loss of her daughter Persephone, and with her joy on Persephone's return from Hades. When Eleusis was absorbed into Athens, there was an increase of dignity in its great festival; but the oversight of it remained with the descendants of Eumolpus, and the most important rites continued to be performed at Eleusis. The lesser mysteries, celebrated in February, were in honour of Persephone, The Daughter; the greater, in August, in honour of Demeter, The Mother. The former took place at Agræ on the Ilissus, and were a preparation for the greater mysteries. The chief rites were the sacrifice of a sow, and initiatory purification by a priest. The greater mysteries lasted for nine days, and were held both at Athens and Eleusis. On the first day, the initiated assembled at Athens; on the second, they went in procession to the seaside to be purified; the third was a day of fasting and sacrifice; on the fourth day a procession took place with a basket containing pomegranates and poppy-seeds, carried on a waggon drawn by oxen, and followed by women; the fifth was the torch day, when the initiated (or *mustæ*), led by the torch-bearer, went in the evening with torches to the temple of Demeter at Eleusis; the sixth was the most important day of the festival, when the statue of Iacchus, son of Demeter, was carried along the sacred way to Eleusis, accompanied by vast crowds shouting and singing; on the following day the initiated returned to Athens; the eighth day was supplementary, and was added in honour of Æsculapius; and on the last day a libation of wine was offered in the ceremony 'Plemochoæ.' These were the external rites of this festival, but we possess no certain knowledge of the doctrines revealed to the initiated in the celebration of the mysteries.

Eleu'sis, a town of Attica, was situated in the Thriasian plain, opposite to the island of Salamis, and near the borders of Megaris. It was on the road from Athens to the Isthmus. It was the chief seat of the worship of Demeter and Persephone. See ELEUSINIAN MYSTERIES.

Eleu'thera, the most productive, and, after New Providence, the most populous of the Bahama Islands, is separated from Abaco by N. E. Providence Channel, about 28 miles in width. It is long and narrow, has an area of about 80 sq. miles, and a pop. of 7358, of whom only 5 are Europeans, engaged for the most part in the culture of the pine-apple, orange, and lemon. There are but 55 persons of African blood and, it is said, the race is fast dying out in the Bahamas.

Eleuthe'ria Bark, a name occasionally given to the bark of the Croton E. and Cascarilla Bark (q.v.). It derives its name from the island of Eleuthera, from which it is exported.

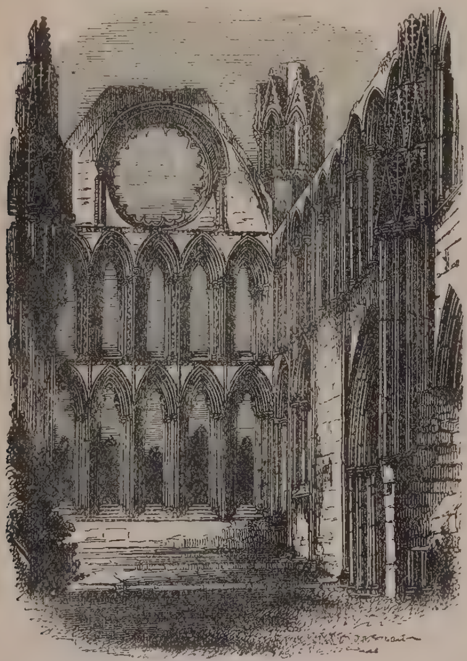
El'evated, the term applied to wings turned upwards in an armorial bearing or other heraldic device.

Eleva'tion, in architecture, a vertical plan of the front or of any external face of a building in which the proportions are set out geometrically, exactly as they are to exist in the actual building, and not as they would appear subject to the laws of perspective.

Elevation, in astronomy, is the height of a body above the horizon in angular measure. Obviously, then, the E. of the equator is the complement of that of the pole, which latter is equal to the latitude of the place. A star is at its maximum E. when it is situated on the meridian of the place of observation.

Eleventh, in music, an interval of an octave and a fourth.

El'gin, the chief town of Elgin or Moray shire, is beautifully situated in the vale of the Lossie, 5 miles from the mouth of that stream and 177 miles N. of Edinburgh. E., formerly interesting chiefly from the beauty of its situation and the number of its fine antiquities, has considerably altered within recent years. Surrounded by new and elegant villas, the residences of the gentry that have been attracted to a town which as a place of residence offers so many advantages, it has emerged from the quiet that was until lately its chief characteristic, and is now a county town of some gaiety, much exclusiveness, and no trade. It is a station on the Great North of Scotland Railway, and is accessible also by the Highland Railway. With the other 'E. burghs,'—Banff, Peterhead, Inverurie, Cullen, and Kintore—it returns a member to Parliament. E., the ancient *Helgin* (named after *Helgyn*, a Norse chief), was the seat of a royal castle prior to the reign of William the Lion. Of its beautiful cathedral, one of the finest and most interesting remains in the country, the most ancient (Early English) portions were commenced by Bishop Moray in 1224, when the see of Moray was transferred hither from Spynie. The vicissitudes of ages have reduced it to ruin. Other fine buildings were the church of St. Giles and the monastery of the Black Friars, both of which have been demolished. The walls of the church of the convent of Grey Friars still remain. The ruins of the ancient castle crown the elevation known as the Lady Hill. Among the more modern buildings and institutions are Gray's Hospital, a useful institution built and endowed in terms of a bequest of £20,000 left by Dr. Alexander Gray of Bengal; the E. or Anderson Institution, which has had its origin similarly in a bequest of £70,000 by Major-General Anderson; the Courthouse and Union Bank. Pop. parl. burgh 7799; entire civ. par. 9285; entire town 7894.


Elgin Cathedral.

Elgin and Kincardine, Thomas Bruce, Seventh Earl of, was born 20th July, 1766. Educated at St. Andrews, Paris, and in Germany, he entered the army, and rose to the position of general. He was occupied mainly, however, as a diplomatist, and it was while (1799) British envoy at Constantinople that he rescued the Elgin marbles (q.v.) from the Turks, and brought them to this country. In answer to his critics and assailants in connection with this matter, E. published in 1810 a volume entitled *Memorandum on the Subject of the Earl of Elgin's Pursuits in Greece.* For half a century he was a Scotch representative peer. He died at Paris, 14th November, 1841.—**James Bruce, Earl of E. and Kincardine,** a distinguished statesman and diplomatist, son of the preceding, was born in Park Lane, London, 20th July, 1811, was educated at Oxford, and succeeded to the peerage in 1841 on the death of his father. In 1842 he was appointed governor of Jamaica, and in this post, which he held for four years, he showed so much ability, that in 1846 he was made governor-general of Canada, when that dependency was in a state of great discontent. E. restored order, while he settled the 'Fisheries' question, established free trade between the United States and British North America, and introduced the wise policy of self-government into the colony. Although at one time so unpopular that in 1849 he was assaulted by a mob in Montreal for assenting to a bill indemnifying those inhabitants of Lower Canada whose property had been injured or destroyed by the rebellion of 1837-38, he was a universal favourite before he left Canada in 1855. In 1849 he was made a peer of the United Kingdom. In 1857, in consequence of difficulties with China, E. was sent out as Plenipotentiary, and after delay caused by sending the troops under his direction to India to assist in suppressing the Mutiny, he arranged, along with the French Plenipotentiary, Baron Gros, the Treaty of Tientsin (1858), making China freer than it had hitherto been to foreigners. He also concluded a somewhat similar treaty with Japan. Having returned to his native country to fill the office of Postmaster-General, he was soon recalled to China by a treacherous onslaught of the Chinese upon a British squadron, but with the help of French allies he penetrated (1860) to Pekin, and dictated peace there. In 1861 E. succeeded Lord Canning as Viceroy of India, but died of fever, 20th November, 1863, at Dhurumsala in the valley of Cashmere. E. has been succeeded in the earldom by his son, **Victor Alexander Bruce,** born at Montreal, 1849, and the son of his second wife, who was the daughter of the first Earl of Durham. The present Earl was Treasurer of the Household and First Commissioner of Works in 1886. He is Lord-Lieutenant of Fife, and has been a staunch supporter of the Home Rule policy of Mr. Gladstone and Lord Rosebery. In recognition of his services to the party, he was appointed Governor-General of India in 1893 in succession to the Marquess of Lansdowne.

Elgin Marbles, a collection of statues and *alti* and *bassi relievi*, brought chiefly from the Parthenon of Athens by the Earl of Elgin, and purchased from him by Government in 1816 for £35,000. They are now in the British Museum. Lord Byron, in the *Curse of Minerva* and in *Childe Harold*, assailed Lord Elgin for despoiling 'Athena's poor remains,' and Payne Knight declared that the marbles were the works of journeymen unworthy the name of artists, a stricture which elicited an eloquent reply from Benjamin Haydon. It is now evident that the removal of these sculptures from Athens preserved them from mutilation or destruction, and has been most beneficial to English art. They are probably the work of Phidias (B.C. 490-432), and consist of:—(1) The Metopes, which represent the battle of the Centaurs and Lapithæ, a favourite subject of Greek art. According to Visconti, the footmen who are here represented grappling with the Centaurs are intended for the Athenian followers of Theseus. These metopes are considered the finest extant specimens of *alto relievo.* (2) The Frieze, which consisted originally of slabs 3 feet 4 inches in height, extending over 524 feet. Of this, 249 feet are preserved in the British Museum along with 76 feet in plaster casts of portions which were not conveyed to London. This frieze, the largest continuous piece of sculpture produced in Greece, is the perfection of bass-relief. It represents the procession of the *Panathenæa*, or great festival in honour of Minerva held every fifth year, and is unsurpassed for grace, majesty, and animation. It consists mainly of a line of horsemen advancing two abreast; but there are also bearers of vessels, flute-players, victims, and citizens on foot. The attitude of the figures, the distribution of the drapery, is exquisitely varied; the champing horses and graceful riders uniting boldness of form with perfect truth to nature and faultless simplicity of design. 'The horses in the frieze,' said Flaxman, 'appear to live and move. We can scarcely suffer reason to persuade us they are not alive.' (3) Statues and fragments from the east and west pediments. Among these are part of a figure of Hyperion rising from the sea, the heads of the horses of Hyperion, Winged Victory, the Fates, head of one of the horses of Night, torsos of Cecrops, Ceres, fragments of Neptune and Minerva, the Ilissus, a lifelike figure, held by Canova to rival in merit the Theseus or Hercules, which last is a masterpiece of symmetry and truth, and the best-preserved of the marbles. Several of these sculptures seem to have been coloured, and adorned with precious stones and metal trappings.

The E. M. are unsurpassed for harmony and chastity of design, for grandeur of conception along with constant fidelity to nature. 'It is,' says Benjamin Haydon, 'the union of nature with ideal beauty—the probabilities and accidents of bone, flesh, and tendon from extension, action, or repose, that rank the E. M. above all other works of art in the world. Were the E. M. lost there would be as great a gap in art, as there would be in philosophy if Newton had never existed.' See *The E. M.*, by Sir Henry Ellis; *Visconti on the Sculptures in the Collection of the Earl of Elgin; Life of Benjamin Haydon.*

El'ginshire, Mor'ay or **Murr'ay Shire,** a county in the N. of Scotland, consisting of two portions, a smaller (inland) enclosed within the counties of Inverness, Nairn, and Banff, and a larger (maritime) bounded by these counties on the E., S., and W., but washed by the Moray Firth on the N. The Findhorn waters its N.W. corner; the Lossie flows through the middle of the maritime portion, past Elgin into Moray Firth at Lossiemouth; and the Spey flows partly through the county, partly along its eastern boundary. Covesea Caves, near the lighthouse of the same name, are large, intricate, natural windings in the rocks, formerly the resort of smugglers. The surface is mostly flat, and the 'Howe of Moray,' embracing the greater part of the area, is occupied by cultivated fields, of which wheat is the most common crop, and by fir and larch plantations. Sandstone, hard in texture and fine in colour, abounds. The soil is for the most part open and gravelly, with loams and clays in the N., which is very fertile. The climate is mild and dry. Of the 308,499 acres, which form the total area of land and water in E., 37,424 are under corn crops (oats 21,823); 18,144 are under green crops (potatoes 1701, and swedes and turnips 15,997); 38,137 are under clover, sainfoin, and grasses in rotation; and 7794 are under permanent pasture and grass not broken up. Small fruit is cultivated over 27 acres, and 66 represent the amount of bare fallow and uncropped arable land. Mountain and heath occupy 40,194 acres, and 65 are laid out in nursery grounds, while 47,650 are devoted to woods and plantations. For live stock see CATTLE, HORSE, PIG, and SHEEP. E. is the east part of the ancient province of Moray. It was early occupied by Scandinavian tribes, and here, as in the other north-eastern counties, the language, features, names, &c., of the inhabitants still retain distinctive traces of a Scandinavian origin. Elgin Cathedral, Pluscarden Priory, Kinloss Abbey, the 'Norman' church of Birnie, and Spynie Palace, are among the chief architectural antiquities, and there are many old and historically interesting castles. E. and the county of Nairn send a member to Parliament. The chief towns are Elgin and Forres. Pop. civ. county 43,453; parl. county district 31,608; and total E. and Nairn parl. county dist. 37,613.

El'ias, St., a mountain belonging to the range of the Sea Alps, on the N.W. coast of N. America, on the American side of the boundary-line between British N. America and the United States territory of Alaska. It is 17,800 feet above the sea, and the chain of which it is the culminating point extends to the S.E. for nearly 100 miles along the coast.

Eli'jah (Heb. 'God-Jehovah'), 'the grandest and the most romantic character that Israel ever produced,' is called 'the Tishbite of the inhabitants of Gilead,' which is literally all that is known of his parentage and birthplace. The facts of his life, gathered in the Bible narrative, are briefly as follow:—Ahab, the king of Israel, had introduced the religion of his wife's countrymen, the worship of the Phœnician Baal, and it is chiefly as a witness against this dishonour done to Jehovah that E. acts. He first appears on the scene (about 910 B.C.) announcing the vengeance of heaven in the shape of a severe drought and consequent famine. For this he had to flee from the vengeance of Ahab, and especially of Jezebel his wife. He hid himself at the brook Cherith, where his food was brought to him by ravens. From this he removed to Zarephath, between Tyre and Sidon, where he stayed with a widow, whose meal and oil he increased, and whose son he restored to life (1 Kings xvii.). After two years he reappeared before Ahab, and had his famous encounter with the prophets of Baal on Mount Carmel (1 Kings xviii.). Being in consequence again in danger of his life from the rage of Jezebel, he fled to the desert to the S. of Canaan. Arrived at Horeb, he had an interview with Jehovah, who comforted him and instructed him to appoint Elisha his successor. He again confronted Ahab, after his robbery of Naboth (1 Kings xxi.). After Ahab's death E. had occasion to denounce the conduct of his son Ahaziah, who had sent to consult the oracle of Baalzebub at Ekron (2 Kings i.). Finally he was taken up to heaven in a chariot of fire (2 Kings ii.).

There are serious difficulties in connection with E.'s biography, but the method of encountering them has not always been happy. To transform the 'ravens,' *e.g.*, into Arabs, merchants, &c., is a piece of trivial rationalism, whether done in the interests of revelation or against them. The whole career of the great prophet is enveloped in miracle, and cannot possibly be explained by hypotheses which reduce it to a commonplace level. Take away the startling, extraordinary, and marvellous element in his history, and his majestic character disappears along with it. There is nothing left that requires or deserves explanation; we need not suppose any veritable fact in the narrative at all. But great historical figures are not easily manufactured. It is more natural to suppose that the glowing and fearless genius of E. left a mark as true as it was indelible on the national memory; that his patriotic audacity involved him at times in deepest peril, and again secured him moments of supreme triumph. The mysterious Providence that moulds every life might shine out more vividly in this passionately-inspired man, and the circumstances and incidents of his heroic destiny might easily take a colouring of romance from the devotion of a grateful posterity, not because it had forgotten, but because it had remembered, his services to the Jehovistic faith of his fatherland. It may be difficult to reconcile E.'s letter to Jehoram King of Judah (2 Chron. xxi. 12-15) with the apparent date of his 'translation' (2 Kings ii.) five years earlier, but such a difficulty rather concerns a certain theory of inspiration than the really historic character of the record. No grander form stands out in the whole line of Hebrew prophets, nor did the reverence of later ages err when it exclusively associated his name with that of the great legislator himself.

Elimina'tion, in algebra, is the process by which from a given set of equations another is deduced, in which some of the original unknown quantities no longer appear. A system of n homogeneous equations in n variables cannot be satisfied by a common set of values unless there exists a certain definite relation between the coëfficients; and the algebraic expression which, equated to zero, represents this relation is termed the *eliminant* or *resultant* of the system of equations. This eliminant is a determinant of the nth order when the equations are linear. The only two works which can be said to give anything like a complete treatment of the subject are Faa de Bruno's *Théorie Générale d'Élimination*, and Salmon's *Higher Algebra*. The development of its theory and methods is chiefly due to Euler, Bezout, Sylvester, and Cayley.

El'iot, Sir John, an eminent English statesman and orator, in whom it has been well said 'centres the earlier struggle for parliamentary liberty,' was born of an old Devonshire family (since ennobled by the title of Earl of St. Germains) in Cornwall, 20th April, 1592. From an early age he showed a high and fearless spirit, and a vehement temper. After a careful education at Oxford he travelled for some time, and in 1614 entered public life as member for St. Germains. E. obtained the favour of Buckingham, and from

1619 to 1623 held the office of Vice-Admiral of Devonshire, receiving the honour of knighthood. E.'s activity, however, in the suppression of piracy, out of which Buckingham wished to make profit, caused him to lose ground with his patron, and he was even thrown into prison. Early in the reign of Charles I., E., now member for Newport, became prominent as the leader of the Parliamentary or Country party, and the uncompromising opponent of Buckingham. Fixing upon the responsibility of the king's ministers to Parliament as the leading principle of constitutional government, he led the House of Commons by a series of remarkable speeches to impeach the minister, and in this course he persisted, although he was thrown into prison for ten days. He was the prime mover of the first Grand Remonstrance on the 'state of the realm,' which preceded the assassination of Buckingham, and in the third Parliament of Charles denounced the dissolution which the infatuated monarch had determined on, saying, 'Some have gone about to break Parliaments, but in the end Parliaments have broken them.' In 1629 he was, along with two other leaders of his party, thrown into the Tower on the charge of disobedience to the royal commands, and ordered before liberation to pay fines of £2000, £1000, and £500. He refused, and his confinement was so rigorous that his health broke down, and he died 27th November, 1632. He had spent his time in prison in corresponding with his family and political friends, and in writing—among his works being a fragmentary *Memoir*, and an *Apology for Socrates*. A complete biography of E. is that by the late John Forster.

Eliot, George, the literary pseudonym adopted in 1857 by Marian Evans, one of the greatest of English novelists. The daughter of a land-agent, she was born near Nuneaton, Warwickshire, 22nd November, 1820, and received her early education at Coventry. Among her first efforts were translations of Strauss's *Leben Jesu* (1846) and Feuerbach's *Wesen das Christenthums* (1853); and, after a residence at Geneva (1849-51), she settled in London, becoming sub-editor of the *Westminster Review*. In the autumn of 1856 the editor of *Blackwood's Magazine* received from George Henry Lewes, as the work of an anonymous friend, the first of those *Scenes of Clerical Life* whose appearance next year proclaimed the rise of a new master-mind—a woman's, as Dickens was probably first to divine. They were followed in brilliant succession by *Adam Bede* (1859) *The Mill on the Floss* (1860), *Silas Marner* (1861), *Romola* (1863), *Felix Holt* (1866), *Middlemarch* (1872), and *Daniel Deronda* (1876). G. E. also published poems—the longest, *The Spanish Gypsy* (1868); the most powerful, *The Legend of Jubal* (1870)—and a volume of essays, *Theophrastus Such* (1879); but it is her novels that give her a claim to be remembered as the most commanding genius that has appeared among women in the whole realm of literature. Her special sphere was that quiet English country life which she had known in early youth; but her works are mainly distinguished by philosophic thought and profusion of scientific illustration, by intensity of unsectarian religious thought, by familiarity with the subtler processes of the mind, and with both the outer and the inner life of English society, and by a pure and strong sympathy with human knowledge. *Romola*, deemed by some 'a magnificent piece of cram,' by more regarded as her masterpiece, is altogether exceptional, a picture of Florentine life in the days of Savonarola. G. E. married first G. H. Lewes (q.v.), and afterwards a gentleman of the name of Cross. She died in Cheyne Walk, Chelsea, 22nd December, 1880.

Eliot, John, the 'Apostle of the Indians,' was born at Nasing, Essex, in 1604, educated at Cambridge, and emigrated to Massachusetts in 1631. He became pastor of the church in Roxbury near Boston, and applied himself to the Indian languages. In 1646, with a few friends, he went to a company of Indians and explained to them the Christian religion. Encouraged by the interest they evinced, he obtained a grant of land from the colonial government on which the Indians might settle and become civilised. By 1674 there were fourteen such settlements, to all of which E. preached. Though still pastor of Roxbury, he regularly travelled through forests and swamps to visit his dusky converts. In 1660 the important Indian church of Natick was formed. About this time E. published the New Testament in the Indian language, and three years after the Old Testament, the first Bible printed in America—a work of great philological interest. E. also instituted schools and wrote school books for the Indians. He died 20th May, 1690. See biography by Small, prefixed to facsimile of his *Indian Primer* (Edinb. 1878).

E'lis, an ancient division of the Peloponnesus, extended from Achaia on the N. to Messenia on the S., and from Arcadia in the E. to the Ionian Sea on the W. It was divided into three parts—E. Proper, or Hollow E., in the N., which consists of a fertile plain watered by the river Peneus; Pisatis, in the middle, which is the lower valley of the Alpheius; and Triphylia ('the country of the three tribes') in the S. E. contains more fertile land than any other division of the Peloponnesus, and produced in abundance wheat, flax, cotton, and grapes. Its rich pastures reared numerous horses and cattle, and it still contains much excellent timber. It possessed the temple of Olympian Zeus, whose festival, celebrated once in four years at Olympia, drew thither strangers in vast numbers; and in consequence of the sacred character which it thus acquired, its soil was regarded by the Greeks as inviolable. These games were abolished by Theodosius, A.D. 394. Of the ancient city of E., now *Kaloskopi*, the existing remains are scanty. Its gymnasium was by far the largest in Greece, and in it the competitors at the Olympic games were compelled to undergo a month's training before the competition. Modern E., together with Achaia, has an area of 1901 sq. miles and a pop. of 210,713.

Eli'sha (Heb. 'God the deliverer'), the disciple and successor of Elijah, held the office of prophet in Israel for a period of not less than sixty-five years [called at least four years before the death of Ahab (1 Kings xix.-xxii.) and died in the reign of Joash]. This prophet presents a striking contrast in appearance, manners, and character to his predecessor. Elijah, with his disordered locks and rough dress, was a true son of the desert, and made the desert his home; E. was a civilised man, dressed in the ordinary style, and frequenting the haunts of men. In character the former was distinguished by fiery zeal against all that opposed Jehovah; the latter, by toleration towards the false religions and general beneficence. The most remarkable feature of the history of E. is the great number of miracles he performed, and the astonishing nature of some of them—*e.g.*, the horses and chariots of fire that encompassed him at Samaria; the smiting of the Syrian host with blindness, and their subsequent capture; the swimming of the iron in the water; the raising to life of a dead man by touching the bones of the buried prophet—in all of which E. appears not like one on whom a double portion of Elijah's spirit had fallen, but rather as an Oriental thaumaturgist. The moral and spiritual elements are absent from the circumstances of his career. We cannot discover in him an instructor and guide of the people, and, except in a certain mildness and gentleness of character, to which the maniacal outburst of temper at Bethel, when he cursed the children in the name of the Lord, and procured their destruction, forms a startling exception, there is little to justify the parallel drawn between him and Christ.

Elisors. If the sheriff, or coroner, who ought to return the jury be a party to a suit, or interested in it, the *venire* (see VENIRE FACIAS) is directed to two clerks of the court, or to two persons of the county named by the court and sworn; and these two, who are called E., or electors, shall name the jury, and that without challenge.

Elix'ir (Arab. *al-iksir*, 'quintessence'), a term in chemistry and modern pharmacy used to denote a tincture with more than one base, or a compound tincture. Among the alchemists an E. denoted a liquor for transmuting metals into gold, and in later times a quintessence, a cordial, or a substance which invigorates. The term tincture is now more common. A great variety of medicines have appeared under the term *E. vitæ*, or E. of life, which are merely compound tinctures of aromatic and stimulating substances. The elixirs best known in pharmacy are the following :—E. paregoric, or *Tinctura camphoræ composita*, a preparation of opium, benzoic acid, camphor, oil of anise, and proof spirit, an excellent remedy for allaying spasmodic cough in bronchitis and phthisis; dose from 15 to 60 minims; 1 drachm contains ¼-grain powder of opium = ⅛ grain of extract. E. of vitriol, or *Acidum sulphuricum aromaticum*, is prepared from sulphuric acid, rectified spirit, cinnamon, and ginger. It is used for making an acid drink, and for checking profuse perspiration. Tincture of aloes and myrrh is sometimes called *E. proprietatis*.

Eliz'abetgrad, a town in the government of Kherson, Russia, on the Ingul, 130 miles N. by W. of Kherson. It has an arsenal with six bastions, and there are four suburbs. The streets, spacious and well built, are in some instances lined with trees. E. has a good general trade and an important annual fair. Pop. 58,720.

Eliz'abeth, Queen of England, the daughter of Henry VIII. and Anne Boleyn, was born 7th September, 1533. She shared her mother's disgrace, and was for a time in seclusion. From this she was allowed for a short period to emerge, but was again disgraced and declared illegitimate along with her sister Mary. In the reign of Edward VI. E. appeared at court, and having avowed herself a Protestant, was looked upon as the hope of the Protestant party. But in the reign of Mary, though she conformed to Papistry, she once more suffered under the royal displeasure. Accused of being concerned in the plot of Sir Thomas Wyatt, she was sent to the Tower in 1554, and would have probably been beheaded but for the fear of a Protestant rising. On her release she was transferred to Woodstock, and then allowed to remain at her residence, Hatfield House, in Hertfordshire, till the death of Mary, 17th November, 1558.

These hardships made E. the singular and successful sovereign she is universally recognised to have been. From her father she inherited courage, pride, frankness, bluff and sometimes brutal manners, cordiality in her dealings with, and a genuine love for, her subjects; from her mother a sensuous nature, a commanding figure, and love of flattery. But her early education in the school of solitude and misfortune rendered her capable of subordinating the gratification of her passions to that of her intellect, taught her what was then the politician's chief art, dissimulation, and made her the most accomplished and eccentric woman of her time. While her brother Edward VI. thought her the essence of propriety, and called her his 'sweet sister Temperance,' she was coquetting outrageously with Lord Seymour, and yet she jested at his death. Her varied culture at court and in retirement made her at once a graceful dancer and musician, a skilful horsewoman, a devotee to classics and to the 'new literature,' as familiar with Tasso and Ariosto as with Demosthenes; 'she could talk poetry with Spenser and philosophy with Bruno; she could discuss euphuism with Lyly, and enjoy the chivalry of Essex; she could turn from talk of the court fashions to pore with Cecil over despatches and treasury books; she could pass from talking business with Walsingham to settle points of doctrine with Parker, or to calculate with Frobisher the chances of a N.W. passage to the Indies.' Extravagantly fond of rich dresses, jewels, and gorgeous processions, she was also extremely economical. She detested war on account of its expense, and grumbled at the bill she had to pay for the defeat of the Armada. Although her passions frequently led her astray, she never let them seriously affect her public policy; throughout her reign she was guided by the counsels of the Cecils, and not by those of Leicester and Essex.

When E. ascended the throne in her twenty-fifth year, she was welcomed by all classes, Catholics as well as Protestants, for her religious opinions were known to be moderate, and domestic misgovernment, national disorders, and religious fanaticism had made the name of Mary in the last degree odious. Circumstances, more than religious sentiment, made E. a Protestant sovereign. She fell back upon what her father did. The majority in her first Parliament was Protestant, and it repealed the Statutes of Heresy, dissolved the monasteries which had been founded, deprived Mary's bishops of their office, restored the royal supremacy, and established the Church on the Prayer-Book of Edward VI. and the Thirty-Nine Articles. In her ecclesiastical policy she was aided by Parker, a moderate but resolute divine, who was made Archbishop of Canterbury in 1559, and in her foreign policy by William Cecil, Lord Burleigh. Although the former was non-revolutionary and the latter peaceful, yet the Act of Uniformity by which her Church policy was carried out led to bloody persecutions both of Romanists and of Puritans, or the Protestants who took their doctrines from Geneva, while the policy of Cecil ended in war. E. supported by money the Protestants struggling in France, in the Netherlands, and in Scotland. Her rival Mary, Queen of Scots (q.v.), brought into collision with the Scottish nation, fled into England and was imprisoned by E. Being looked upon as the next heir to the throne, Mary became the hope of the Roman Catholic faction in England. Conspiracies were formed in her favour. The Dukes of Northumberland and Westmoreland headed a rebellion in the north which was put down with great severity. Pope Pius V. published a bull absolving E.'s subjects from their allegiance to her. At length the discovery by the spies of Walsingham (q.v.) of a plot against her life by a Roman Catholic gentleman named Babington led to an outcry by Parliament for vengeance on Mary. She was charged with being accessory to Babington's plot, tried before a commission, and beheaded 8th February, 1587, in the hall of Fotheringay Castle. Mary had bequeathed to Philip of Spain her rights upon England, and he, resenting the aid given to the Netherlanders, and the attacks made by British seamen on Spanish commerce, resolved on vengeance. The destruction of the 'Armada' (q.v.) was the greatest event in the reign of E. Dudley, Earl of Leicester, who had commanded one of the armies that was prepared to meet the troops of the Duke of Parma, died suddenly in the midst of the national rejoicings, and E. was never herself again. The latter years of her reign were occupied chiefly with Irish affairs. Hugh O'Neil, Earl of Tyrone, raised (in 1595) the flag of rebellion against the authority of England, which had been established in the reign of Henry VIII., and for a time overran Ireland. E. sent against him Essex, who had succeeded Leicester as her favourite, but Essex was not successful and made a delusive truce with Tyrone. He was in consequence recalled, and attempting an insurrection in London, was apprehended, tried, and beheaded 25th February, 1601. Although Ireland was subsequently reduced to submission by Blount, Lord Mountjoy, E. fell into a state of utter despondency after the death of Essex, and, indeed, may be said to have outlived her time. She lived into a period of earnest Puritanism which failed to understand, still less to approve of, her vanity and irreligion; and although by skilful concessions, especially on the matter of monopolies, she avoided a collision with Parliament, she would, had she lived, probably have been found in opposition to the wishes of the second generation of her subjects. In the end her temper became intolerable. She chid her attendants and even her chief adviser, the second Cecil. She believed that she was beset with murderers, had a sword constantly beside her, and repeatedly thrust it through the arras. Finally she refused to take sustenance. Her last act was to indicate by a motion of her head that she wished her successor to be James VI. of Scotland. She died in her seventieth year, 24th March, 1603.

The life of E. was essentially lonely and far from happy. She refused to be married, even when Parliament petitioned her, and declined the offers made by numerous and powerful suitors, including Henri of Anjou, the Duc d'Alençon, Prince Erik of Sweden, the Archduke Karl of Austria, and even, it is said, Philip of Spain; and yet that she felt her loneliness is plain from such ejaculations as that on hearing of the birth of a son to Mary, Queen of Scots—'The Queen of Scots has a fair son, and I am but a barren stock.' It seems now to be proved beyond dispute that she would have gladly married the worthless Leicester, and it is far from certain that she did not stoop to be an accessory to the murder of Amy Robsart, Leicester's wife. Burleigh was able to prevent this marriage, but he was not able to persuade her to another.

From the reign of E. may be said to date the material prosperity, the naval power, the commercial activity, and the literary glory of Great Britain. The great seamen and adventurers of the time, Hawkins, Drake, Frobisher, and Raleigh, made their country the mistress of the seas, and found an outlet for its commercial and colonising energy. What grew into the East India Company obtained its charter, and Birmingham, Manchester, and Sheffield became seats of manufactures. The general increase of wealth showed itself in an increase of luxury, in richer dresses and better houses than had hitherto been known. The first attempt was made by the suppression of mendicity to grapple with the problem of pauperism. The reign of E. saw the fulness of the literary glory of Sidney and Spenser, the death of Marlowe, and the rise of Shakespeare. See Camden's *Annales Rerum Anglicarum et Hibernicarum regnante Elisabethâ* (Lond. 1615); Froude's *History of England* (vols. vii. to xii.), which is especially valuable for the extracts from the state-papers of Cecil, and the documents preserved in the archives at Simancas; also the authorities quoted in Green's *Short History of the English People*.

Elizabeth Stuart, Queen of Bohemia, born in 1596, was the daughter of James I. of England and Anne of Denmark. In 1613 she married the Elector Palatine, Friedrich V., who on the forced abdication of Ferdinand II. in 1619, was called to the throne of Bohemia. This he lost by the battle of Prague (8th November, 1620), which drove the royal spouses to Holland. It was not till after the Peace of Westphalia that E.'s son Karl recovered his father's hereditary estates in the Palatinate. E.'s eldest son was christened Moritz by the Prince of Orange. E. died at London, 13th February, 1662. She left a daughter, E., who, during her parents' retreat at Leyden, studied geometry and metaphysics with Descartes, who dedicated to her his *Principia*. This lady afterwards withdrew to the Abbey of Heroorden, which yielded her 20,000 dollars of income, and where she kept an open house for literary persons of all churches and creeds, Catholics as well as Free-thinkers, and Unitarians as well as Lutherans. She died in 1680. See Miss Benger's *Memoirs of E. S., Queen of Bohemia*.

Elizabeth of Valois, Queen of Spain, born at Fontainebleau, 13th April, 1545, was the daughter of Henri II. and Catharine de Médicis. 'The Princess of Peace' was promised in marriage first to Edward VI. of England, then to Don Carlos, but was ultimately married to Philip II. in 1559, the Duke of Alva appearing as proxy at Notre Dame. She met her husband at Guadalavara, and Brantôme says stared at him so much that Philip said, 'What are you looking at? Is my hair white?' After a short and unhappy life E. died at Madrid, 3rd October, 1568. See Brantôme's *Vie des Dames Illustres*.

Elizabeth, Queen of Spain, born 22nd November, 1602, was the daughter of Henri IV. and Marie de Médicis. She married Philip IV. of Spain in 1615, the Infanta Anna Maria of Austria being at the same time given to Louis XIII., a proceeding most distasteful to the Huguenots. E. had an enemy in the Minister Olivarez. She displayed political energy, and a strong love of her adopted country. She died 6th October, 1644.

Elizabeth Farnese, Queen of Spain, born 25th October, 1692, was the daughter of Odoardo II. of Parma. She was ill-treated by her parents, and was a singularly ugly and obstinate child. In 1714, on the suggestion of Alberoni and the Princess des Ursins, *camarera mayor* or first maid of honour at the Spanish court, she married Philip V., then a widower. Her first act was to drive Des Ursins from Spain. Her active mind at once assumed the mastery over Philip, whom she reconciled with the Duc d'Orleans. She supported the Inquisition, and substituted D'Aubenton for Robinet as the King's confessor. The Spaniards resented the increase of Italian influence at the court. The temporary abdication of the jealous and hypochondriac Philip and the reign of her stepson Louis interrupted her schemes, pursued in the European alliances, the Congress of Cambrai, the Congress of Soissons, &c., for securing the Two Sicilies and the Duchies of Parma and Piacenza to her son Carlos, who became King of Naples in 1734, and Charles II. of Spain in 1759. E. survived her husband until 1766. The 'tenacious termagant,' as Carlyle calls her, had great political ability; she spoke fluently in Spanish, Latin, German, and French. Among her younger children were Maria Anna, married to Joseph, King of Portugal, and Marie-Antoinette, married to Victor Amadeus, King of Sardinia. E.'s *Memoirs* were published in 4 vols. at London, 1746. See also Peralla, *Historia Civil*, and the innumerable private memoirs of the time (Noailles, Saint Simon, Duclos, &c.).

Elizabeth Christine of Brunswick-Wolfenbüttel, born 28th April, 1691, was the daughter of Ludwig-Rudolf of Brunswick-Blankenburg. Her grandfather, Anton Ulrich, who wrote novels—'six vols. in 4to'—brought about her marriage with the Archduke Karl, who had been previously refused by Caroline of Anspach. This event in 1707 caused the elder Brunswick family to become Catholic. E. was proclaimed Queen of Spain at Barcelona, and after her husband's election as Emperor acted as regent there till the Peace of Utrecht (1713). She was then crowned at Presburg Queen of Hungary. On her husband's death in 1740, E. devoted herself to the cause of her daughter, the famous Maria Theresa. She founded the order of the Red and White Star, to be conferred by the Aulic Council of War on twenty-one superior officers who should have served Austria for thirty years. E.'s sister Charlotte married Alexius, the Czarovitch, and had a 'fabulous end.' Her sister Antoinette married Ferdinand Albrecht of Brunswick-Bevern, and became the mother of Friedrich the Great's wife. E. died 21st December, 1750.

Elizabeth, Queen of Hungary and Poland, the daughter of Stephen, Ban of Bosnia, married in 1363 to Louis the Great, King of Hungary and Poland. After her husband's death E., as regent, assisted by the Palatine, Nicolas of Gara, oppressed her subjects until the arrival of a Neapolitan prince, Charles of Durazzo, who was crowned in 1385, and soon after was murdered. E. was herself murdered in 1387 by the Ban of Croatia.

Elizabeth of Poland, Queen of Hungary and Transylvania, born in 1518, daughter of Sigismund I. of Poland, married to John Zapolski, whose death in 1540 left her in a difficult position between Ferdinand I. on the one hand, and the Sultan Suliman, who took possession of Hungary, on the other. E. offered to cede Transylvania to Ferdinand for Ratibor and Oppeln in Silesia, but the bargain was not carried out, and the Turks helped her to drive the Austrians from Transylvania. She died 20th September, 1558, leaving a son Stephen, or John Sigismund.

Elizabeth Petrov'na, Empress of Russia, was the daughter of Peter the Great and Catharine I., and was born 18th December, 1709. Contrary to the order of succession prescribed by the will of Catharine, on the death in 1730 of Peter II., the Dolgorouki family placed on the throne Anna, Duchess of Courland, a niece of Peter the Great. (See ANNA and BIRON.) But a palace insurrection made E. empress, 6th December, 1741. In her reign capital punishment was abolished, but the activity of the 'Secret Chancery' caused the greatest misery, and the ancient authority of the Senate was restored. A successful war against Sweden was terminated by the Peace of Abo (1743), and E. selected the new King of Sweden, Adolf of Holstein-Gottorp. E. made her nephew, the Duke of Holstein (afterwards Peter III.), her presumptive heir, and gave him as wife Sophie of Anhalt-Zerbst (afterwards Catharine the Great). She encouraged education by founding a university at Moscow and an academy of fine arts at St. Petersburg, and she gave to Voltaire the materials for his work on *Russia under Peter the Great*. There were many reasons for the war with Prussia—the influence of Bestuchef, 'corruptiblest brute of a chancellor ever known'; the war-policy of Schouvalov; the indignation of the Czarovitch, whose wife E. had insulted; and, lastly, a personal pique against Friedrich on the part of E. In the Seven Years' War her troops were repeatedly successful, and her death, 5th January, 1762, was a fortunate thing for Friedrich, as her successor Peter was friendly to Prussia. E. earned for herself in Europe the shameful title of 'Catin du Nord.' She was grossly superstitious, being unable to face the dark; and extravagantly luxurious, leaving 15,000 unused dresses in her wardrobe. See Weydemeyer's *Zarstwowanie Elisawety Petrowny* (Petersb. 1834).

Elizabeth of Thuringia, St., daughter of King Andreas II. of Hungary, was born at Presburg in 1207. She was married at the age of fourteen to Ludwig, son of Hermann, Landgraf of Thuringia. When a girl, she astonished the court of Wartburg, the brilliant resort of the *minnesingers*, by her gentleness, benevolence, and piety. After her husband's death in the Fifth Crusade, his brother, Heinrich Raspe, stripped her of authority, which she afterwards declined to resume, contenting herself with her revenues as Landgräfinn. She spent her life in constant penances and benefactions, wandering about to relieve the sick and the poor, and was brutally maltreated by her fanatical confessor, Konrad of Marburg. Worn out by sufferings, she died, at the age of twenty-four, in 1231, in one of the many hospitals which she had erected in Germany. She was canonised in 1235. The victim of monkish cruelty and of her own false ideal of duty, she led a singularly mournful, stainless, and noble though mistaken life. In piety and self-sacrificing zeal she resembles the celebrated St. Theresa. The story forms the subject of Kingsley's *Saint's Tragedy*. See Montalembert's *Histoire de Sainte Elisabeth de Hongrie* (Par. 1836).

Elizabe'than Ar'chitecture, a transition style of English architecture, unique in its origin, application, and duration. It arose with and reached its prime during the reign of Elizabeth, and its chief characteristic as an architectural style is a revived classicism engrafted upon the domestic Gothic of the Tudor period. The necessity for building great cathedrals passed away at the completion of the Reformation, and the hatred of symbols which now took possession of the nation's mind, and of the pride and pomp of the ceremonial of the old religion, as savouring of idolatry, was extended in part to the old religious houses. While many of these were destroyed or injured, no rich and splendid churches were being built for the Protestants, and architecture, no longer employed in building temples for God, was almost wholly occupied during Elizabeth's reign in building mansions for the nobility and gentry. It was evident that a Reformed people could not dwell in mansions the style and feeling of which were Gothic and Catholic; and as at this time—the earlier half of the 16th c.—a classic renaissance in literature and art was beginning to shed abroad its borrowed light, the architects of the period eagerly appropriated classical outline and detail, and modifying these by rules best known to themselves, and combining them with the chief structural features of the late domestic Perpendicular, they created E. A. This style prevailed for about a century. Though true to neither Gothic nor Classical architecture, E. A. is stately and picturesque. It embodied all the ideas of splendour and luxuriousness that prevailed during the 16th c., and its chief characteristics were great bow windows, long and wide galleries, vast elaborately-carved chimneypieces, panelled and wainscoted walls, spacious staircases with carved balustrades, heraldic figures, &c. Noble specimens of this architectural style are Campden House, Longleat, Holland House, Kensington, Hardwick, Burleigh, and Knowle. See Fergusson's *History of Architecture.*

Elizabeto'pol, a town of Russian Transcaucasia, on the Jansha, and capital of a government of the same name. It is divided into four quarters, two of which are inhabited by Armenians and two by Tartars. Pop. 22,073. The principal industries are horticulture and the rearing of bees, silkworms, and cattle. The *government* of E. has an area of 16,721 sq. miles and a pop. of 793,969. Its chief products are madder, tobacco, lint, and grain.

Elk or Moose Deer, the largest species of *Cervidæ* or Deer (q.v.) inhabiting N. Europe and America, being known under the name of 'Moose' in the latter continent. In the E. genus the neck is short and thick, and the hair bushy and coarse. A 'mane' exists on the throat, and the hind legs have tufts of hair above the metatarsus. The muzzle is broad and hairy, and the horns are large and 'palmed,' but have no basal 'snags,' or short branches near the crown. The tail is very short. The E. may attain a height of 7 feet at the shoulders. Its colour is a dark brown, the legs possessing lighter tints. The E. is hunted for the sake of its horns, skin, and flesh. It is wonderfully agile and swift, but is speedily overtaken in snow. When brought to bay, it will fight with great courage and ferocity. It may be domesticated and trained to carry burdens if captured young. The horns in a large specimen may weigh about 60 lbs. In Sweden the E. is not allowed to be hunted, and the chase is greatly restricted in Norway.

American Elk, or Moose.

Elk, Irish, a famous fossil and extinct genus of deer, supposed to be intermediate in structural position with the Reindeer (q.v.) and Fallow Deer (q.v.). Its remains occur in the Pleistocene or Post-tertiary deposits of Ireland, and also in deposits of similar age in England, Scotland, and on the Continent. This animal was of very large size, and the antlers were enormous, attaining an expanse of 10 feet from tip to tip, and a weight of between 70 and 100 lbs. The I. E. does not appear to have survived into the Prehistoric period.

El Khar'geh, the chief town of the Great Oasis, in the Libyan Desert, 115 miles W. of Esneh, on the Nile. The Khargeh and Dakhel oases, taken together, form the Great Oasis. E. K. is the centre of numerous converging routes between the Nile on the E. and the oases on the W. and N. In the vicinity are extensive palm-groves, and there are numerous Egyptian, Roman, and Arabic remains. The oasis and town were visited by Schweinfurth in the winter of 1873-74, by Rohlfs in 1874, and by the Grand Duke of Oldenburg in 1875. Pop. 4060.

Ell (Dutch *eln*, Fr. *aune*, Lat. *ulna*), a linear measure taken originally from the length of the fore-arm. The Flemish E. is 27 inches long; the French E. (see AUNE), 47¼ inches; and the English E., 45 inches.

Ell'enborough, Earl of, Edward Law, an English orator and statesman, was born 8th September, 1790, educated at Eton and Cambridge, and became Lord Privy Seal under the Duke of Wellington (1828), and President of the Board of Control in the two administrations of Sir Robert Peel. In 1841 he was made Governor-General of India. In this capacity his policy was vigorous, and he aided in vindicating the British honour in Afghanistan, but gave great offence to the civil servants of the Company, while some of his proclamations—particularly that in regard to the sandal-wood gates of the temple of Somnauth—provoked much censure and ridicule. Ultimately E. was recalled (1844). He was, however, supported by the Government, appointed to the office of First Lord of the Admiralty, and raised to the dignity of earl and viscount. In Lord Derby's administration of 1858 E. became Indian Minister, but was again unfortunate; a despatch he sent to Viscount Canning rebuking him for what is known as his Oude Proclamation caused a great outcry, and compelled him to resign (1858). After this E. was one of the keenest and most eloquent of the critics of Liberal administrations. He died at his seat, Southam House, near Cheltenham, 22nd December, 1871. See Lord Colchester's *Defence of Lord E.'s Indian Administration* (Lond. 1875).

Ell′enrieder, Marie, a German painter, was born at Constance in 1791, studied art in her native place, but afterwards at Munich and Rome. At Karlsruhe, where she lived for some time, she painted a 'Martyrdom of St. Stephen,' after which she was nominated court painter at Munich. After a second visit to Rome in 1839, she returned to Constance, where she settled till her death in June, 1863. Such were the grace and sweetness of her heads of women and children that it has been said of her 'she painted with angels about her.' Her subjects were for the most part sacred. 'A Child Overtaken by a Thunderstorm' is her best-known *genre* work.

Elles′mere, Francis Egerton, Earl of, an English nobleman and man of letters, was the second son of the first Duke of Sutherland, and was born in London, 1st January, 1800. He entered Parliament in 1822 as Lord Francis Leveson-Gower, supported the cause of free-trade, and helped to establish the University of London. In 1846 he was elevated to the peerage as Earl of Ellesmere. He died 18th February, 1857. E. was an ardent student and a respectable *littérateur*. In 1824 he published a translation of *Faust* with versions of lyrics from Goethe, Schiller, and others; *Mediterranean Sketches* (1843); *The Two Sieges of Vienna by the Turks* (1847); and *Guide to Northern Archæology* (1848).

Ellesmere, a town on the N. border of Shropshire, 10 miles S.W. of Whitchurch by railway. It has a church, part of which dates from the 14th c., and it is situated near a fine lake. Pop. reg. sub-dist. 6296; and civ. par. 5507. The people are mostly engaged in malting.

Ellesmere, Lake, in the province of Canterbury, New Zealand, 20 miles S. of Christchurch, has an area of 125 sq. miles. It receives the Selwyn, but has no outlet, except in wet seasons, when it overflows into the sea.

Ell′ichpoor or Ellichpur (*Ilichpur*), the chief town of a district of the same name in Berar, or assigned districts of the Nizam, 275 miles N. of Hyderabad, and 100 E. of Nagpur. It has a beautiful well and many fine tombs, surrounded by gardens. There is a military cantonment at Paratwada, two miles distant from the town, where the Hyderabad contingent of 73 cavalry, one battery of artillery, and 765 infantry are quartered. The trade is in local products. There are manufactures of cotton and silk fabrics, carved articles, lac ornaments, &c. Pop. 26,637, of whom 19,042 are Hindus, 7301 are Mohammedans, 250 are Jains, and 3 are Parsees.—The *district* is the most mountainous in Berar. Area, 2623 sq. miles; pop. 315,798. The gross revenue is £123,652. The chief products are *joar* (a kind of millet), cotton, rice, excellent wheat, grain, pulses, oilseeds, and timber; besides tea, and various kinds of fruit. In 1853 the district was assigned to the British. The climate is trying, and cholera, small-pox, and fevers prevail.

Ell′iot, an ancient Scottish border family, which has produced several distinguished men. The first really notable E. was **Gilbert**, 'the laird of Stobbs,' in Roxburghshire, who married a daughter of Scott of Harden, and was the grandfather of the Gilbert E. who was made a baronet in 1666. From the latter's younger son are descended the Earls of Minto; while his elder son was father of **George Augustus E.**, the defender of Gibraltar, who was born in 1718, entered the army at the age of fifteen, and distinguished himself at the battle of Dettingen and in the Seven Years' War. After the peace, he was made lieutenant-general, and having been appointed Governor of Gibraltar in 1775, he, in 1782, repelled the prolonged attacks of a Franco-Spanish force of 30,000 men, supported by ten floating batteries, and compelled the enemy to change the siege into a blockade, which ended in the Peace of Versailles, 20th January, 1783. E. received the Order of the Bath, and afterwards the title of Lord Heathfield. He died 6th July, 1790.—**Sir George E.**, brother of the first Earl of Minto, was born 12th August, 1784, entered the navy, rose rapidly in the service, and in 1837 was appointed one of the Lords of the Admiralty, and Commander of the Fleet at the Cape of Good Hope. In 1840 he was appointed to the chief naval command in Chinese waters, and on the 5th of July he captured the island of Chusan. He was promoted vice-admiral in 1847, admiral in 1853, and died at Kensington, 24th June, 1863.—**Sir Charles E., K.C.B.**, nephew of the preceding, was born in 1801, entered the navy in 1816, served in India, on the African coast, and the W. Indies. In 1835 he was appointed Chief Commissioner and Plenipotentiary in China. He was in the centre of the diplomatic operations leading up to the ransom of Canton in August, 1841, and was subsequently in succession Chargé d'Affaires in Texas (1842-46), Governor of the Bermudas (1847-52), of Trinidad (1853-56), of St. Helena (1863-69). He died at Withycombe, Devon, 9th September, 1875.—**Sir Henry Meiers E.**, son of John E. of Pimlico, was born in 1808, educated at Winchester, and entered the Indian civil service, the first of the competition set, in 1827. He became Secretary to the Government of India in the Foreign Department, and died at the Cape of Good Hope in 1853. His chief work was his posthumous *History of India as told by its own Historians* (Lond. 1867). He also wrote a *Supplement to the Glossary of the Indian Terms*, from which was compiled *Memoirs on the Races of the North-Western Provinces of India* (Lond. 1859).

Elliot, Ebenezer, the 'Corn-law Rhymer,' was born near Rotherham, in Yorkshire, 7th March, 1781. He began life in an iron-foundry, where his father was clerk. In 1821 he started an iron-work at Sheffield, and was so successful that he retired from business in 1841. He died near Barnsley, 1st December, 1849. E.'s poems comprise—(1) Pieces descriptive of scenery and rural life, chiefly in Yorkshire, as, *The Vernal Walk*, *Night*, *Wharncliffe*, *The Village Patriarch*; (2) the political pieces, or *Corn-Law Rhymes*, to which he more especially owes his fame. These appeared between 1831 and 1836, and are marked by great fire of diction and a certain rude straightforward earnestness. In 1834 appeared a collected edition of E.'s works in 3 vols.; in 1840 an one vol. edition. See Carlyle's essay on the *Corn-Law Rhymes*, and an autobiographic sketch in the *Athenæum* of 12th January, 1850.

Ellipse′, a central curve of the second order, distinguished from the Hyperbola (q.v.) in having no infinite branches. It is one of the so-called conic sections, being the curve in which a right cone is intersected by a plane cutting its opposite sides obliquely. Every point on the circumference is such that the sum of the lines drawn from it to two certain fixed points inside the figure is equal to a constant quantity. These two points are called the *foci* (sing. *focus*). It is symmetrical with respect to two axes, the *major* and *minor*, in the former of which the foci lie. The double ordinate through either focus is called the parameter, and is a third proportional to the axes. Also, the square of any ordinate is less than, or differs in *defect* from, the rectangle contained by the abscissa and parameter—whence the name E.

Ellip′sis (Gr. *elleipsis*, 'omission'), a figure in grammar and rhetoric, by which one or more words are omitted, to be filled in by the imagination. It expresses strong feeling, and conduces to brevity and energy, as in many familiar phrases. The omission of connectives, as in 'The wind passeth over it —it is gone,' is called *asyndeton*, a figure of great importance with the Greek rhetoricians.

Ellip'soid, a surface of the second degree, whose *every* plane section is an ellipse. It is completely determined by its three rectangular axes, *a*, *b*, and *c*. If any two of these axes be equal, the surface becomes an E. of revolution or Spheroid (q.v.).

Ell'is, George, F.R.S., F.S.A., one of the earliest, soundest, and most tasteful of the scholars who have devoted themselves to Early English literature, was born in London in 1745. He was educated at Westminster school and at Cambridge, was one of the authors of the *Rolliad*, a satire on Pitt, with whom he afterwards became reconciled; accompanied Lord Malmesbury as secretary to Lisle in 1797; became a contributor to the *Anti-Jacobin*, and died 15th April, 1815. Walter Scott said E. was the best converser he had known. E.'s works are *Specimens of the Early English Poets* (1790); *Specimens of English Metrical Romances; Essay on the Formation and Progress of the English Language;* and a preface, notes, and appendix to Le Grand's *Fabliaux*. E. renders the quaint language of mediæval poets into modern English with a graceful ease which is made doubly charming by a curious combination of genuine sympathy with mocking humour. He was a worthy forerunner of the new school of critics and historians who have revived an interest in our early literature.—**William E.,** born in London, 29th August, 1794, worked as a missionary in the South Sea Islands from 1816 to 1824, when he returned to London. He was Foreign Secretary of the London Missionary Society from 1838 to 1840. In 1853 he visited Madagascar to examine the state of Christianity there. The results of this journey were embodied in his *Three Visits to Madagascar*, 1853-56, *with Notices of the People, Natural History, &c.* (1859), an excellent work. His other works are—*Narrative of a Tour through Owhyhee* (1826); *Polynesian Researches* (1829); *History of Madagascar* (1839); *Vindication of the South Sea Missions* (1851); and *Madagascar Revisited* (1867). E. died 9th June, 1872.—**Sarah Stickney E.,** born about 1800, married William E. in 1837. She was the authoress of many well-known works, among which are *Women of England* (1838); *Daughters of England* (1842); *Wives of England* (1843); *Hearts and Homes* (1848); *Mothers of Great Men* (1859); and several tales, *The Sons of the Soil, Family Secrets*, &c.—**Alexander John E.,** whose original name of Sharpe was changed by royal license in 1825, was born at Hoxton, 14th June, 1814. He was educated at Cambridge, and entered the Middle Temple, but never practised as a lawyer. He was made an F.R.S. in 1864, and was president of the Philological Society in 1872-74. Among his works are—*Alphabet of Nature* (1845); *Essentials of Phonetics* (1848); *Universal Writing and Printing* (1856); *Early English Pronunciation, with Especial Reference to Chaucer and Shakespeare* (1869-75); *Algebra identified with Geometry* (1874), &c. See PHONETIC WRITING.

Ello'ra, a decayed city of India, in Hyderabad, 13 miles N.W. from Aurungabad, and 170 E. of Bombay. It is encircled by a ruined wall, but is now a mere village, famous only for its rock-cut caves and temples. These are excavated in the side of a hill of red granite, and are of two distinct kinds—caves proper, and temples hewn out of the solid rock. The former are of Buddhist origin; the latter were made, in a later age, by the followers of the Jain and Brahmanical religions, and are among the most stupendous productions of man. Of the caves, the most celebrated is the Viswakarma Chaitya, or assembly hall, which is 85 feet long by 43 feet wide. The façade is less elaborately ornamented than in other cases; the roof is curved, and supported by twenty-eight octagonal figures; at the end is a colossal sitting statue of Buddha. There are numerous *viharas*, or Buddhist monasteries, of which by far the largest is 110 feet by 70. These are all caves proper, and their excavation is placed by Fergusson at about A.D. 600. One of them has Brahmanical sculptures. The rock-cut temples are monolithic, and hewn entirely out of the hill, 'the rock having been cut away externally as well as internally'; each temple looking as if it had been placed in a pit. In the case of the Hylas, the most magnificent of these structures, the pit was dug in the sloping side of the hill, 100 feet deep, 150 wide, and 270 long. In the centre was left standing a block forming the temple, from 80 to 90 feet high. All round is a peristylar cloister, covered with carved objects from the Hindu pantheon. The temple itself is covered with carved and sculptured figures. There is no inscription or other date. It has been assigned to about A.D. 800, allowing for the excavation from thirty to fifty years. It was the work of a Dravidian people, and was dedicated to Siva. A second temple, the Dhumnar Lena, at the corner of the hill, 150 feet square, is so excavated that light is admitted from three sides, while the fourth side is part of the solid rock. The Jain rock-chambers have gateways and detached shrines. Of these the two finest are the Indra Subha and Jaganath Subha, which probably date from A.D. 750. See Fergusson's *History of Indian Architecture*.

In 1818 Holkar ceded E. to the British, and in 1822, in accordance with the provisions of the treaty of Hyderabad, it was handed over to the Nizam.

Ellore', or **Elur,** a town of British India, province of Madras, on the Jummulair, 38 miles N. of Masulipatam. It has manufactures of carpets and leather, was formerly an important military station, and is connected by an aqueduct with the Kistna Canal, but has a bad climate. It was famous in olden times as the chief town of the Northern Circars. Pop. 29,382.

Ells'warth, a port in Maine, on the Union River, 2 miles from its mouth, and 30 miles S.E. of Bangor. It has considerable shipbuilding, and an active wood trade. Pop. 4804.

Ell'wood, Thomas, a Quaker writer, born at Crowell, Oxfordshire, in 1639, now remembered for his relations with Milton, to whom he became reader in 1661. In 1665 he visited Milton at Chalfont St. Giles, Buckinghamshire, and the poet gave him the MS. of *Paradise Lost*, asking him to criticise and return it. E. tells us he read the poem, and took it back to Milton:—'He asked how I liked it and what I thought of it, which I modestly but freely told him; and after some further discourse about it, I pleasantly said to him, "Thou hast said much here of paradise lost; but what hast thou to say of paradise found?"' Milton, says E., sat some time musing, then changed the subject, but on E. visiting him after the Great Plague, he showed him *Paradise Regained*, and said, 'This is owing to you; for you put it into my head by the question you put to me at Chalfont, which before I had not thought of.' He died in 1713. See his *Autobiography* (1714).

Elm (Old Eng. *ellm*, Dut. *olm*, Swed. and Dan. *alm*, comp. Lat. *ulmus*), a genus of Exogenous plants typical of the natural order *Ulmaceæ*, in which the leaves are alternate stipulate, with unisexual flowers borne in loose clusters. The perianth is inferior, irregular, and bell-shaped. The stamens are definite, and are attached to the base of the perianth. The ovary is one or two celled, and the fruit is dry or drupaceous. The seed is solitary, with little or no albumen. The genus *Ulmus* has a two-celled ovary and anatropal ovules, whilst the fruit is a *samara* and possesses winged appendages. The English E. has small elliptic leaves. The flowers are subsessile. This tree grows in all parts of Europe, and affords a hard durable wood, much used by wheelwrights and shipbuilders. Its bark yields a dye, and is used in sugar-refining. Of the galls found in E.-leaves in S. Europe is made E. balsam, a substance formerly much used in eye-diseases. The wych or Scotch E. has large leaves, and grows quickly. The cork-barked E. is doubtfully regarded as a distinct species from the English E. It is common in English plantations. Other species are the Dutch cork-barked E., the smooth-leaved E., the Cornish E., the American white E., and the slippery E. of America. The winged E. of N. America has its branches provided on each side with corky appendages. The China E. affords galls from its leaves, which are much used by the Chinese for dyeing and tanning leather.

Elmi'na ('the mine'), a fortified seaport on the Gold Coast, W. Africa, formerly the capital of the Dutch possessions, 10 miles W. of Cape Coast Castle. It is defended by Fort St. George, one of the oldest as well as strongest of the forts on the Gold Coast. E. was founded by the Portuguese under the name São Jorge da Mina in 1481, and was taken by the Dutch in 1637. It was ceded with the rest of the Dutch possessions in Guinea to the British, 6th April, 1872. During the Ashanti war it was destroyed by the English; but since then it has been rebuilt, and is now a place of some importance. Pop. 10,530.

Elmi'ra, a city of New York state, on the Chemung River, 274 miles N.W. by W. of New York. It stands in a fertile district, and possesses a fine court-house, a well-endowed female college, a state reformatory, and several churches. There are large iron-foundries, manufactories of machinery, wool, boots and shoes, &c. The trade is large, and the town rising greatly. Pop. 30,893.

El'mo's Fire, St., a popular name of the electric brush sometimes seen round the top of masts or other pointed objects during a thunder-storm. The phenomenon, which is accompanied by a hissing noise, is supposed to indicate that the storm is nearly over. By the ancients it was called Castor and Pollux if the appearance were double, or Helena if single. In the latter case it was generally regarded as an evil omen.

Elms'horn, a town of Prussia, province of Slesvig-Holstein, on both banks of the Krückau, 18½ miles N.W. of Hamburg by railway. The principal industries are shipping, tanning, and shoemaking. There are also brandy distilleries, breweries, and manufactures of tobacco, paper, chocolate, straw hats, cement, &c. The Swedes under Wrangel gained a victory here over the Danes, 15th February, 1645. Pop. 9803, of whom many are Jews.

El Obeid', or **Lobeid',** the capital of Kordofan, lies in the heart of the country, at the N.W. base of the Djebel-Kordofan, 220 miles S.W. of Khartum. It is built chiefly of clay and straw, and the houses are scattered over a wide area. There used to be a large trade in gums, gold, ostrich-feathers, &c., and E. O. was a place through which the great caravan route to Khartum passed; but since the Mahdist war the trade has fallen off considerably. Pop. 10,900.

Elocu'tion (Lat. *elocutio*, 'speaking out'), expression in words rendered vivid and impressive by suitable look, accent, modulation, and gesture or action. In ancient times E. was carefully studied as one of the most important elements of oratory. In our own time a simpler taste allows only a minor place to E. in public speaking; and while the art still flourishes on the stage, and in some degree in the lecture-room, it is paid but little attention to in Parliament or in our pulpits or law-courts.

Éloge' (Gr. *eulogia*, Lat. *elogium*, 'praise'), a term denoting eulogy, applied in France to a panegyric or funeral oration regularly pronounced in honour of members of the Academy. The E. reached its greatest perfection in the days of Fontenelle, whose elegant *Éloges des Académiciens* fill two volumes (Par. 1731). It is now a common tribute at the grave of any person of eminence, and sometimes furnishes an opportunity for the expression of political sentiments. Occasionally the E. is in Latin, as in Ruhnken's famous *Elogium Hemsterhusii*. See Thomas, *Essai sur les Éloges*.

El'ohim (sing. Eloah, Arab. *Ilâh*, Syr. *Alôh*, 'power,' 'might'), the Hebrew word meaning *gods* (Micah iii. 7), is also applied to the one God of Israel (Amos iv. 2). The history of the Hebrew nation clearly indicates that their purer conception of God arose from an early polytheistic worship. Joshua (xxiv. 2) accuses the forefathers of the Hebrews of serving other gods beyond the Euphrates. In the time of Moses, Jehovah (properly Yahveh) was acknowledged as the national deity. By the prophets the name E. was certainly applied to the *one* God Jehovah, as if he were to them all that the plural could be, but the older name belonging to the polytheistic period was also retained, and in the opinion of many scholars the occurrence of E. in one of the accounts of creation in Genesis, and of Jehovah in the other, marks a difference in the antiquity and even in the origin of the tradition. This point, however, is still keenly disputed by rival schools of theology and biblical criticism.

Elonga'tion, Angle of, an astronomical term originally applied to the angular distance between two heavenly bodies, but now generally restricted to that distance between a planet and the sun, or a satellite and its planet.

El Pa'so del Nor'té ('the north pass'), a fertile valley of Mexico, in the state of Chihuahua, extends a distance of 10 miles along the right bank of the Rio Grande, and is the thoroughfare leading northward out of the republic into the state of New Mexico. The inhabitants are much engaged in the vine culture, and in the manufacture of a celebrated wine and brandy.

El'phinstone, Mountstu'art, an East Indian statesman and administrator, the fourth son of the eleventh Baron E., was born at Edinburgh in 1779. He entered the East India Company as a cadet (1796), and after some diplomatic service under the Duke of Wellington was nominated first envoy to Cabul in 1808. On the apprehension of a Franco-Russian invasion of British India he concluded a treaty of alliance with Shah Sujah, which was the first step in our eventful relation to Afghan affairs. He published an *Account of the Kingdom of Cabul* (Lond. 1815). In 1816 he took up residence at the court of the Peshwa, and in 1817 was actively engaged in the battle of Kirkee—the deathblow of the Mahratta power. He was governor of Bombay from 1820 to 1827, and his rule was marked by great public works and vast reforms, and was crowned by the enactment of 'the E. Code,' which, for comprehensive clearness and brevity, is comparable to the *Code Napoléon*. The E. College in Bombay was founded in his honour (1827). On his return to Europe he devoted his leisure to his *History of India, the Hindu and Mohammedan Periods* (Lond. 1841), a work which gained him the title of the Tacitus of Indian history. He died at his estate of Hookward, in Surrey, 29th November, 1859. See Colebrooke's *Memoir of E.*, and Sir J. W. Kaye's *Lives of Indian Officers*.

Elphinstone, William, one of the most enlightened of Scotch ecclesiastics and statesmen of the 15th and 16th centuries, was born about 1430. He was the illegitimate son of William E., Archdeacon of Teviotdale. Trained at Glasgow for the Church, he showed a strong liking for law, which he studied on the Continent to such purpose that he obtained a professorship in the University of Paris, and afterwards in that of Orleans. Returning to Scotland about his thirty-ninth year, he threw himself into ecclesiastical and diplomatic life, held in succession the offices of official-general of Glasgow diocese, Rector of the University and official of Lothian, and, under James III. and James IV., Chancellor of the kingdom of Scotland, and Keeper of the Privy Council. This last office he held from 1500 to his death, 25th October, 1514. His chief ecclesiastical offices were those of Bishop of Ross (1481), and of Aberdeen (1483), and no prelate of his country or time had so high a reputation for devotion to his church, erudition, or sagacity. Employed on various embassies, he was a strenuous advocate of an alliance between Scotland and France. Such was his patriotism that the defeat of Flodden is believed to have hastened his death. He aided in establishing the first Scotch printing-press (that of Millar and Chepman) in Scotland (1509-10), and in causing to be printed the *Breviarium Aberdonense* (reprinted in 1853), in which he wrote the lives of Scottish fathers. E. will be remembered chiefly for having obtained from Pope Alexander VI. a bull for the establishment of a college in Aberdeen, otherwise largely benefited by him, which was founded in 1500. Originally St. Mary's College, it has since become known as King's College, and is now merged with Marischal College in the University of Aberdeen. See Cosmo Innes's *Sketches of Early Scottish History*.

El Rosar'io, a town of Mexico, state of Cinaloa, 55 miles

E. of Mazatlan, has some trade with the interior, and was formerly noted for its now abandoned gold-mines. Pop. 6237.

El'sass Loth'ringen, the German form of Alsace-Lorraine (q.v.).

Elsinore' (Dan. *Helsingör*, formerly *Krogen*), a picturesque old seaport of Denmark, on the island of Zealand, and on the W. shore of the Sound, 24 miles N. by E. of Copenhagen by railway. It has a cathedral, a beautiful royal palace (*Marienlyst*), a large custom-house, &c., and is defended by the castle of Kronborg (1574-84), which commands the Sound from a promontory. The Sound is here only 2½ miles broad, and is frozen over in exceptionally severe winters. E. has a good harbour and active manufactures of hosiery, arms, and brandy. Here were formerly collected the Sound dues. E. is the birthplace of Saxo Grammaticus and the scene of Shakespeare's *Hamlet*. Pop. 8925.

Els'ter ('the alder-tree stream') **the Black,** a river in Saxony, rises near Hernhut, flows N.W., and joins the Elbe 8 miles E. of Wittenberg, after a course of 111 miles.—**The White E.** rises on the N.W. frontier of Bohemia, flows N., and joins the Saale 3 miles S. of Halle, after a course of 120 miles.

Els'tracke, Reginald, an accomplished English engraver of the early part of the 17th c. whose works, chiefly portraits, have a high character for firmness and vigour. They are extremely rare, and are much sought after, not only for their artistic merit, but also for their historical value.

El'ton, Lake, a salt lake of Russia, on the border of the Kirghiz Steppes, in the government of Samara, and 90 miles E.N.E. of the point at which the Volga bends S.E. to the Caspian Sea. It is 14 miles long, has an area of 78 sq. miles, but is exceedingly shallow. It yields some 6,000,000 cwt. of salt yearly. The industry employs 10,000 people. All the salt is conveyed for shipment to Kamyschin, on the Volga.

Elutria'tion (Lat. *elutriatus*, 'washed out'), a process of washing with water employed in the laboratory and in several arts for separating the lighter from the heavier particles of disintegrated mineral matter. After the large heavy particles subside, and while the lighter particles are held in suspension, the water is drawn off. E. is usually performed in a vat provided with grinding wheels, as in the case of ores, potter's-clay, and pigments.

El'vas (anc. *Alba*, from the Basque *Alboa*, 'the place on the rugged hill'), a fortified town and bishop's see in the district of Portalegre, province of Alemtejo, Portugal, on a steep hill overlooking a tributary of the Cayo, near the Spanish frontier, and 12 miles W. of Badajoz. The streets are crooked and filthy, but many Moorish houses, with their latticed windows and verandahs, give the town a picturesque appearance. The fortress, the strongest in Portugal, was built by the Moors, and was unsuccessfully besieged by the Spaniards in 1658 and 1711. The cathedral is of mixed Arabesque and Gothic. E. has also a college, an arsenal, a hospital, a theatre, &c. A supply of water is provided by a Moorish aqueduct (*Os Arcos de Amoreiro*), which rises in several tiers of arches to a height of 250 feet, and has a length of 3½ miles. The inhabitants carry on a profitable smuggling trade with Spain, especially in British fabrics. The neighbourhood is rich in wine, oil, and fruits. Pop. 19,318.

E'ly (Old Eng. *Elig*, 'Eel town'), a cathedral city in Cambridgeshire, 72½ miles N.N.E. of London and 15 N.E. of Cambridge by railway. It stands on slightly elevated ground on the left bank of the Ouse, and in the midst of a country exceedingly fertile, producing large quantities of fruit and vegetables (chiefly asparagus) for the London market. Of the parish churches, St. Mary's is partly Norman, partly Early English. But the importance and the renown of E. lies in its famous cathedral, founded by Simeon, the first Norman abbot (1082-94) of the monastery established (970) on the site of the former convent of St. Ætheldrida, daughter of Anna, king of the East Anglians. The building was completed to its western end, and the first tower nearly to the summit, in the time of Bishop Riddell (1174-89). The Galilee or western porch was built 1198-1215. In the time of William of Wykeham it had a choir and a presbytery added to it, which raised it to the very first rank among English churches; and when its old Norman tower fell in 1322, the famous octagon, at the intersection of the nave and transepts, was built by Alan of Walsingham. This octagon, 70 feet by 65, is, according to Fergusson, the only true Gothic dome in existence. It is unsurpassed in beauty by any similar structure in Gothic architecture. All the styles of architecture from Early Norman to Late Perpendicular may here be studied. The nave is Norman, the presbytery belongs to the 13th, and the octagon and choir to the 14th c. The cathedral measures 565 feet from western to eastern exterior, and is one of the largest churches in Europe (area 61,700 sq. feet). The height of the central tower is 215 feet, while the nave is 72 feet high and 75 wide. It is built throughout of stone from Barnack in Northamptonshire, but many of the interior shafts and pinnacles are worked in Purbeck marble. Among the famous ecclesiastics that ruled in E. cathedral were Abbot Theorstan, who espoused the cause of Eadgar the Ætheling, and successfully held the Isle of E. against the Normans for several years; Simeon, the brother of Walkelin, Bishop of Winchester, and a relative of the Conqueror; Longchamp, the Grand Justiciary of Richard I.; Louis de Luxemburg, who had been Chancellor of France and Normandy for Henry VI.; and Stanley, third son of the first Earl of Derby. The cathedral has been restored under the superintendence of Sir Gilbert Scott, at the cost of £45,000. Pop. reg. sub-dist. 7970; civ. par. 3059; and diocese 524,112.

Ely, Isle of (Old Eng. *Eligea*, 'Island of eels'), the Cambridgeshire Fens, or the N. portion of Cambridgeshire, from the rest of which it is cut off by the Ouse. The fen lands, formerly sour from excess of moisture, and producing nothing but reeds and sedge, are now rich and productive in cereals and vegetables. They are protected from inundation by artificial banks along the rivers. Formerly windmills were used to work the machinery by which water was removed from the flats into the streams, but now these have partly given place to steam-engines. Pop. adm. county 63,861.

Ely, County of, is only a royal franchise, and not a county-palatine, though sometimes improperly so considered. See COUNTY.

El'ymus, a genus of Gramineæ (q.v.) or Grasses.

Elys'ium (Gr. *ēlusion*), in Greek mythology the abode of the blessed after death. Homer (Od. iv. 563 *seq.*) places it on the W. border of the earth near to Ocean, and represents its hero-tenants as living in ease and plenty under the mild rule of the golden-haired Rhadamanthus. Elsewhere (Od. xi. 490 *seq.*) he gives a gloomier description of the spirit-land, and makes Achilles say that he would rather be the veriest drudge on earth than king of the shades. Hesiod and Pindar place E. in the Islands of the Blest. The Latin poets regard it as a part of the nether world, and paint it as a delicious region of verdant fields, amaranthine meadows, perennial streams, and shady groves.

Elzevier', or **Elzevir,** the name of a Dutch family who for 130 years were engaged in the business of bookselling and printing, and whose name is identified with accurate and beautiful typography. The first was Lodewijk E., born at Louvain, who started business at Leyden in 1580. His *Eutropius* appeared in 1592, and before 1617 he had published 150 works. His five sons all followed the same trade: Mattheus at Leyden, Ægidius at the Hague, Bonaventura, who in partnership with his nephew Abraham (specially a printer) at Leyden for twenty-six years produced small but beautiful editions of the classics, and the famous *Les Petites Républiques*. The Amsterdam printing house was started in 1638 by Lodewijk of the third generation; he before 1654 had produced 189 works, chiefly 8vo classics, *Cicero* in 4to, *Corpus Juris*, folio, and the *Etymologicon Linguæ Latinæ*. Lodewijk was afterwards joined by Daniel, the son of Bonaventura, who had previously, in partnership with his cousin Jan at Leyden, produced about 30 works, and afterwards, when alone, 118 works, including the 4to *Homer*, Heinsius' edition of *Ovid*, and the New Testament. At Amsterdam Daniel, who lived till 1680, had produced about 152 additional works. Pieter, a bookseller at Utrecht, and Abraham II., who did University printing at Leyden down to 1712, were the last of the family. In 1820 a descendant was governor of Curaçoa. Of the total 1213 Elzevirs, 968 are Latin, 44 Greek, 126 French, 32 Flemish, 11 German, 10 Italian, 22 in Eastern languages. Only one, Heinsius' *De Contemptu Mortis*, is on vellum. Among the 8vos, the most prized are *Pliny* (1635), *Virgil* (1636); *The Imitation of Christ*, *Livy*, *Cæsar*, and *Tacitus* were also masterpieces. Among French works *Comines* and the *Sagesse* of Charron may be mentioned. The *Seneca* is valued as being unbound and showing the original margin. The best lists of Elzevirs are to be found in Brunet's *Manuel du Libraire*. Didot, Nodier, Mottely, Pieters, Bérard, Walther, and De Beaume have written special works on the subject. Elzevirs are with difficulty distinguished, the E. name having been stolen by other printers, and the Elzevirs having issued many anonymous works to escape political or religious censure. There are also close copies by eminent printers like Foppens of Brussels and Wolfgang of Leyden. At one time every book printed in Holland in the 17th c. and marked with a sphere was cherished as an E. The reliable marks are these:—(1) An eagle bearing seven arrows with the motto *Concordia res parvæ crescunt*; (2) a column surrounded by a vine branch, with a philosopher below and the motto *Non solus*; (3) Minerva and an olive-tree, *Ne extra oleas*; (4) a burning pile of wood, *Apud Elzevirios* (in allusion to the name E., which means elm or firewood), or *Ex officina E.*, also appears. The paper came chiefly from Angoulême; the types were, many of them, cut and cast by Garamond and Sanlecque. The Elzevirs were more successful men of business than the older printers, such as the Aldi, Morel, Amerbach, &c., but probably had not the same literary enthusiasm.

Emana'tion, Doctrine of, was the hypothesis by which Plotinus surmounted the dilemma that if God produced a world, as it could not be produced from nothing, it must be produced from God's substance, and was therefore identical with God; or from some other substance, which was therefore contemporaneous with God. The Christian said creation took place by an omnipotent volition, but Plotinus said the world was the mere emanation of the absolute unity into intelligence, and of intelligence into the universal soul. Emanation thus excludes dualism and even pantheism, for though the world is God, God is not the world. There was also a process of reabsorption of the finite into the infinite existence. Intimations of this change are received from time to time through Ecstasy (q.v.). God is also described as Buthos, or Abyss of Being. The successive attenuations of the divine substance, æons or ideas, are described as expanding rays of light. The sum of these æons is *plērōma*, and the last æon, *sophia*, passing into the void (*kenōma*), produces the world.

Emancipa'tion (Lat. *emancipo*, 'I liberate or declare to be free, not a chattel or piece of property') is the act of freeing from any subjection or disability. See CATHOLIC EMANCIPATION and SLAVERY.

Emancipation is a term borrowed from the Roman law, denoting in Scotch law the liberation of a child from paternal authority. See FORISFAMILIATION, PARENT AND CHILD.

Eman'uel I., King of Portugal, was born 3rd May, 1469, and succeeded João II. in 1495. His reign is the most glorious in the Portuguese annals. He reformed education, patronised art and literature, and codified the Portuguese laws; but he is especially memorable as the energetic promoter of his country's commerce and naval power. In his reign Vasco de Gama sailed round the Cape of Good Hope to India, Cabral took possession of Brazil, Lope de Soares opened up the China Trade, and Almeida and Albuquerque extended the Portuguese power in India and on the E. coast of Africa. His reign is the beginning of what is called the *Golden Period of Portuguese History*, which extends from 1495 to 1580. E. made Lisbon the chief seat of commerce in Europe. The only severe reverse which he sustained was in Northern Africa. He was variously styled the Good, the Great, and the Fortunate. Thrice married, his last wife was sister of Karl V. of Austria. He died 13th December, 1521.

Embalm'ing (Fr. *embaumement*, from *baume*; Old Fr. *bausme*, Lat. *balsamum*), the art of preserving dead bodies by employing antiseptic drugs, aromatic, saline, tanning, or other chemical reagents. In Ancient Egypt the art attained a high state of perfection, and bodies, called 'mummies' (from the Arabic *mumia*, 'bitumen,' or *mum*, 'wax'), embalmed in that country thousands of years ago are still in a fair state of preservation. Probably the oldest human relic in the world, the mummy of King Mycerinus, builder of the third pyramid, is now in the British Museum. E. was universal among the Egyptians, and the custom has been ascribed to their belief that an undecayed body would be reanimated after a lapse of 3000 years. Wilkinson, however, thinks 'the custom arose rather from a sanitary regulation for the benefit of the living, and from that feeling of respect for the dead which is common to all men.' Herodotus describes three methods that were pursued in Egypt, each differing in details and costliness. The corpses of the rich were embalmed in a most elaborate and magnificent style. The brains were extracted through the nostrils with curved instruments, and the viscera through an incision in the left side, and drugs and powdered aromatics inserted into the cavities. The wound in the side was then closed, and the body kept in natron for seventy days, and after that time it was swathed in fine linen bands smeared with gum. In some instances the face and other parts of the body were gilded. The other two processes were similar but less expensive. It would appear that there were other modes of E. than those mentioned by the Greek historian, for mummies have been found in which bitumen has been the chief preservative. A modern classification of Egyptian modes of E. is given in Pettigrew's *History of Egyptian Mummies* (Lond. 1834). The embalmed bodies of the rich were enclosed in two coffins of sycamore or cedar wood, painted with hieroglyphic legends. Those of the poor were wrapped in sheets and laid in mummy pits. The bodies of sacred animals were also embalmed by the Egyptians. Other nations, including the Jews, Greeks, and Romans, practised the art of E., but less effectively than the Egyptians. Large numbers of mummies, chiefly preserved by desiccation, have been discovered in Peru. The Aztecs, and others of the extinct tribes of Central America, also occasionally preserved their dead (Bancroft's *Native Races of the Pacific States of N. America*, Lond. 1875). Many caverns, containing Guanche mummies, generally in a good state of preservation, have been opened in Tenerife. The Guanches, the aboriginal inhabitants of the Canary Islands, disembowelled the corpse, washed it with a saline solution, anointed it with a composition of sheep's butter, powdered pumice-stone and pine-tree dust, and dried it in the sun for fifteen days (*Ethnological Society Transactions*, new series, vol. vii.). E. has been studied scientifically in modern times. During last century Lewis de Bil, Clauderus, and Benjamin Gooch operated with varying success, and two bodies preserved in the Royal College of Surgeons show the efficacy of Dr. John Hunter's injection method. In one of these camphorated spirits of wine was thrown into the arteries and veins. An arsenical solution was used by Tranchina of Naples and by Gaunal of Paris. The latter subsequently adopted a solution of sulphate and chloride of aluminium, and a chloride of zinc solution was employed by Dr. Souquet. The Parisian Academy of Medicine tested, in 1847, the processes of Gaunel and Souquet, with the result that the mode of the latter was alone successful. Audigier's method of E. has been adopted in Paris. It consists in pouring a preserving liquid into the larynx through the mouth, and in surrounding the corpse with a vegetable powder saturated with the same liquid. The body, it is said, acquires a wooden hardness. In America Seely has resorted to carbolic acid, and in England Richardson has used conjunctly three solutions with success. A saturated solution of zincic chloride is injected slowly into the tracheal or femoral artery, which is afterwards plugged with silicate of soda. Zinc colloid is then introduced into the brain and abdomen, the nose is stuffed with cotton and wool, and the eyelids and lips drawn together. While it is impossible to say whether these processes of E. will stand the test of time, it would be unreasonable to assert that chemical research is unable to furnish a preservative as efficient as the preparations of the Egyptians. Modern E., however, should be regarded as a scientific curiosity, for it is unlikely that the art will ever be revived widely.

Embar'go (Span. 'arrest or impediment') is a detention or arrest of ships or merchandise by public authority. On breaking out of war, an E. may be imposed on the shipping of the enemy by proclamation. An E. has not the effect of putting an end to the contract of affreightment, the freight being due as if the ship were detained by contrary winds. The master and the crew are consequently entitled to wages during detention.

Em'bassy (Mid. Lat. *ambactia* or *ambavia*, 'service or charge,' from a Celtic word Latinized into *ambactus*, 'retainer,' or the Gothic *andbahts*), a diplomatic mission, the function, or residence, of an ambassador. The Romans had their *legatus*, 'a delegate,' whence this branch of international law is known as *jus legatorum*, and the rights of E. are called *jus legationis*. A sovereign, the head of a department, or a military officer may act on E. without having the title of an ambassador. Lord Coke says of Henry VII. that he would not suffer any foreign ambassador within his realm; and in Poland in the 17th c., one who did not depart after his business was over was thought to be a spy. Whether any state of a confederation can send ambassadors depends on the federal compact. Generally, no objection to religion, rank, or sex of an ambassador can be taken. Madame Guelriant was French ambassador at the Polish court in 1646. The rank of ambassador was fixed at the Congress of Vienna, 19th March, 1815. Diplomatic employés are divided into (1) ambassadors, legates or nuncios; (2) envoys, ministers, or chargés d'affaires. The office of ambassador is terminated by the death of either sovereign. A *consulate* is the official residence of a consul-general, consul, &c., who are inferior officers of a diplomatic service.

Embatt'led, or **Battled,** in heraldry, the partition line across the shield in representation of battlements. This 'difference' was often conferred for distinction in battle.

Embezz'lement is the fraudulent appropriation to his own use of the property (not freehold or parcel of it) of another by the clerk or servant to whom it is intrusted by his employer or master. At common law this offence does not amount to larceny, but is punishable arbitrarily as malversation or Breach of Trust (q.v.). It has, however, been found necessary to enact statutes for the punishment of E. in certain cases. E. is not cheating, because there is no fraudulent contrivance, nor is any false pretence used. Neither is it larceny, because no property is *taken*, the offender being previously in lawful possession; but the line between larceny and E. is often very difficult to draw. Thus the appropriation by a watchmaker of a watch left with him to be cleaned and repaired was held to be larceny, because, as the judge said, 'when a party puts his watch into the hands of a watchmaker to be cleaned or repaired, he only parts with the *custody;* the *possession* of the watch is the possession of the owner.' E. is a felony punishable by penal servitude or imprisonment —a male under 16 years of age is liable to be whipped as well as imprisoned. See Statute 24 and 25 Vict. c. 116. A member of a copartnership who converts the common property to his own use is liable to be tried and punished as if he had not been a member of the copartnership. E. of Government stores is punishable by penal servitude or imprisonment. See BROAD ARROW.

Em'blem (Gr. *emblēma*, 'something inserted'; *en*, 'in,' and *ballein*, 'to throw'), a concrete or pictorial expression of a symbolical idea. Thus the lion is the E. of courage. Among the sacred emblems in heraldry are the winged lion of St. Mark, the angel of St. Matthew, the winged ox of St. Luke, and the eagle of St. John. The red rose, the white rose, and the violet have served respectively as the emblems of the houses of Lancaster, Stuart, and Bonaparte.

Em'blements, a term of English law denoting the profits of land sold, but the word is also used to denote the natural fruits of the ground, which are annually produced through the toil of him who cultivates the land. A tenant, or another in his right, is in all cases entitled to reap the crop which he has sown. On the death of a tenant, the executor, and not the heir, is entitled to the E., since they rank as personal property.

Em'blica, a genus of *Euphorbiaceæ*, of which the only species is the *E. officinalis* or *Phyllanthus E.* It is a native of India and the Malay Archipelago. Its acrid fruit is used in India as a pickle. The dry ripe fruit is a medicine for diarrhœa, dysentery, and cholera, and is known as *Myrobalani emblici*. The bark is used for tanning and as a black dye.

Em'bolism (from the Gr. *emballō*, 'I throw in'), in medicine, denotes the presence of obstructing clots of blood in the vessels. E. often causes obscure disease and sudden death, especially if it occurs in the large arteries near the heart.

Emboss'ing (Fr. *bosse*, 'a swelling or hump'), the art of producing raised patterns or ornaments on any plane surface of paper, cardboard, cloth, leather, wood, &c. Metal patterns are produced by E. or 'stamping.' In the E. of paper a die with the pattern is first prepared, and a counter-die either in metal or cardboard is made. The dies are fixed in a press, and the paper or cardboard is well damped before E. For the E. of names, monograms, and crests, steel dies and counter-dies are engraved, and E. and colour-printing are required for the printing of such in colours. The E. of cloth, such as velvet, felted table-covers, &c., is done by a cylinder machine, which is a modified form of calender. A colour-printing apparatus is also used, as in calico-printing. The pattern for E. is engraved on one roller, and either countersunk on that opposed to it, or the opposing roller is covered with a yielding surface-thickness of felt. Wall papers are embossed on such cylinder machines. The E. of leather has long been practised, and bold designs are easily produced in that material when it is thoroughly softened by water. There are several methods for producing raised patterns on wood otherwise than by carving, and these may be regarded as modified forms of E. One method applicable to soft wood is to produce the outline of the required pattern by powerful pressure, which sinks and compresses the fibres. The wood being planed level and steeped in water, the previously compressed portion which has escaped the plane expands, and the pattern is produced in relief. Another plan, which may be adopted with hard wood, is to apply a mould containing the pattern red hot to the wet surface. A superficial charring takes place, and repeated wettings and burnings are all that is necessary to procure patterns.

Em'bouchure (Fr.), a mouth or opening, as the mouth of a river. In music it means the part of a wind instrument to which the mouth is applied in blowing.

Embowed', in heraldry, means curved or bent. The left arm bent at the elbow is blazoned 'embowed,' the right arm 'counter-embowed.' The word was formerly in general use in English, as in *Il Penseroso*, 'And love the high embowèd roof,' and in Spenser's *Visions of the World's Vanity*, 'Embowed like the moon.'

Embra'cery, in English law, signifies an attempt to influence a jury in their verdict by persuasion or bribery. E. is a misdemeanour and the party embracing and guilty juror are liable to imprisonment and fine (Statute 6 Geo. IV. c. 50).

Embra'zures are openings for cannon in fortified works or in siege batteries. E., which have an outward slope to allow of free firing, secure the safety of those within the walls.

Embroca'tion (through Low Latin from the Gr. *embrechō*, 'I soak in') denotes the incessant moistening with certain applications, and rubbing of a diseased part, as a means of cure.

Embroi'dery (Fr. *broderie*, a doublet of 'bordering'), decorative work wrought with the needle upon any textile fabric. The art reaches back into prehistoric times. Embroidered patterns are seen upon the garments of persons represented on Egyptian monuments, and from the Book of Exodus we gather that the Israelites acquired the art while dwelling in Egypt. Babylon had a wide-spread reputation for the beauty of her E.; and in Phrygia, Greece, and Rome the art was also carried to perfection. During the Middle Ages nuns, and even monks, and women of royal and noble rank, engaged in it. Some ecclesiastical vestments of that time display gorgeous E. in gold, silver, and coloured silk, frequently enriched with precious stones. England was for several centuries celebrated for various styles of E., and during the 13th c. a new method was introduced which won the admiration of Christendom, and was designated *opus Anglicum.* In it the old feather-stitch (*opus plumarium*) was combined with a chain-stitch, which was laid down in circles for parts of the human face, and in straight lines for the rest of the figure, and an appearance of relief was given to the face by pressing some parts down with a heated instrument. The finest existing example of 'English work' is the Syon Cope, embroidered in gold, silver, and silks in the 13th c., and now treasured in the South Kensington Museum. About the same period was produced the misnamed Bayeux Tapestry (q.v.).

Modern E. may be divided into two classes—white E., worked upon muslin, cambric, &c.; and coloured E., as silk, worsted, gold, &c., worked on silk and other stuffs. France stands in the first rank for the production of white E., and then follow Saxony, Switzerland, and Italy. Glasgow was a great centre of this industry till the crisis of 1857. E. is applied to curtains, caps, collars, &c. In coloured E. China, Japan, and India especially excel, and rich work of the same kind is found on the dresses and common domestic articles of the Turks, Georgians, and Circassians. The vestments of the Russian hierarchy and Albanian costumes resemble tissues of gold and silver, so profusely are threads of these metals employed in their adornment. Artistically coloured E. has greatly declined in England, but there are signs of its revival. *Appliqué* work signifies that the needlework has first been wrought upon some tissue, and afterwards sewn or *applied* to the embroidered stuff. It is common on mediæval velvets. Machines, chiefly modifications of Heilmann's invention, have recently come into use in England and on the Continent, by which elaborate patterns can be executed by one person, who may keep 130 needles in simultaneous motion. The work of fifteen hand-embroiderers is performed by one of these machines. Several sewing-machines have also been adapted to embroidering. See Dr. Ure's *Dictionary of Arts, Manufactures, and Mines.*

Embrun', an ancient town of France, in the department of Hautes-Alpes, on the right bank of the Durance, and on the side of Mont St. Guillaume, about 100 miles N.N.E. of Marseille. Its cathedral, the construction of which is referred to the era of Karl the Great, is one of the finest historic buildings in France. E. manufactures cloth, silk, and velvet. E., the ancient *Ebrodunum*, is of Celtic origin, and is mentioned by Strabo. It was made the see of a bishop during the 4th c., and afterwards of an archbishop. It was ravaged successively by Vandals, Huns, Lombards, and Spanish Arabs. E. suffered greatly in the religious wars of the 16th c., and was partly destroyed by the Duke of Savoy under Louis XIV. (1692). Pop. of commune, 4017; of arrond. 27,050.

Em'den ('the fort on the Ems'), formerly **Embden,** a seaport in the province of Hanover, Prussia, German Empire, on the N. shore of Dollart Bay, near the mouth of the Ems, 70 miles W.N.W. of Bremen by railway. It has a good harbour, and is intersected by several canals, which are crossed by some thirty bridges. The chief buildings are the townhouse (1574-76), an exchange, a custom-house, a school of navigation, a deaf and dumb asylum, and a museum of antiquities. E. has manufactures of linens, hosiery, sailcloth, starch, soap, tobacco, &c., and also extensive shipbuilding yards and breweries. The town, which lies low, is protected from inundation by dykes. The free port of E. became Prussian in 1774, passed to Holland in 1806, France in 1809, Prussia in 1814, Hanover in 1815, and again to Prussia in 1866. Pop. town 13,695; district 18,459.

Em'erald (Fr. *émeraude*, Old Fr. *esmeralde*, Sp. *esmerelda*, Ger. *smaragd*, from the Gr. *smaragdus*). This highly valued precious stone differs from the beryl and aquamarine only by the brilliant green colour which is its characteristic, and which some allege to be due to the presence of organic matter similar to the chlorophyl of leaves, while others ascribe it to a small proportion of chromium oxide. The precious E. crystallizes in the hexagonal system; it is transparent, with a deep-green colour, without any admixture of blue or yellow; in hardness it exceeds quartz, and its specific gravity is 2·732. In percentage composition it consists of silica 68·50, alumina 15·75, glucina 12·50, with generally small proportions of iron, chromium, and lime. The largest emeralds are found in Siberia, on the Tokowoia, while the finest occur in S. America, especially at Muzo, in Colombia. Other mines are at Canjargum in India, Limoges in France, Mount Zabarah in Upper Egypt, and the Henbach Valley in Salzburg. When first taken from the mine, the E. is so soft and friable that it can be reduced to powder by rubbing between the fingers, but it hardens by exposure to the air for a few days. The E. is esteemed in value next to the ruby, and from its supposed great virtues is especially treasured in the East. The Duke of Devonshire owns a fine American E. weighing 8 oz. 18 dwt. In the Hope collection there was another weighing 6 oz., for which its owner paid £500. The E. is often referred to in Scripture and by classical authors. Oriental E. is the name of a rare green variety of sapphire. E. copper, or dioptase, a green crystallized mineral found only in Central Asia, consists of 50 parts of protoxide of copper, 39 of silica, and 11 of water. E. nickel is a compound of carbonate and hydrate of nickel, found at the chrome mines of Texas.

Emer'sion (Lat. *emergere*, 'to come forth'), in astronomy, is the reappearance of one heavenly body from behind another. *Immersion* is its disappearance at the commencement of the occultation or eclipse. Both phenomena are of great use in determining the Longitude (q.v.) of any locality.

Em'erson, Rev. William, a descendant of a chaplain in the Army of Independence, was born at Concord, Massachusetts, 6th May, 1769, graduated at Harvard College in 1789, became a minister of a Unitarian Church in Boston, published several discourses, a *Selection of Psalms and Hymns* (1808), and a *History of the First Church of Boston* (1812), and died 12th May, 1811.—**Ralph Waldo E., LL.D.,** essayist and poet, son of the above, was born at Boston, 25th May, 1803, graduated at Harvard College in 1821, became a Unitarian minister in Boston, but in 1823 abandoned preaching, and since then lived, chiefly at Concord, in seclusion and study. An oration, *Man Thinking*, before the Phi Beta Kappa Society, Cambridge, in 1837, and an address to the senior divinity class, Cambridge, won him wide notice for their daring and poetic transcendentalism. He produced *Literary Ethics*, an oration, in 1838; *Nature*, an essay, in 1839; in 1840 started the *Dial*, a transcendentalist organ, and in 1841 published *The Method of Nature*, *Man the Reformer*, *Lectures on the Times*, and the first series of his *Essays*. A second series of *Essays* appeared in 1844, and his first *Poems* in 1846. In 1848 he visited England, where he lectured on *The Mind and Manners of the 19th C.* In 1850 he issued *Representative Men*, and published, along with W. H. Channing, the *Memoirs of Margaret Fuller* (1852). Thereafter he produced *English Traits* (1856), *Conduct of Life* (1860), *Oration on the Death of President Lincoln* (1865), *Mayday and other Pieces* (1867), *Society and Solitude* (1870), *Parnassus*, a collection of poems (1871), and *Letters and Social Aims* (1876). He died at Concord, 27th April, 1882, aged 78. Throughout his writings E. sought to render life more spiritual and of a nobler moral tone, to lend it an ideal colouring without neglecting its practical needs. His works mingle a beautiful idealism with shrewd ethical teachings. In the nature of his admonitions, in the union of mystical speculation with fiery homely reproof of the age, he resembles Carlyle, but not at the expense of originality. His prose style is crisp, simple, and limpid, rich in words and phrases of singular suggestiveness and pregnancy. His poems lack melody and free lyrical impulse, and are sometimes rough in diction and cloudy in meaning, but embody much of the freshest and subtlest thought to be found in recent verse.

Em'ery (Fr. *émeri*, Old Fr. *esmeril*, Gr. *smuris*, from *smurizō*, 'I polish') is the massive variety of the mineral species Corundum (q.v.), which includes also the sapphire, the Oriental ruby, the Oriental topaz, &c. E. has a dull-brown colour, and varies in hardness and specific gravity according to its degree of purity. Thus sapphire, which is practically pure, crystallized alumina, is only exceeded in hardness by the diamond, and is the purest form of the mineral of which E. is a variety. The supply of E. for industrial purposes comes chiefly from Naxos, Nicaria, and Samos, where it is obtained in large boulders. It is also obtained near Gumuch-Dagh, about 12 miles E. of Ephesus, and in Massachusetts, U.S. E., on account of its hardness, is a substance very extensively employed in the arts. It is used in the grinding, cutting, or polishing of plate glass, flint glass, gems, jewels, edge-tools, brass, &c. It is prepared for use by pounding it under heavy steel stamping tools; and when sufficiently comminuted, it is arranged into sizes by sifting through sieves. Grinding wheels of a composition the essential ingredient of which is E. are in use. E. cloth is made by sifting particles over a surface of calico prepared with dissolved glue. E. dust is laid on the edge of iron and lead wheels for cutting and polishing in lapidary work.

Emet'ics (Gr. *emetikos*, from *emeō*, 'I suffer from sickness') are substances which act specifically on the stomach, independently of their odour, taste or bulk. They should be administered in every case in which a poisonous or injurious substance has been swallowed. If medicinal E. are not at hand, the action may be induced by tickling the fauces with the finger or with a feather, or by copious draughts of tepid water. In slight disorders of the stomach E. afford relief, and in many acute internal diseases nausea is only removed by emesis, occurring naturally or by the administration of E. The occasional use of E. in the pulmonary diseases of infancy is of great value, as infants swallow the discharges from the lungs. E. are partly vegetable and partly mineral, the more important of the former being mustard, ipecacuanha, sanguinaria, &c.; and of the latter, sulphate of zinc, sulphate of copper, and tartrate of antimony. E. that may be taken safely without medical prescription are, for an adult, a teaspoonful of mustard, or 20 grains of ipecacuanha, in tepid water.

Emigra'tion, the removal of persons from one country to another for the purpose of permanent residence. Among nations historically identified with E. are the Greeks, Spaniards, Dutch, and Portuguese. In late years the great body of emigrants are English, Irish, and German. The following figures will show the growth of the practice. In 1815, 2081 persons left, but by 1819 this had increased to 34,787. The numbers fluctuated until 1830, when they began to rise, reaching 103,140 in 1832. From 1846 to 1854 there was a steady rise up to 368,764, but this point reached they fell to 91,770 in 1861. Since then there has been considerable fluctuation in the numbers emigrating from Great Britain. A larger majority of emigrants proceed to the United States—no fewer than 789,000 having landed there in 1881, of whom 250,000 were Germans. Since 1847 the emigrants from the United Kingdom have chiefly gone to U.S. of America, Canada, Australia, and the Cape of Good Hope. The returns of immigrants and liberated Africans introduced into the W. India colonies and Mauritius are very interesting. Thus during the thirty years prior to 1872, Jamaica received 25,000 persons, of whom 16,000 came from the E. Indies; British Guiana received 160,000, of whom 80,000 came from the E. Indies, 28,000 from Madeira, 23,000 from the W. India Islands, 13,000 from Africa, and 12,000 from China. Trinidad received 60,000—44,000 from E. Indies, only 2665 from China. Mauritius received 358,000, of whom 352,000 were from E. Indies and 2500 direct from captured slavers. From 1847—1871 about 125,000 immigrants, liberated Africans and Kroomen, returned home from these colonies.

The following information has been gleaned from the report and returns presented to Parliament in 1894:—

Passenger movement between the United Kingdom and the continent of Europe shows a considerable decrease in the number of passengers inwards in excess of that of the passengers outwards. In 1892 the excess of the former over the latter was 84,164; in 1893 it was 73,280, and in 1894 it had sunk to 13,013, although the number of passengers inwards was in that year 490,330 as compared with 468,642 in 1893, and 490,165 in 1892. In 1894 the total number entered on the alien list (foreigners arriving from continental ports) was 74,015, as against 120,334 in 1893, and of these 35,512 were *en route* to America except 378, who were bound for other countries. Of the 22,066 immigrants who came to remain in the United Kingdom, 7246 were Russians and Poles, 4130 were Norwegians, Swedes, and Danes, and 5817 were Germans. We will now give the general statements of emigration during the year 1894.

Nationality.	To U.S.	To B.N.A.	To Aust.	To C. of G. H.	Other Places.	Total 1894.	Total 1893.
English .	54,253	15,558	9,251	11,824	8,704	99,590	134,045
Scotch . .	10,151	914	941	1,148	1,278	14,432	22,637
Irish . .	39,597	987	725	205	494	42,008	52,132
Total . .	104,001	17,459	10,917	13,177	10,476	156,030	208,814
Foreigners	55,350	6,102	207	3,583	1,790	67,032	95,123
Not distinguished .	80	72	27	—	3,586	3,765	3,696
Grand Total	159,431	23,633	11,151	16,760	15,852	226,827	307,633

Of the English, Scotch, and Irish emigrants in 1894, 88,125 were males and 67,905 were females; of the foreigners and those not distinguished, 42,537 were males and 28,260 were females. Of all the males, in 1894, 30,056 emigrated as general labourers; 11,599 as gentlemen, professional men, merchants, &c.; 6671 as mechanics; 6,172 as agricultural labourers; 4522 as miners, quarrymen, &c.; and 3227 as shopkeepers, shopmen, &c. Of all the females in 1894, 20,000 emigrated as domestic and farm servants, nurses, &c.; 1062 as milliners, dressmakers, &c.; 675 as spinners and weavers, and 237 as gentlewomen and governesses. The occupation of 59,385 females and 29,872 males was not stated: by no means a hopeful phase of emigration, and, indeed, so far as the female portion of it was concerned eminently unsatisfactory. During the year 1894 the demand for labour in Canada, either of the artisan, farm hand, or female domestic servant, has not been over or above the supply on the spot, and consequently immigrants thither have failed to get employment easily. In Australasia (notably in Victoria, Western Australia, and New Zealand), the demand for labour has been fairly great, though in the last-named the supply of unskilled labour has been excessive. At the Cape the labour market has become overstocked, and emigrants are warned to secure engagements before they leave this country if they are bent on going thither. In the other S. African states, although a great impetus has of late been given to trade and agriculture, the penniless immigrant will find it difficult to obtain employment—'the demand is for settlers possessing at any rate some small means.' The emigration hence to the United States of America has been considerably checked during 1894, chiefly owing to the stringent regulations in force as to alien immigration. Both the Argentine Republic and Brazil are practically closed to the British emigrant. In Uruguay a decree has been issued restricting *useless* immigration. Three colonising movements are worthy of mention here. The Jewish colony in the Argentine Republic has been carefully managed, 'all that could be done by the combined employment of capital and ability was ready at hand,' and consequently the venture has proved very successful. The New Australian settlement in Paraguay, chiefly consisting of discontented Australian working-men, would appear to be turning out a complete failure. The Free-land colony in E. Africa is an enterprise which has much to be said in its favour, but which appears for the time 'to be in a state of suspended animation.'

In 1886 the Emigrants' Information Office (31, Broadway, Westminster, S.W.) was established by the Government, and every sort of information useful to the person intending to emigrate may be obtained there. A professional handbook for medical men, barristers, solicitors, &c., is issued, containing full particulars concerning each colony. Penny handbooks, maps, and free circulars are also issued by the same office. Little or no assistance is given by the colonies towards paying an emigrant's passage, but W. Australia and Natal hold out most encouragement.

The average annual number of emigrants from each of the principal countries of Europe is as follows:—Austria-Hungary 74,000, Belgium 22,000, Denmark 9500, France 9800, Germany 96,000, Italy 250,000, Netherlands 5600, Portugal 22,700, Russia 35,000 (not including 90,000 to Siberia), Spain 9000, Sweden 44,000, Norway 16,300, and Switzerland 7500. See also article COOLIES.

Emigration, Law Regarding.—By 4 & 5 Will. IV. c. 76, money was allowed to be borrowed on the security of the poor rates to assist in the E. of the poor, and by 7 & 8 Vict. c. 101, s. 29, the guardians of any parish or union constituted by the Poor Law Commissioners were authorised to apply all money raised or borrowed for the purpose of defraying the expenses of emigration in such parish or in any parish within such union, subject to certain conditions and restrictions. Statute 54 & 55 Vict. c. 23, gives the guardians, &c., power to dispose of children in industrial schools and reformatories by E. And the powers of the Commissioners referred to has now been transferred to the Board of Trade under 35 & 36 Vict. c. 73. The Act 13 & 14 Vict. c. 101, contains provisions for facilitating the E. of poor orphans and deserted children. These Acts do not apply to Scotland; but by 14 & 15 Vict. c. 91, landowners in the Highlands and Islands of Scotland may apply to the Inclosure Commissioners for England and Wales for advances of money to defray the expenses of E. of poor persons within the parishes where their land is, and after inquiry the Treasury may issue a provisional certificate; and by 19 & 20 Vict. c. 9, advances may now be made to landowners, as above, to assist E., and such advances are repayable by rent-charges. See SHIPS' PASSENGERS ACTS.

Em'igrés ('emigrants'), the name given to the French nobles and clergy who fled from France on the outbreak of the Revolution in 1789. Many of them were indemnified on the Bourbon restoration. See Saint-Gervais, *Histoire des É. Français* (Par. 3 vols. 1823).

Emil'ia (named after the *Æmilia Provincia* of the Romans, on the famous *Via Æmilia*), a former division of N. Italy, consisting of parts of the Romagna and of the duchies of Modena and Parma, now portioned into eight modern provinces, Bologna, Ferrara, Forli, Modena, Parma, Piacenza, Ravenna, and Reggio Emilia. In the N.E. it is flat and marshy, in the S.W. mountainous and interspersed with fertile valleys. Bologna forms its centre.

Em'inence (Lat. *eminentia*), an ecclesiastical title, the employment of which was restricted by special enactment of Pope Urban VIII., 1630, to cardinals, ecclesiastical electors, and the Grand Master of the Order of the Knights of St. John.

Emir' (Arab. 'ruler'), the title given to all the descendants of Mohammed's daughter Fatima, who are distinguished by the green turban. It is assumed by many tribal chiefs in the East and in N. Africa. The E.-al-Mumenic, 'Prince of the Faithful,' is a title of the caliphs; E.-al-Omra, 'Prince of Princes,' is at present in Turkey the title of provincial governors; E.-Hadji, leader of the pilgrims; E.-Bazaar, market inspector, &c.

Emman'uel College, Cambridge, was founded by Sir Walter Mildmay, Chancellor of the Exchequer to Queen Elizabeth, in 1584, and is now regulated in accordance with the statutes confirmed by an Order of the Queen in Council, 3rd May, 1882. At the present time the foundation consists of a Master, thirteen Fellows, and twenty-four scholars; two of the scholarships are of £80 per annum, two of £70, eight of £60, six of £50, and six of £40. These are open to resident members and are usually tenable till the time for taking the B.A. is reached, sometimes till the M.A. There are also four *Thorpe* scholarships (two of these are awarded for Theology); four *Johnson* scholarships (£22); two *Ash* (£50); one *Smith* (£16); and three *Dixie* (£30). Other scholarships and exhibitions also belong to the college. In 1894 there were 142 undergraduates, 339 members of Senate, and 652 members on the Boards.

Emm'erich, a walled town in the province of Rheinland, Prussia, on the right bank of the Rhine, 5 miles N.E. of Cleve by railway, with an active shipping trade on the Rhine, and manufactures of tobacco, chocolate, and leather. Pop. 10,241.

Emmetro'pia, the condition of the normal eye as regards power of sight for different distances. Near-sightedness is called *Myopia*, and far-sightedness *Presbyopia* (q.v.).

Emm'ett, Thomas Addis, son of a physician, was born at Cork, 24th April, 1764. He was educated for the law, which he abandoned to become a leader of the 'United Irishmen.' On the Irish insurrection of 1796-98 being suppressed, he was arrested; but his sentence of imprisonment was commuted to exile, and removing to New York, he became a distinguished lawyer. He died 14th November, 1827.—**Robert E.,** younger brother of the above, was born in Dublin, 1778; was intended for the bar, but joined the Irish insurgents; was captured, and executed 20th September, 1803. His death and his love for Miss Curran are the subjects of two of Moore's *Irish Melodies.*

Emo'dic Flo'ra, a name given to plants, as species of *Cedrus*, *Pinus*, *Picea*, &c., found in the 'Emodic region,' or that part of India to the S. of the Himalayan ridge, and from 4500 to 10,700 feet above the sea. The average temperature of the region is from 37° to 66° F.

Emoll'ients (from Lat. *mollis*, 'soft'), substances used to soften the tissues. Externally they are applied as poultices and fomentations, and internally as demulcents. The principal E. are gums acacia and tragacanth, fats, wax, cetaceum, glycerine, collodion, cydonium, linseed, flour, starch, decoctions of barley and linseed.

Emo'tion (from Lat. *e*, 'out,' and *moveo*, 'I move') is one of three fundamental properties of the human mind, the other two being volition and intelligence. Though separated for the purpose of scientific analysis of their separate laws, the three functions are generally present in varying proportions in every mental state. E. includes all the pleasures and pains, the particular sensations, including muscular feelings, and general excitements of the nervous system. It is singular that while Reid's division into intellectual and active powers formally leaves no room for E., Brown's division of internal states into intellectual states and E. leaves no room for volition. The phenomena of E. are, however, described by both writers. One general condition of E. seems to be a change in the mode or intensity of the cerebral and other processes. Once aroused, it tends to diffuse itself over the brain, and unless suppressed or exhausted, passes into the moving organs and the viscera. One large class of characteristic effects of E. is expression, *i.e.*, definite excitement of the muscles of face and features. The muscles of the chest and larynx are in many cases stimulated, and characteristic sounds are emitted. The whole body may be agitated, but the following parts chiefly express and propagate E.—the lachrymal gland and sac, the digestive organs, the skin, and the heart. Characteristic examples of this are the suppression of the flow of the saliva by fear, the spasmodic contraction of the muscles of the pharynx by grief, and the flow of tears caused by tender E. such as pity. Besides specific expression of each class of feelings, it is a general law that pleasant feelings tend to increase the activity of the vital functions, while the tendency of painful feelings is to depress these functions. This is very obvious in the case of pleasurable muscular exercise, and is not contradicted by the pleasure of repose, which may be attended by a reflux of blood to the brain and stomach. The pleasures experienced from respiration and digestion, indeed all the organic pleasures, come under the rule. The pain of cold is only an apparent exception, for it checks perspiration, the function of the skin, although it may at a certain point stimulate the nerves and muscles. On the other hand, indigestion, skin-disease, and, in fact, most diseases, are accompanied by painful feeling. Pleasure, again, has generally a fuller, more intense expression than pain. Pain more often depresses the system and relaxes the muscles; sometimes, however, this is done by very intense concentration of energy on particular muscles. The frenzied excitement of great pain is really a case of shock. The contrast between the two tendencies is best seen in laughter, which sets in violent vibration whole systems of muscles; and grief, which, when severe, 'beats a man down.' The pleasures of sensation seem at first an exception. Even here, however, the pains of touch, hearing, and vision are chiefly due to excess of stimulus. This fact suggested the theory that in all cases pleasure and pain depend on the degree of violence with which the nerve or the sensorium is affected. It must be remembered in dealing with such theories that even where, as in light and sound, it might be possible to connect the painful effect with an increase in the number or character of the external vibrations, we know nothing whatever of the specific mode in which either a sense-pleasure or a sense-pain affects the nerve. But as regards taste and smell, although theory has also attempted to resolve them into vibrations on the external side, it is clear that some substances produce nothing but pleasure, and others nothing but pain. These then must be regarded as specific stimuli, producing nervous muscular activity independently of their character as pleasant or painful. The higher emotions, as wonder and love, illustrate the general rule; those which are pleasant strengthen and give tone to life, whilst shame, hatred, and the like are depressing. The stimulating drugs, on the other hand, alcohol, tea, &c., do not enhance vital action, except indirectly, and then generally at the cost of reaction. The Platonic theory, expounded in the *Gorgias*, that pleasure consists in the supply of a want or the negation of pain, and that pain consists in want, is now generally abandoned as inconsistent with the facts of experience, for men are conscious of indifference, also of pleasure unmixed with pain. The Hamiltonian theory is that pleasure may arise from faculties, capacities, dispositions, and habits, known as various forms, potential and actual, of 'energy.' Pleasure is the reflex of a spontaneous and unimpeded energy. A spontaneous energy is that which is neither strained above nor depressed below a certain pitch, and unimpeded energy is that which reaches its object. This theory is purely verbal, the word 'energy' being defined so as to meet all the known cases of pleasure. The most important distinction in feeling, after pleasure and pain, is that of degree; E. may be either acute or massive. This distinction enters into the volitional strength of feeling, and also into its ideal persistence, or its capacity of being reproduced by the intellect. E. tends to occupy the mind, and a pleasant feeling in idea is the germ of desire. In the same way E. powerfully affects belief, excluding from the mind what interferes with the contemplation of itself. Besides the emotions which may be called primitive, and which are enumerated below, there are emotions formed by the harmony or discord of simple sensations experienced together, by the transfer of feeling from its original causes to contiguous objects, by coalescence of separate emotions. Of this last, the most conspicuous example is conscience. There are also certain general emotions depending on the amount of change operated on the system, and these are novelty, surprise, and wonder; liberty, as opposed to restraint, and power, as opposed to impotence. These emotions of contrast are the real foundation of the Platonic theory. The chief forms of special E. are fear or terror; tender emotions or love, branching out into those of admiration, reverence, and esteem, and by further associations into self-complacency and approbation or glory, power; anger, or the pleasurable E. of malevolence. Connected with the volitional side of the mind there are the higher emotions of pursuit; the exercise of the intellect yields a characteristic E. in the perception of resemblances, and in the jar of contradictions; and there are also æsthetic emotions interwoven with intellectual association. Last of all, comes the E. of the moral sense, which varies from the rudest instinct up to the most sensitive and complex of faculties. The classification of the emotions directly affects æsthetics and phrenology. Among others may be mentioned that of Brown into immediate, retrospective, and prospective; of Hamilton into contemplative and practical; of Spencer into presentative (sensations); presentative-representative, *e.g.*, terror; re-presentative (ideal sympathy with another); re-representative, as property, justice. See Stewart on *The Active Powers* (1828), and Bain, *Emotions and the Will* (3rd. ed. 1875).

Emotions, Physiology of.—The anatomical seat of the emotions is undoubtedly some part of the cerebral hemispheres. Disease of these organs produces the various forms of insanity, in which the emotions are more or less affected. But they are related to the rest of the body in a complex way, the exact physiological mechanism of which at present is not understood. The emotions may be affected (1) by various states of the body, or (2) by outward impressions, and, on the other hand (3), they can influence the actions of various organs.

Empann'el in English law denotes the enrolling on parchment or paper by the sheriff of the names of jurors. The schedule of names is called a panel, and those named in it are bound to attend to serve upon the grand and petty juries.

Empecina'do, Don Juan Martin Diaz, el, was born at Castrillo in 1775, enrolled as a volunteer in 1808, and as a guerilla chief inflicted signal losses on the French occupants of Spain. He was made a general, and in 1815 petitioned Ferdinand VII. to establish a constitutional government, for which he was imprisoned. In 1820 he pronounced in favour of the Cortes, and in 1823 held a command in the corps of General Palencia. On the suppression of the revolution in 1825, this patriotic soldier was captured and executed as a traitor.

Emped'ocles, a Greek philosopher, who flourished about 444 B.C., was born at Agrigentum in Sicily. He belonged to a wealthy class, but supported the democratic party, and was benevolent as well as magnificent in his mode of life. A passage in Aristotle's *Metaphysics*, i. 3, has thrown much doubt on E.'s philosophical position. He derives much from Pythagoreans and Eleatics, and the tradition is that Anaxagoras was his teacher. In the fragments of his writings preserved he laments the uncertainty of ordinary knowledge, and states that a *dæmon* (a soul) polluted with guilt must wander apart from the blessed 30,000 years. He deduced abstinence from animal food from the doctrine of metempsychosis. As like can be known only by like, and as the idea of God, the perfect mind pervading the world, is recognised by man, God must exist. Creation is not an absolute beginning or ceasing to be, but a 'mingling and then a separation of the mingled,' there being four primary elements—earth, air, fire, water. This seems a combination of the fire of Heraclitus and the *homoiomeriæ* of Anaxagoras. But in place of the *desire* of the former, and the *nous* of the latter, E. selected *love* as his formative power. It was hate or separation which produced the misery of the sensible world. We must add his beautiful conception of God—'the sphere in the bosom of harmony, fixed in calm rest, gladly rejoicing.' His system seems to have been emotional and fanciful rather than logical. E. is eulogized by Lucretius in his *De Rerum Naturâ*. The fragmentary writings of E. extant have been edited by Sturz (Leipz. 1805), Karsten (Amsterd. 1838), and Steinn (Bonn, 1852).

Em'peror (Fr. *empereur,* Lat. *imperator, impero,* 'I command'). The primary meaning of E. was a commander-in-chief; and next, one sent on any important expedition. Cæsar assumed the name as a prænomen. This continued under the Empire, *imperator* only becoming part of the formal title after the Antonines, the proper term being *princeps,* or first man in the senate. In the early stages of the Roman Empire the absolute power of the E. was disguised by the form of a senate, but in the 2nd c. Septimius Severus was the apparent autocrat of the Roman world. Temples were raised to him when living, and when dead he was called *divus.* As the successor of the Pontifex Maximus, but still more from there being no chief patriarch of recognised authority, the E. became the head of the Church. He presided in councils, issued edicts against heresies, and was 'orbis Christiani custos.' Even after the division of Karl the Great's empire the E. was revered by the nations of Europe. Though he had no definite political supremacy over all, the mediæval E. ('Imperator terrenus') was the advocate of the Church—a 'secular pope,' deriving authority not through the spiritual pope, but direct from heaven. The position of the E. was greatly strengthened by the fusion of the title with that of the feudally powerful 'King' of the Eastern Franks. The 'Rex Francorum' was first discontinued by Otto the Great (A.D. 962), 'Imperator Augustus' being alone retained. In the feudal conception the E. was the suzerain of all kings and potentates. Various countries at times owed allegiance to the E. Thus Hungary, Denmark, Poland, and France acknowledged Otto the Great. The great interregnum beginning in 1254 loosened many of these relations. Spain, England, and Venice never admitted the supremacy of the E., and the Byzantine princes constantly protested against his title. The E. was crowned at Aachen, the original capital of the (Eastern) Franks, but after Heinrich II.'s time, 'King of the Romans,' at Pavia, or latterly at Milan or Monza, where he became King of Italy or of the Lombards, and at Rome, where he received the crown of the Roman Empire. The coronation at Rome was not held to confer the ownership of the separate kingdoms. Such importance was attached to it, however, that the Italian writers do not include in their list emperors who were not crowned at Rome, and the dates of the *regnum* and the *imperium* are in every case distinguished. This distinction was supported by the Empire passing from one family to another, the Karolings, Italians, Saxons, and Franconians. Hence sprang the latter theory that the pope was lord paramount, and the E. a vassal receiving a fief on conditions variable on each investiture. The word *holy* was applied in the German court, as at the Roman, to the person of the E. The E., at least in the 14th and 15th centuries, sought to represent a spiritual unity by deciding the disputes of inferior sovereigns, a right based on his divine commission. Among other secular privileges of the E. was that of creating kings, and he was the head and centre of the institutions of chivalry. In theory the Empire could be held by any man free-born and orthodox. By the Treaty of Westphalia large changes were made in the position of the E. The rights of making war and peace, levying contributions, passing or interpreting laws, were given to the Diet. The Reformation destroyed the Catholic theory of Empire. The subsequent changes in the attitude of the E. belong to the history of Austria and Germany. The title was dropped in 1806. In 1870 Germany again became an empire, which, however, does not claim to represent the Roman Empire. The German E., or E. *in* Germany, is the E. of a federation, not of all Christians. In the imagination of Napoleon I. the French Empire was a revival of the Karoling idea; he claimed authority over the pope, and called his son 'King of Rome.' The modern notion of E. is the somewhat inconsistent one of an elective despot. The title has been adopted by several new dynasties, as Brazil, Haiti, and Mexico, all of which have disappeared. Barbarous princes, like those of China and Abyssinia, also prefer the title to that of king. It was assumed in 1876 by the sovereign of Britain, to express the relation in which she stands towards the rajahs of India.

Emperor Moth, a species of Lepidopterous insects, the larva of which, common on heather in summer, is green, and has seven hairy pink tubercles set on black rings. It is the largest British moth. Each wing has a large transparent spot. The night or peacock moth of France (of the same species), may attain an expanse of wing of 5 inches. The E. M. is nearly related to the silk-moth.

Emperor Moth.

Em'phasis. See ACCENT.

Emphyse'ma (Gr. *emphusaō,* 'I inflate'), a distension of the body with air. E. of the lungs may be *vesicular* or *interlobular. Traumatic* E. is most commonly caused by a wound of the *pleura costalis* and the lung from an external puncture or a fractured rib. E. is sometimes caused by foul gases escaping into the cellular tissue.

Emphyteu'sis (Gr. 'an implanting'), in Roman law, a right in land granted by the superior for a yearly rent called *canon emphyteuticus.* The *emphyteuta,* or tenant, was not allowed to sell without making the first offer to the *dominus,* but he was entitled to the full profits of the subject. The word E. has been applied to Scottish feu-holding.

Empir'ic (Gr. *empeirikos,* 'searcher after facts in nature,' from *peiraō,* 'I try'), originally meant a man who gained his knowledge from experiment, and was applied to a medical school founded by Philinus of Cos and Serapion of Alexandria, which made the science of medicine depend upon experience, but which afterwards neglected science and fell into disrepute. Consequently a quack or pretender in any field, but chiefly in medicine, is called an E. Empiricism, in philosophy, is applied to the system which is based on observation and induction.

Empiric For'mulæ, in chemistry, are the symbols employed to denote the quantities of the respective elements of a substance without giving an insight into its constitution or the arrangement of its atoms. See CHEMISTRY.

Empir'ical Laws are laws which seem to hold during the occurrence of certain phenomena, but which do not give the explanation or cause of these phenomena, as in Bode's Law (q.v.). Kepler's were E. L. until Newton established his theory of gravitation. In time, probably, they will be shown to be all dependent upon a few great underlying principles.

Emplas'tra (Gr. *emplassō,* 'I plaster up') are external applications, of a firmer consistence than ointments, spread on linen or leather. They are mostly made from powders, extracts, or gums, and owe their consistence to metallic oxides, or to wax, resin, &c. Almost every solid medicine may be applied in this form, so that the non-official preparations are numerous.

Em'poli (a corruption of the Lat. *emporium,* 'the market-place'), a town in the province of Firenze, Italy, on the left bank of the Arno, in a fertile district, and 16 miles below the city, of Florence, with which it is connected by railway. It has a fine church of the 11th c., adorned with paintings by Giotto. There are manufactures, cotton and leather, and trade in fruits and grain. Pop. 18,030.

Empo'rium (Gr. *emporion,* from *emporos,* 'a wholesale trader'; Lat. *emporium*), the centre of a special commercial or manufacturing industry, or a warehouse for the storage and disposal of goods.

Emp'tion. See SALE OF GOODS.

Empye'ma, an accumulation of pus in the chest, caused by secretion in the pleural cavity, or by the bursting of an abscess of the lung. In the former case it is the result of pleuritis, and in the latter of organic disease or injury of the lungs. E. generally proves fatal, but is sometimes cured by drawing off the fluid with a trochar and canula.

Ems, or **Bad-Ems,** a market-town in a narrow valley on the Lahn, in the province of Hesse-Nassau, Prussia, 6 miles

S.E. of Coblenz by railway. It was celebrated for its baths as early as the 14th c. The springs, which are alkaline, vary in temperature from 93° to 135° F., and are beneficial in nervous and stomachic complaints. Near E. are silver and lead works. Pop. 7989.

Ems (probably the *Amisia* of Tacitus), a river in N.W. Germany, rises in the S.W. slope of the Teutoburger Wald near Paderborn, flows N.W., receives the Leda and Hasse, and enters Dollart Bay, near Emden, after a course of 215 miles. It drains an area of 5200 sq. miles, and is two-thirds navigable.

E'mu or **Emeu,** a bird belonging to the family *Struthionidæ*, order *Cursores*, and is a native of Australia. It attains a height of from 5 to 7 feet, and its plumage is light brown mottled with dirty grey. The throat is nearly naked, but the head is feathered, unlike that of the cassowary, from which the E. also differs in having no horny crest or pendent wattles. The three toes are directed outwards. The E. is monogamous, and lays from nine to thirteen dark-green eggs. They are placed in a hollow on the ground and hatched by the male, which is smaller than the female. The E. is swift, but can be hunted down with dogs. It inhabits the plains, living upon grass and wild fruits. An amber-coloured oil, esteemed for its anti-rheumatic properties, is made from its skin, a full-grown bird yielding from six to seven quarts. The E. can be easily domesticated; but no pains having been taken to rear it, it is dying out rapidly.

Emu.

Emul'sin, or **Synap'tase,** is a nitrogenous substance occurring in bitter almonds along with amygdaline. It is a species of ferment, and when added to solution of amygdaline, causes the latter to take up water and to split into hydrocyanic acid, oil of bitter almonds, and grape-sugar.

Emul'sions (Lat. *emulgeo*, 'I milk') are white liquid preparations obtained by mixing oil and water by the addition of some mucilaginous or saccharine substance, as camphor, balsams, &c. Emulsion of bitter almonds is used in cough medicines.

Em'ydin, a substance found in the yolk of turtles' eggs. It is probably derived from the decomposition of some more complex albuminous substance. A somewhat similar substance called *ichthin* has been found in the eggs of fishes.

Em'ys, a genus of Chelonians, represented by the terrapins or water-tortoises, belonging to the family *Emydidæ*. In this family the head is flat and covered with skin, the neck is retractile, the feet are broad, the nails sharp, the toes webbed, and the tail is conical and furnished with plates. In E. there are four hinder and five front toes. The most familiar species are the chicken tortoises and the lettered tortoises, both common in N. American lakes. The former is from 6 to 9 inches long, and is brown in colour. The lettered tortoise is so named from the markings on the edge of the body. The Quaker tortoise has long foreclaws. Allied to the E. are *Malaclemys, Cistuda, Chelydra*, &c.

Enam'el (Fr. *émail*, Old Fr. *esmail*, Ital. *smalto*, of Ger. origin, *smalti* in Old High Ger. meaning 'what has been fused or melted'; comp. mod. Ger. *schmelzen*, and Eng. *smelt*), a vitreous compound, consisting of a basis of transparent glass combined with colouring metallic oxides, applied principally to the surface of metal and fused by the action of fire. E. is either opaque or transparent according to the oxide. The oxide of tin produces an opaque white E., such as is seen on watch-dials, and a little peroxide of manganese communicates a violet tinge to it. Oxide of cobalt produces blue; oxide of lead yellow; the oxide of copper green; cuprous oxide ruby-red, &c. Any work of art in metal encrusted or painted with E. colours is commonly called an E. The art of decorative enamelling is of great antiquity, and had its origin in the East. There are different styles of metal enamelling, distinguished as *cloisonné*, *champ-levé*, and *painted* enamels. In the last, opaque or semi-fluid colours are spread over the surface of the metal with a brush. In cloisonné enamels, partitions (French *cloisons*) formed of slender strips of copper are soldered on the metal surface, and in champ-levé enamels spaces are dug out of the metal, and in both cases the cells are filled in with E. paste, which is permanently fixed to the metal by fusion. Old enamels from China and Japan are masterpieces of the art, and are highly valued. Chinese enamels are distinguished for brilliancy of colours, while Japanese enamels are unsurpassed for beauty and intricacy of design. The most interesting mediæval Greek E. extant is the celebrated Pala d'Oro, an altar front in St. Mark's at Venice. In France and England cloisonné enamelling is now carried on extensively. A celebrated firm is that of Messrs. Elkington & Co., Birmingham.

In champ-levé work metal plates with prepared troughs are now obtained by casting and by electro-deposition. Champ-levé was practised extensively in Constantinople, and early in the 12th c. Köln and Limoges were the great seats of its manufacture. The largest enamels were executed in this method, because there was little difficulty in procuring large plates of copper. Two varieties of champ-levé are recognised: one, belonging to the 11th and 12th centuries, has the flesh-tints and draperies as well as the ground represented by E.; and the second, practised in the two following centuries, has the figure chased in low relief on a gilded ground, the E. being restricted to the space around the figure. Early in the 14th c. Italian artists struck out a new path, and produced the translucid enamels upon relief, the design being chased upon a gold or silver plate and covered with brilliant E. tints. Painted enamels originated with the Limoges artists of the 15th c. The design was no longer expressed by engraved lines, but by colours mixed with fusible fluxes, applied to a copper plate. The plate was covered with a translucent flux, and upon this the design was outlined with a black E., around which the other colours were filled in. Flesh-tints were rendered upon a violet ground with white E. applied in varying thicknesses to secure effect of light and shade, and the background and draperies were heightened with golden touches. In the 16th c. *grisaille* (grey) enamels were produced at Limoges by working upon a thick dark-coloured layer with white opaque E., shaded flesh-tints being retained for the face. Translucent colours were sometimes spread over the grisaille. The chief artists of the late Limoges school were the Penicauds, L. Limousin, the Courtois or Courteys family, Jean Court, also called Vigier, Martin Didier Pape, and Pierre Raymond or Rexmon. The main difficulty of E. painting consists in the artist not having actual colours to work with, but substances which are to take these colours after firing. See ENCAUSTIC PAINTING.

The coating of the inside of cast-iron pots and saucepans with E. glaze, to protect them from the action of acids, is comparatively new. Still more recent is the application of coloured E. to plates of iron for use as railway and other signs, dials, &c. Articles of cast-iron are prepared for enamelling by being heated to a low red heat and slowly cooled, scoured with sand in warm dilute sulphuric acid, then washed and dried. Several coats of E. mixtures of variable composition are then applied, one coat being vitrified before the next is laid on. Letters and ornamental designs in E. colours are stencilled and fused upon the last coat.

Enamel is the name given to the hard external coating of the teeth, which contains a large quantity of oxide of lime.

Ena'ra, or **Inare,** a lake of Russia, in Lapland, 60 miles long and 20 broad, in about lat. 69° N. and long. 28° E., has an area of 1050 sq. miles. It is studded with islands, and connected with the Varanger Fiord by the Pasvig River.

Enar'ea, a country of the Gallas, in Africa, to the S. of Abyssinia, in lat. 7° 40' to 8° 40' N. and long. 36° 40' to 37° 35' E. It is bounded on the N. by Nonno, is watered by the Didesa, Omo, and Gibbe, and is intersected by offsets of the Abyssinian highlands. Coffee is extensively cultivated, and there is an active trade, chiefly in gold, ivory, civet, skins, and ornamented arms. The Mohammedan religion prevails.

Enarthro'sis (Gr. *arthrōsis*, 'a joining') is the ball-and-socket form of joint, like the shoulder and hip, allowing motion in every direction.

Encamp'ment (Lat. *campus*, 'a plain') is the temporary station occupied by an army or division, with its artillery, baggage, or stores. In early times an established arrangement of the troops, &c., in camp, was rigidly adhered to. (See CAMP.) In modern times, the leading idea in arranging an E. is to dispose the lines so that at a few minutes' notice every battalion shall be able to assume its position in order of battle. The extent of the front is determined by the number of troops in camp, and is generally calculated at the rate of two paces for every file of infantry, and three for each file of cavalry. The tents for infantry now generally in use accommodate fifteen, those for cavalry twelve men each, and they are usually ranged in rows or 'streets.' In the single rows of cavalry, a total frontage of 19 yards must be given for each troop. The extent of front covered by the tents of each battalion is no greater than that battalion will occupy in order of battle. In selecting a site for E. it is desirable to choose a spot where wood and water can be readily obtained; the front should be covered by forest or stream, and the rear be perfectly open. Formerly the natural strength of the site of a camp was a matter of first importance; and even in our own time, when a complete watching system has been elaborated, the natural defences of a site—the marshes and rivers which bound it, &c.—and the character of the roads converging upon it, are carefully considered in encamping. For camps of instruction, see ALDERSHOT, KILDARE, &c.

Encarpa, in architecture, a festoon of fruit, or of flowers, frequently used as decoration of friezes or other flat spaces.

Encarpa.

Encaus'tic Painting (Gr. *en*, 'in,' and *kaustikos*, 'caustic,' from *kaiō*, 'I burn'), a process of using colours mixed with wax and subsequently heated, somewhat akin to enamel painting. Ancient descriptions of the art, as practised by the Greeks and Romans, are not quite clear as to the modes of operating. In one process it would appear that the wall was first coated with wax, and upon it a design was outlined with a style, and filled in with colours in a wax medium with a hot spatula, the whole being subsequently polished. The art, lost for centuries, but revived in the 18th c. by Bachelier, Comte Caylus, and Miss Greenland, is seldom practised now.

Encaustic Tile, a tile with an ornamental design produced by inserting and 'burning in' coloured clays. Encaustic tiles were much in vogue for pavements in cathedrals during the Middle Ages, but for some centuries later the art of making them was neglected till it was revived and brought to great perfection by the late Herbert Minton. The modern process is as follows:—From red clay consolidated into a 6-inch cube a sufficient thickness to form the body of one E. T. is cut off with a wire. The upper side of the tile is then faced with fine clay to form the ground of the pattern, and a coating of the same material is applied to the lower side, and pierced with holes to prevent the tile warping. A plaster-of-Paris mould, bearing the intended pattern in relief, is then pressed upon the tile, and the indentations so formed are filled with various-coloured 'slips,' or fine clays, in a semi-fluid state. After partially drying, the superfluous slip is scraped off, and the coloured pattern left flush with the surface is then slowly dried and baked. Hard non-porous encaustic tiles are extensively manufactured in the Stafford potteries, and encaustic floors, even in dwelling-houses, are now common.

Enceinte' (Fr. 'an enclosure,' from Lat. *incincta*) is a term in fortification used to designate the well or rampart enclosing a fortified place, and secondarily the whole of the fortified area.

Enceph'ala (from Gr. *kephalē*, 'the head'), a name given to the three higher classes of Mollusca, the *Gasteropoda*, *Pteropoda*, and *Cephalopoda*, from the fact that they possess a well-developed head. These groups are so named in contradistinction to the Lamellibranchiate molluscs, or *Acephala*, which possess no distinct head.

Encephalar'tos, a genus of Exogenous plants belonging to the *Cycadaceæ*. The species of E. produce starch. *E.* or *Zamia pungens* has ripened and produced its fruit at Chatsworth in England. Many species afford 'Caffre bread.'

Encephali'tis, or **Cerebri'tis,** inflammation of the brain substance, or of the structures generally within the cranium, is often associated with *meningitis*, and followed by softening or induration. There are two varieties of softening of the brain—(1) Inflammatory *red softening*, or acute ramollescence; and (2) *white softening*, the result of an atrophic process. Red softening is frequently followed by abscess, and is essentially a fatal disease. In induration, the texture of the brain resembles the white of egg boiled hard, the convolutions being flattened, and there is an absence of blood and serum in the encephalon. Causes:—Morbid poisons, associated with zymotic or constitutional diseases; intemperance; *coup de soleil;* great mental excitement, &c. E. may be *traumatic*, resulting from injury; or *idiopathic*, *acute*, or *chronic*. In acute E. there is usually delirium, followed by a loss of mental power terminating in dementia. In chronic E. the mental symptoms may be slight; but there is always loss of intellectual vigour, failure of memory, confusion of ideas, and irritability of temper. The disease often ends in general paralysis, or death from apoplexy. Treatment:—General measures must be adopted to remove the exciting cause, and the brain must have perfect rest. Hygienic measures and a change of scene are of primary importance.

Enceph'alon, a term sometimes applied to that part of the nervous system within the skull. See CEREBRUM.

Enchondro'ma, or **Cartilag'inous Tu'mour,** may be innocent or semi-malignant. In the first case it is smooth, elastic, round, or flattened, seldom exceeding the size of an orange, and growing slowly without pain. In the second it is rapid in growth, attains an enormous size in a few months, and deposits secondary growths in internal organs, which are frequently associated with encephaloid cancer. The treatment consists in excision of the tumour, or amputation of the affected part, when possible.

Encho'rial Writing. See HIEROGLYPHICS.

Enck'e, Johann Franz, was born at Hamburg, 23rd September, 1791, studied at Göttingen, served from 1813-14 in the Hanseatic Legion, and in 1815 was appointed a lieutenant of artillery in the Prussian army. He left the service and became astronomer at the Seeberg Observatory near Gotha, whence he went to Berlin in 1825. He was made editor of the *Berliner Astronomische Jahrbuch* in 1830, and died 2nd September, 1865. His greatest labours are the determination of the orbit of the 1680 comet; the reduction of the transit observations of 1761 and 1769, and calculation of the sun's parallax; and the discovery of the short-period comet which goes by his name. See Bruhn's *Life of E.* (1869).

Encke's Comet has the shortest period and the least aphelion distance of all the known comets. It revolves in a very eccentric ellipse, which does not, however, extend to the orbit of Jupiter, and moves in a plane inclined at an angle of about 13° 20′ to the ecliptic. The period is 3·29 years, but it seems to be lessening by about two hours and a half every revolution, a fact accounted for by Encke by the presence of a resisting medium pervading space. It was first recognised by Encke as a comet of short period in 1819, and its subsequent appearances have been so accurately observed, that its orbit and motions are as well determined as those of any planet. Its last reappearance commenced on 1st November, 1894.

Encore' (Fr. 'again,' Old Fr. *ancore*, Ital. *ancora*, a corruption of the Lat. *hanc horam*), a call made by an English audience for the repetition of a part of a performance. The French similarly cry *bis* (twice).

Encrini'tal Lime'stone, a name given to certain limestones intermingled with rocks of Carboniferous age, from their containing vast quantities of fossil Encrinites or Crinoids.

En'crinite, or **Lily Star,** the name given to certain fossil *Echinodermata* (q.v.) belonging to the order *Crinoidea* (q.v.). There are a few living species of crinoids, whilst a vast number of fossil species, popularly named E., are known. The crinoids appear to be first represented in the Lower Silurian rocks. The Carboniferous or Coal period is, however, the great region of crinoids. Many strata of Carboniferous limestone are wholly composed of crinoid remains; and the crinoids of this period, as well as those of all other Palæozoic rocks, are distinguished chiefly by having the grooves of the arms running to the mouth in closed channels, and by their rounded stalks. The mesozoic crinoids include the genus *Encrinus*. *E. liliformis* is a well-known Triassic species, these typical encrinites having the joints of their stalks perforated by a small canal, and having the arms composed of two series of alternating pieces. The genera *Pentacrinus* (Lias) and *Extracrinus*, and the *Apiocrinidæ* or pear E. of the Oolitic rocks are well known. The latter are so named from their pear-shaped calyx.

Encrinites.

Encyclopæ'dia (Gr. *en*, *kuklos*, and *paideia*, lit. 'a circular course of education'), a work meant to treat, generally in alphabetic order, of the whole circle of knowledge. Aristotle was the first who saw the connection between all branches of knowledge, but his idea was not embodied in the form of an E. for ages, as the works of Pliny, Varro, and Suidas are unsystematic compilations. Albertus Magnus (1193-1280) made a collection of remarks on scientific facts which bears closer resemblance to an E., but a more clearly encyclopædic work was the *Speculum Naturale Morale Doctrinale et Historiale* of Vincent de Beauvais (1264) compiled from Aristotle and Aquinas. In the 13th c. the idea of throwing knowledge into encyclopædic shape seems to have been common, from the number of works then written with the title *Summa* or *Universitas*. The chief of such books was Roger Bacon's *Opus Majus*, a summary of the knowledge of his times, and the introduction to an E. on a larger scale, the *Compendium Philosophiæ*, which was never finished. Whewell calls the *Opus Majus* the E. and the *Novum Organum* of the 13th c. In the 16th c. the encyclopædic idea again became active. Ringelberg published at Basel the earliest work entitled a Cyclopædia, which was followed by similar compilations, the best being Alsted's *E. Scientiarum Omnium* (1620), a collection of treatises giving special attention to grammar, rhetoric, and logic. Two remarkable French works belong to this period, the *Grand Dictionnaire Historique et Critique* by Louis Moreri (10 vols. Lyon, 1674), and the still better known *Dictionnaire* by Bayle (2 vols. Rotterdam, 1696). The very earliest attempt to gather the body of science and art into lexicographic form was probably made by Hoffmann in his *Lexicon Universale* (2 vols. Basel, 1677). This was followed by Thomas Corneille's *Dictionnaire des Arts et des Sciences* (2 vols. Par. 1694), and Coronelli's Italian *Biblioteca Universale* (45 vols. Venice, 1701). In 1706 appeared the *Lexicon Technicum* of Dr. J. Harris (Lond. 1706), and in 1727 Ephraim Chambers's *Cyclopædia* (Lond. 2 vols.), which suggested the great French E. (See ENCYCLOPÉDISTS.) Of encyclopædias issued since E. Chambers's, the most noteworthy are Barrow's *Universal Dictionary of Arts and Sciences* (1751), *E. Britannica* (1st ed. 3 vols. 1771, 9th ed. 24 vols. 1875-89), *Rees's Cyclopædia* (45 vols. 1802-19), Brewster's *Edinburgh E.* (18 vols. 1810-30), the *Encyclopædia Metropolitana* (30 vols. 1818-45), the *London E.* (22 vols. 1829), *Penny Cyclopædia* (27 vols. 1833-43), Knight's *English E.*, based on the *Penny* (22 vols. 1853-61), *W. and R. Chambers's E.* (1st ed. 1860, 10 vols., new ed. 1888-92), *Illustrated Globe Encyclopædia* (1876, new ed. 1895). Of French encyclopædias, besides Diderot's famous *Encyclopédie* (28 vols. Par. 1751-72), the chief are the *Encyclopédie Méthodique* (1782-1852, 201 vols.), *Encyclopédie des Gens du Monde* (22 vols. 8vo, 1833-44), *Encyclopédie Moderne* (1846-62, 42 vols.), *Dictionnaire de la Conversation et de la Lecture* (52 vols. 1834-39), *Biographie Universelle* (1st ed. 1811, later ed. 1854), *Nouvelle Biographie Générale* (46 vols. 1862-70). The chief German encyclopædias are the *Œconomische Encyclopedie* (242 vols. 1773-1858), the *Conversations Lexicon* (1st ed. 8 vols. 1796-1809, later ed. 17 vols. 1865), Meyer's *Grossem Conversations Lexicon* (44 vols. 1840-55), and, above all, Ersch and Gruber's colossal undertaking, the *Allgemeine Encyclopädie der Wissenschaft und Künste* (1818, still unfinished). Those of America are the *British Encyclopædia* (Philad. 1798-1804), *E. Americana* (14 vols. Philad. 1829-48), the *New American Cyclopædia* (16 vols. New York, 1857-63, revised as *American Cyclopædia*, 16 vols. 1873-76). Schemnis' *German-American E.* (11 vols. 1869), and Johnston's *Universal Cyclopædia* (4 vols. 1878, new ed. 1894). Others are Mellado's Spanish *Enciclopedia Moderna* (34 vols. Madr. 1848-51), the *Nordisk Conversations Lexikon* (5 vols. Copenh. 1858-64), *Svenskt Konversations Lexikon* (Stockh. 1845), Rieger's *Slovink Naŭcny* (vols. i.—v., Prague, 1860-65). The enormous Chinese E. in 5020 vols., entitled *Ku tu shu tseih ching*, also merits notice.

Encyclopé′dists, the name given to a French school of writers, from their contributing to the great encyclopædia of the 18th c. edited by Diderot. A project of translating Ephraim Chambers's English encyclopædia having failed, Diderot resolved to form a new and far ampler work, the plan of which was matured between 1745 and 1748, the first volume appearing in 1751, and the last in 1765. The foremost authors of the time contributed to the book; among others, Diderot, D'Alembert, Voltaire, Montesquieu, Turgot, Grimm, Rousseau, Marmontel, Daubenton, Jaucourt, Haller, Du Fresnoy, and Condorcet. There was great variety of belief among these, some being deists, others materialists, others pantheists; and no consistent attack was made on Christianity throughout, though the Catholic priesthood was boldly assailed. This encyclopædia was the first great embodiment of the sceptical and revolutionary spirit, of which it became a most potent organ. Though not pledged to any social theory, and the vehicle of no new social facts, the book, by its clear statement of existing evils, prepared the way for their abolition. It presented the latest scientific results, gave great space to practical arts and industries, but contained no articles on biography or history. See La Porté's *Esprit de l'Encyclopédie* (Par. 1768), Voltaire's *Question sur l'Encyclopédie* (1770), and Taine's *Ancien Régime* (1876).

Endem′ic (Gr. *en*, 'among,' and *dēmos*, 'the people'), a term applied to diseases to which the inhabitants of any country are peculiarly subject, and which proceed from local causes and conditions. When from any cause in the manners and customs of a people, or in their local surroundings, the general health of a community deteriorates, an E. disease is the result. Diseases peculiar to certain localities are, in some way or other, connected with terrestrial and climatic influences, the most marked type of diseases of this class being ague or intermittent fever. E. disease may be caused by unavoidable influences, such as solar heat, the density and electricity of the air, low-lying or elevated situations; or by remediable causes, as swampy districts, luxuriant and decaying vegetation, and by the habits of the people, giving rise to miasmatic and filth diseases. E. diseases are caused also by errors in diet, and principally by the use of contaminated drinking water. Many E. diseases are preventable. Even those of miasmatic origin may be checked by draining and cultivating the soil, as has been done in the Tuscan Maremma. E. diseases, as a class, are not communicable from man to man like epidemic diseases, although the latter class of diseases are said to be E. in certain countries. In the tropics, the principal E. diseases are malarious fevers, dysentery, diarrhœa, cholera Asiatica, specific yellow fever, and hepatic affections. In the temperate disease realm, zymotic and constitutional diseases cause the greatest mortality; *leprosy* and *elephantiasis* prevail in Scandinavia; *pellagra* in Italy, France, and Spain; *plica polonica* in Poland and Tartary; *goitre* and *cretinism* in Switzerland; *beri-beri* in Further India and the Eastern Archipelago. Sanitary improvements in civilised countries are rendering E. diseases less frequent, and even phthisis has been shown to be, in great measure, preventable.

End′erby Land, an extensive tract of land in the Antarctic Ocean, lat. 67° 30′ S., long. 42°-60° E., discovered by Biscoe in 1831, and now understood to be an island. Morrell, in 1827, found drift-ice close to the S. of E. L.

Ender′mic Medica′tion, a mode of administering medicines through the skin, as in neuralgia, skin-diseases, the reduction of tumours, &c. Constitutional effects often result from E. M., as salivation from mercury applied in this way.

En′dive, a species of Composite plants belonging to the *Cichoraceæ* or Lettuce section of the order, also known as the 'garden succory.' It is a native of China, but grows well in our gardens, where it is sown in May, and survives through the winter. A salad is made of the leaves.

End′licher, Stephen Ladislaus, was born at Presburg, 24th June, 1804, studied at the universities of Pesth and Vienna, and devoted himself to the study of botany and of Eastern languages. In 1828 he held a post in the imperial library at Vienna, in 1836 became keeper of the museum of natural history, in 1840 Professor of Botany in the High School of Vienna, and director of the Botanic Garden. He contributed greatly to the establishment of the Academy of Sciences (1846). The political movements of 1848 affected him so strongly that he committed suicide, 28th March, 1849. Among his works are *Genera Plantarum*, in Latin (Vien. 1831-41), and others upon botany and geography.

Endocardi′tis, an inflammation of the serous membrane, or endocardium, covering the valves and internal surface of the heart. See HEART, DISEASES OF.

Endocar′dium (Gr. *endon*, 'within,' and *kardia*, 'the heart'), the lining membrane of the heart. See HEART.

En′dogens, or **Endog′enous Plants** (Gr. *endon*, 'within,' and root *gén*, from *gignomai*, 'I am born'), a great natural division of the vegetable world, characterized by the *inward growth* of the stem. The term is used chiefly in opposition to Exogen (q.v.). Endogenous plants possess only one seed-leaf, and the name *Monocotyledonous* is therefore used synonymously with E., whilst the leaves of E. show a *parallel venation* or arrangement of their veins. In their growth also E. differ from the higher exogens. The *radicle* or young root of the E. divides into numerous fibres, which, as they pass outwards, are covered by a thin sheath or *coleorhiza*. The roots are hence called *enderhizal*. The stem of any endogen (well exemplified by palms, bamboos, grasses, lilies, &c.) shows no division into layers of pith, wood, and bark, as in the stem of an exogen. No concentric woody circles, nor *medullary rays* running between the pith and circumference, are to be seen. The bark of an endogen cannot be separated from the wood, and exhibits no annual increase as in exogens. The bundles of vessels are also diffused through the tissues of the endogenous stem without any definite arrangement. The stem is composed of cells in its young state, but afterwards of bundles of woody, spiral, and other vessels. The endogenous stem grows, therefore, by additions to its central portion, the older vessels being pushed outwards; and there seems to be a definite limit to the outward growth of these plants, since, after a certain thickness has been attained, the stem may increase in height but not in thickness. E. possess flowers with stamens and pistils, and the seeds are held in an ovary or seed-vessel. They may be subdivided into the (1) *Dictyogenæ* (in which the leaves have reticulated venation), exemplified by the natural orders *Smilaceæ*, *Trilliaceæ*, and *Dioscoreaceæ*; and (2) the *Petaloideæ* (with parallel-veined leaves and a coloured perianth), represented by the great bulk of E., such as orchids, palms, lilies, grasses, and many other less familiar groups.

Endorse′ (Lat. *in*, 'on,' *dorsum*, 'the back'), in heraldry, is an ordinary containing one-fourth of the pale. It is generally borne on the field in pairs.

Endorse. See BILL OF EXCHANGE.

Endow′ment, in English law, is the application of wealth to any use or to any person such as the settling of Dower (q.v.) upon a woman. The term is also applied to a provision for the support of a church, school, charity, &c., or to a portion to maintain a vicar when his benefice is appropriated.

Endröd′, a village of Békés, Hungary, on the Körös, 92 miles E.S.E. of Pesth. It is situated in a very fertile region, and has a trade in horses, cattle, sheep, grain, &c. Pop. 1898.

Endym′ion, a youth (variously described as king of Elis, shepherd, or hunter) renowned for his beauty and for the perpetual sleep in which he spent his days. He was greatly beloved by Selēnē (the Moon), who, according to a Carian tradition, lay beside the sleeping E. in a cave of Mount Latmos. The sleep of E. is indifferently accounted for. Some say it was the gift of Zeus, some a punishment for falling in love with Hērē, others that Selēnē, fascinated by his charms, conveyed him to Latmos, and lulled him to slumber that she might nightly kiss him without reserve. The myth itself has received various explanations. E. is regarded by some as an astronomer, by others as a personification of Sleep. The Eleans showed his tomb at Olympia. Max Müller (*Oxford*

Essays, 1856) takes E. as a name of the setting sun (from *enduō*, probably a dialectical variety of *duō*, 'I sink or set'), who goes to sleep in the caves of Latmos (Night), to be followed there by Selēnē, the daughter of Latona (Night). E. is the subject of Keats' longest poem.

En′emy. Originally every subject of a belligerent state was said to be the E. of every subject of the opponent state, and everybody's property was liable to confiscation; but now a distinction is made between combatants and non-combatants. An E.'s subjects, resident in the country declaring war, generally get notice to depart. An E.'s property within the country, debts due by an E.'s subjects, and even public stocks held by the government, are now seldom confiscated. Non-combatant enemies, if they resist, are liable to severe punishment from the home government, and whatever plunder they take is forfeited to the public. On the other hand, their property within their own territory is partially protected, though on sea it is subject to capture. Accordingly there has always been more freedom for private exertion at sea. There was a system of issuing letters of *marque* (*i.e.*, licenses to cross the boundary) from the belligerent government which gave a right to the thing captured, and were recognised by the E. as authorising war. Privateering has been stipulated against in certain treaties, and the Declaration of Paris (30th March, 1856) declares privateering abolished. War on land is growing more humane. Formerly, an army pillaged in order to live. Now no commander severs his connection with his base whence his supplies come. The separation of the army from civilians has had a good effect, having strengthened discipline, and reduced war to a science. But the deeper changes, such as the abandonment of killing or enslaving prisoners, have arisen from the growth of intelligence and sympathy. Though the modern tendency is to excuse anything that does wholesale execution, infernal machines, constructed to produce a frightful moral effect by severe wounding or mutilation, are now little resorted to. The use of savage allies has always been criticised; but in 1848 the Russians brought Circassians into Hungary, and the Turks employed them in the insurrectionary wars of 1876. Systematic pillage was practised in the Thirty Years' War, and by Turenne and Catinat under Louis XIV. The substitution of fixed contributions in certain districts dates from the campaigns of Villars and Marlborough. Contributions were discountenanced by Wellington, were unknown in the Crimean War, and were paid for by the Germans in 1870. Military stores and buildings are held lawful plunder, and may be destroyed. In sieges a distinction is now made between forts and fortified towns: some generals do not bombard the latter, except after notice to the inhabitants. It is often difficult to fix the line where rebels become entitled to the privileges of combatants. Peace is generally adjusted by definite treaties, very often qualified by secret articles. Such treaties are often acceded to or protested against by neutral powers. These documents were in Latin till, in the 18th c., French became the *lingua franca* of diplomacy.

Ener′gico (Ital. 'with energy'), a mark of expression in music.

En′ergy (Gr. *energeia*, from *en*, 'in,' and *ergon*, 'work') is the capacity which a material system possesses for doing work, *i.e.*, for overcoming resistance. A stone ascending into the air against the gravitating attraction of the earth, a bowl rolling with ever-decreasing velocity along the ground, the slow onward and downward grinding of a glacier, all indicate the existence of E.; for all moving bodies possess power of doing work in virtue of their motion. But a raised weight, a drawn bow, a stretched piece of india-rubber, a quantity of compressed air, a heated body, a charged electric conductor, &c., also have each a certain capacity of doing work, though there is no evident motion. We thus recognise two apparently distinct forms in which E. is made evident, viz., that of motion, or *kinetic E.*, and that of configuration, or *potential E.* Now, the working power of a moving body must increase with both the mass and velocity, but must further be quite independent of the *direction* of motion. These, conjoined with other considerations more mathematical, lead to the definition of kinetic E. as half the product of the mass into the square of the velocity ($K = \frac{1}{2} m v^2$). For a clearer comprehension of potential E., take the case of a raised weight—say a weight of 10 lbs., at a height of 50 feet. The work which is stored up in it, and which it could perform if allowed to fall to earth, is estimated at 10 × 50 = 500 foot-pounds—where a foot-pound is the amount of work which must be expended upon a weight of one pound so as to raise it through a distance of one foot at the surface of the earth. This stored-up work, valued at 500 foot-pounds, is a measure of the potential E. We may then define the potential E. of a given material system, at any instant, as the amount of work stored up in that system during its passage from a certain configuration to the configuration it has at the instant in question. We find, on a close investigation of any physical phenomenon, that kinetic and potential energies are mutually transformable. Thus an ascending stone is continually losing in kinetic and gaining in potential E.; a descending stone the converse. The potential E. of a bent bow is made evident in the rapid flight of an arrow; the bowl derives its motion from the E. stored up in the muscle of the bowler; the heated body generates aërial currents, and raises the temperature of surrounding bodies; the charged conductor may give rise to a variety of motions—light, heat, sound, &c.—or may make a part of its E. sensible as an electric shock. From these few examples it will be seen what a wide significance in science the term E. has. Under it we study the nature, the effects, and the relations of the formerly so-called *imponderables*—light, heat, electricity, &c.; we investigate all phenomena of attraction and repulsion existing in the physical universe; we trace results through their varied transformations back to some known principle, thus rendering the whole science of natural philosophy more and more the vast and coherent structure which it should be, and which has for its foundation the grandest of modern generalisations—the *conservation of E.* This principle may be thus enunciated:—The total E. of the universe, or of any portion of it, uninfluenced save by its mutual actions, is *constant* throughout all transformations. It is this indestructible and non-creatable character which most warrants us in conceiving E. as something which has an existence as real and objective as matter; and it is utterly opposed to the possibility of perpetual motion, taken in its purely scientific sense of doing work without an expenditure of an equivalent quantity of E. The experimental basis for this generalisation is that any one form of E. may, by suitable means, be transformed wholly or in part into an *equivalent* amount in any other form. This constitutes the *transformation of E.* These principles were fully recognised, in their purely *mechanical* connections, by Newton; but they have only been developed during the last fifty years.

One of the most remarkable discoveries is the calculation upon theory by Professor Thomson of the lowering of the freezing-point of water by pressure, and the subsequent experimental verification, even to its numerical details, by Lord Kelvin. The latter extended the theory further in this direction, and deduced the interesting law that solids which *expand* when melted have their melting-point *raised* by pressure, and solids which *contract* when melted have their melting point *lowered* by pressure. For the application of this law to the explanation of physical phenomena, see EARTH and GLACIERS. Another discovery by Lord Kelvin is the so-called *electric convection of heat*, or the effect produced by a current directed through an unequally-heated metallic wire or bar—tending to equalise the temperature in some metals, as in the case of iron, and to render it still more unequal in others, as in copper. In electrolysis we have the E. of the electric current expended in dissociating the molecules whose combination forms the electrolyte; and the researches of Faraday show that the more hidden actions of chemical combination and decomposition are as truly governed by this law of conservation as the more evident motions of the solar system. Experiment shows that there is always a definite amount of heat taken in or given out during the formation of a given quantity of a chemical compound; and further, that a compound, if capable of being decomposed by heat, requires to give out or take in precisely the same amount to effect its decomposition.

Now one of the most evident properties of heat is its tendency to diffuse itself in all directions, and thus ultimately render all bodies of one and the same temperature. But mechanical work can be obtained from heat only when it is capable of being transmitted from one body to another, *i.e.*, when we have two bodies at *different* temperatures. Evidently, then, heat tends, when left to itself, to destroy its power of doing useful work. In other words, though the amount of E. is constant, its *availability* for work is diminishing; and thus are we led to Lord Kelvin's more recent development of the science, viz., the *dissipation of E.* It simply asserts that no natural process is reversible, and that all transformations are accompanied by a constant degradation of E. to the final unavailable form of uniformly-diffused heat. Hence if, as suggested by Professor Tait of Edinburgh, we take the word *entropy* to mean availability for work of a given quantity of E., we are led to the conclusion that the 'entropy of the universe tends to zero.' Heat can only do work when it is let down, so to speak, from a hotter to a colder body—just as a mass of water, however great, is useless unless it can be let down from a higher level to a lower. Further, the greater the difference of temperature between the boiler and condenser of a heat engine, the greater is the amount of work the engine is capable of performing as the boiler is cooled to the temperature of the condenser. If there were no dissipation of E., every natural phenomenon would be reversible, *i.e.*, would be capable of going over its various stages in the reverse order, fulfilling at each instant exactly the same conditions as in its original progress. But on account of the tendency which heat has to diffuse, very few instances in nature can be adduced which are even approximately reversible; and so unless it be possible to localise or prevent the diffusion of a given quantity of heat, we are compelled to accept the dissipation principle as an important law in nature. Professor Clerk Maxwell, however, showed, upon the molecular theory of gases, that the localisation could be effected if the molecules of matter were of sufficient size to be individually directed by physical means. The excessive smallness and great number of the molecules, however, render this impossible, and thus shut the only door of escape from this principle, overthrowing the whole of that materialism which has of late years been advocated by quasi-scientific sceptics.

E., then, including as it does Electricity, Magnetism, Gravitation, Heat, Light, Sound, &c. (q.v.), must be recognised as *the* agent in the physical universe—matter being in itself passive and merely the vehicle by which E. is made evident. The most plausible speculation regarding the ultimate nature of matter is that which supposes the atoms to be vortex rings in a perfect homogeneous fluid. (See VORTEX.) If we suppose this fluid to be almost but not quite frictionless, we see that the atoms may be but forms of E., and that ultimately matter may cease to exist, an equivalent portion of hidden E. reappearing as each vortex disappears. Regarding the more hidden properties of E., experiment suggests the following hypotheses as highly probable:—That transformations of E. take place through a medium, which, according to Lord Kelvin, must have an appreciable density to fulfil the requisite conditions for the propagation of light, radiant heat, and magnetic action; and that potential E. is really kinetic, being due to motions of displacement of some nature through the ether, as the medium has been called.

In conclusion, be it remembered that the theory of E. is still in its infancy. Grove's *Correlation of the Physical Forces* (1842) was the first step in this direction; but under the care of such men as Kelvin, Rankine, Helmholtz, Joule, Clausius, Maxwell, &c., the science has grown so rapidly, and has opened up such important lines of research, that it has established the whole of natural philosophy upon a new and firmer basis. The researches of Faraday have done more towards this than all other previous discoveries put together; yet it is a curious fact that this distinguished experimentalist never fully appreciated or recognised the potency of the principle of the conservation of E.

En'fantin, Barthélemy Prosper, 'Père,' was born at Paris, 8th February, 1796. He was expelled from the École Polytechnique for having taken part in the 'national defence' at Montmartre in 1814. For some years he was a bank clerk, and in 1825 was introduced by Rodriguez to the dying St. Simon. Later, E., along with Rodriguez and Bazard, the head of the French Carbonari, started a journal, the *Producteur*, in which they explained St. Simon's views, calling themselves the 'Supreme Fathers.' E. divided all human characters into the constant and the variable, the profound and the superficial. After a split in the sect, E. was called by his preachers—Barrant, Transon, Laurent, &c.—'the living law,' while the *Globe* newspaper argued that the salvation of society depended on the recognition of E. as Pope. In 1832 the society was put down by Government, and E. was imprisoned for conspiring against public morality. He afterwards lived in seclusion for some years, but was a member of the Algerian Scientific Commission of 1841, and edited the journal *Le Crédit Public*, 1848-50. He died 1st September, 1864. E. wrote many socialistic works; among the latest, *La Vie Éternelle, Passé, Présente, Future* (1861). E.'s works, along with those of St. Simon, were published in 20 volumes (1865-69) by a council of followers.

En'field, a town in Middlesex, 10 miles N.E. of London by railway, celebrated as the seat of the Government small-arms factory. It belonged to the Crown till the time of James I., and there was here an extensive royal chase, disforested in 1729. Pop. parl. div. of county 84,414; reg. sub-dist. and civ. par. (each) 31,803.

Enfilade' (Fr. *enfiler*, lit. 'to thread,' hence 'to take in line') is to sweep any line of works or of troops with shot from a battery placed on the prolongation of such line. An E. is evaded by constructing works so as to present angles to the enemy's fire, and on the side of the attack by advancing to these works in zigzag trenches.

Enfran'chise (Fr. *franc*, Ger. *frank*, 'free'), to liberate, to confer on a person free privileges, as of voting in a constitutional government, &c. It also means to *naturalise*.

Engadine' (*Encò d' Oen*), a valley in the E. of the canton of Grisons (Graubünden), Switzerland, is watered by the Inn, and has a length of 43 miles. It extends in a north-easterly direction between the Lepontian and Rhætian Alps, and is divided into the Lower E. in the N., an inclement ravine, clad with cembra pines, and the Upper E. in the S., a smiling meadow-land 4000 feet above the sea. The chief places in the former are Zernez and Tarasp: in the latter, Silvaplana, St. Moritz (a sanatorium), Samaden, &c. The Engadines are of Latin origin, and speak a Romanic tongue (*Ladin*). They usually pass a portion of their lives in the large European towns, chiefly as hawkers and confectioners, invariably returning to their native valley.

Engage'ments, Military and Naval, are hostile encounters between armies and fleets or divisions of these. The nature of these conflicts has been continually changing. The primitive manœuvres were upset by the invention of gunpowder, and warfare has in recent years been again revolutionised by the stricter study of tactics, by the introduction of armoured and ramming steamships, by the use of torpedoes, and by the vast improvements in cannon and small arms. See DRILL (MILITARY), ÉCHELON, CAMP, &c.

Enghien', Louis Antoine Henri de Bourbon, Duc d', son of Prince Henri Louis Joseph, Duc de Bourbon, was born at Chantilly, 2nd August, 1772. He fought with the French Royalists against the Republicans, 1796-99, and after the peace of Luneville, having a pension from England, retired to the château of Ettenheim, in Baden, and was privately married to the Princess Charlotte de Rohan. On the 17th of March, 1804, a French force entered the Baden territory, seized E. in bed, and took him to the Castle of Vincennes near Paris, where he was tried by a military court on the charge of being privy to the plot of Pichegru against the life of Napoleon, and having been convicted without evidence, was by order of Napoleon shot in the castle ditch on the 21st of March. Fouché, Napoleon's chief adviser, said of the execution of E. that 'it was worse than a crime, it was a blunder'; Napoleon defended it on the ground that it was necessary to frighten the Bourbons. See Dupin's records of the trial, and Savary's memoir *Sur la Catastrophe de M. le Duc d'E.* (Par. 1823).

En′gine (Lat. *ingenium*, 'natural capacity,' 'invention'; Ital. *ingegno*; Fr. *engin*, 'craft,' 'contrivance'), a term in mechanics, applied in a general sense to any powerful machine, but strictly denoting prime movers. Engines are usually more fully designated in accordance with their special functions, as in the case of a Steam-E. (q.v.). The forces applied and utilised by the various engines are heat, gravity, and electricity. The relation of these forces to useful work is described under THERMO-DYNAMICS, HYDRO-DYNAMICS, ENERGY, &c.

Engineer′ and **Engineering′.** The Institution of Civil Engineers defines E. as 'the art of directing the great sources of power in nature for the use and convenience of man,' and as dealing with 'the construction of roads, bridges, aqueducts, canals, river navigation, and docks for internal intercourse and exchange,' &c. In the widest sense, the E., to use the words of the late Professor Macquorn Rankine, 'is he who makes the mechanical properties of matter serve the ends of man.'

The business of the *military* E. (in distinction from whom others received the title *civil*) is to construct fortifications and military roads and works generally. In India, however, much purely civil work—the construction of railways, canals, bridges, &c.—is still done by military engineers, and throughout the Empire the work of the Ordnance Survey is carried on by them.

The profession of the Civil E. (q.v.) is further subdivided into railway engineers, hydraulic engineers, telegraphic engineers, electrical engineers, mining engineers, &c. The civil E., generally only designs and superintends work; the actual making of the railways, bridges, docks, &c., under his care is done by a *contractor*. The mechanical E., on the other hand, usually constructs as well as designs his work. He employs his own workmen—pattern-makers, moulders, smiths, fitters, turners, &c.

The English still hold the foremost position as engineers, in spite of the greatly superior education received by those of Germany and France. England, however, is now rapidly extending the provision for efficient training. Although she has nothing exactly corresponding to the German Polytechnic Schools, most of the universities and colleges have at last been won over to move with the times and have established chairs of engineering. The E. requires a knowledge of pure mathematics, mechanics, hydrostatics, hydraulics, dynamics, optics, electricity, and drawing. The various operations of the art are treated of in separate articles.

Engineers in the royal navy rank as commissioned officers. They are admitted by examination, and have charge of and control over the engines, boilers, and machinery in general of vessels of war. The principal classes into which they are divided are inspectors of machinery, chief E., and assistant E., the latter being subdivided into first, second, and third class. The pay ranges from £110 to £639.

Engineers, Royal, a regiment or corps of the British army, the special duties of which are the defence, attack, and alteration of fortified places, and making or destroying roads, bridges, &c. The regiment was first incorporated in 1763, the department of military engineering having previously to that date been superintended by officers selected from the army. The distinction of being made a royal corps, with a distinctive uniform, was conferred in 1783. In the army estimates for 1894-95 the corps of R. E. consisted of 588 officers, 1222 non-commissioned officers, and 5413 men. Officers of the R. E. require to possess a liberal knowledge of mathematics, mechanics, the theory and practice of construction, and drawing, &c. They enter as cadets, by competition, into the Royal Military Academy, where a course in these branches is pursued, and whence they pass out with commissions. The non-commissioned officers and privates are all skilled workmen in some mechanical calling. The pay of officers and men is considerably higher than in line regiments; and as the Ordnance Survey has been entrusted to the corps, as well as various special Government works, unusual facilities are afforded for advancement. The corps consists of 1-42 companies stationed at various places throughout the empire, A-N (except H) companies stationed at Chatham, H company in India, and Telegraph battalion at Aldershot and London, besides Bridging battalion, Mounted Detachment, Field Depot for R. E. Troops, Balloon Depot and Section, all stationed at Aldershot. At the present time the Duke of Cambridge is Colonel of the corps. Besides the R. E., there are the Coast battalion of the Submarine Miners, two regiments of Militia Engineers, ten divisions of Militia Submarine Miners, twenty battalions of Volunteer Engineers, seven divisions of Volunteer Submarine Miners, and one Volunteer Engineer and Railway Transport Corps.

Eng′land and Wales, the southern and larger portion of the island of Great Britain, is bounded N. by Scotland, E. by the North Sea, S. by the English Channel, and W. by the Atlantic and the Irish Sea, and lies in lat. 49° 51′-55° 45′ N. and long. 1° 45′-5° 44′ W. The country is somewhat in the form of a scalene triangle, having its base in the S., while its extreme points are in the N. Berwick, S. the Lizard Point, E. Lowestoft Ness in Suffolk, and W. Land's End. Its extreme length, from Tweedmouth in the N. to St. Alban's Head in Dorset, is 365 miles; and its breadth, from Hartland Point in Devon to the S. Foreland in Kent, is 290, while the extent of the coast-line amounts to 2000 miles, giving 1 mile of sea-margin to every 29 sq. miles of surface.

The chief indentations on the W. side are the Solway, Morecambe Bay, Cardigan Bay, St. Bride's Bay, Milford Haven, and Bristol Channel; on the S. Mount's Bay, Plymouth Sound, Portsmouth Harbour, and Southampton Water; and on the E. the estuary of the Thames, the Wash, and the Humber. Of the capes may be mentioned, on the E. coast, Flamborough Head and Spurn Head in Yorkshire, the Naze in Essex, the N. and S. Foreland and Dungeness in Kent; on the S. coast, Beachy Head in Sussex, the Needles in the Isle of Wight, Portland Point in Dorset, Start Point in Devon, the Lizard and Land's End in Cornwall; on the W. coast, Hartland Point in Devon, Worms Head in Glamorgan, St. David's Head in Pembroke, Braich-y-Pwll and Great Orme Head in Caernarvon, and St. Bees' Head in Cumberland. E. and W. are divided into fifty-two counties, with areas and populations as follow, according to the census of 1891:—

Counties.	* Total area in statute acres.	Pop. of Ancient County.	Capitals.
England.			
Bedford . . .	298,494	160,704	Bedford.
Berks	461,742	238,709	Reading.
Buckinghamshire .	475,694	185,284	Buckingham.
Cambridge . . .	549,565	188,961	Cambridge.
Chester . . .	655,036	730,058	Chester.
Cornwall . . .	868,208	322,571	Bodmin.
Cumberland . .	970,161	266,549	Carlisle.
Derby	657,550	528,033	Derby.
Devon	1,667,097	631,088	Exeter.
Dorset	632,272	194,517	Dorchester.
Durham . . .	647,281	1,016,559	Durham.
Essex	985,545	785,445	Chelmsford.
Gloucester . . .	796,731	599,947	Gloucester.
Hants (Southampton) .	1,037,764	690,097	Winchester.
Hereford . . .	537,363	115,949	Hereford.
Hertford . . .	406,932	220,162	Hertford.
Huntingdon . .	233,928	57,761	Huntingdon.
Kent	975,820	1,142,324	Maidstone.
Lancaster . . .	1,202,726	3,926,760	Lancaster.
Leicester . . .	528,986	373,584	Leicester.
Lincoln . . .	1,694,907	472,878	Lincoln.
Middlesex . . .	224,488	3,251,671	London.
Monmouth . . .	347,018	252,416	Monmouth.
Norfolk . . .	1,315,092	454,516	Norwich.
Northampton . .	639,541	302,183	Northampton.
Northumberland . .	1,289,756	506,030	Newcastle.
Nottingham . .	539,752	445,823	Nottingham.
Oxford	485,322	185,669	Oxford.
Rutland . . .	97,273	20,659	Oakham.

* Land and water, but not including tidal water.

Counties.	Total area in statute acres.	Pop. of Ancient County.	Capitals.
England.			
Salop	859,516	236,339	Shrewsbury.
Somerset	1,042,488	484,337	Taunton.
Stafford	749,713	1,083,408	Stafford.
Suffolk	947,724	371,235	Ipswich.
Surrey	461,230	1,731,343	Guildford.
Sussex	932,733	550,446	Lewes.
Warwick	578,595	805,072	Warwick.
Westmoreland	500,906	66,098	Appleby.
Wilts	880,248	264,997	Salisbury.
Worcester	480,342	413,760	Worcester.
York	3,888,351	3,208,828	York.
Total	32,543,890	27,483,490	
Wales.			
Anglesea	175,836	50,098	Beaumaris.
Brecknock	469,894	57,031	Brecknock.
Cardigan	443,071	62,630	Cardigan.
Caermarthen	587,816	130,566	Caermarthen.
Caernarvon	360,138	118,204	Caernarvon.
Denbigh	424,435	117,872	Denbigh.
Flint	164,051	77,277	Mold.
Glamorgan	516,959	687,218	Cardiff.
Merioneth	427,810	49,212	Dolgelly.
Montgomery	510,111	58,003	Montgomery.
Pembroke	392,710	89,133	Pembroke.
Radnor	301,164	21,791	New Radnor.
Total	4,773,995	1,519,035	
Grand Total	37,317,885	29,002,525	

The principal islands along the English coast are the Isle of Man in the Irish Sea, Walney off Lancashire, Anglesey and Holyhead, Lundy Island in the Bristol Channel, the Scilly Isles off Land's End, the Isle of Wight and the Channel Islands, Sheppey in the mouth of the Thames, and, near Berwick, Holy Island, the Farne Islands, and Coquet Isle. They are described at length under their respective names.

Physical Aspect.—The surface of E. proper is agreeably diversified by hills and plains. The hills are generally steep towards the W., but have a gentle eastern slope. A line drawn N.E. and S.W. from Scarborough in Yorkshire to the mouth of the Severn would divide E. into two portions distinct alike in geology and physical outline. To the N. the surface is broken and hilly, rising occasionally into bold heights; to the S. it is chiefly characterized by gentle undulation, and level, fertile expanse. Extending from the western declivity of the Cheviots in a direction mainly E.S.E., the Pennine chain forms the great watershed of the N. It runs as far S. as the Peak in Derbyshire, and reaches its greatest height of 2927 feet in Cross Fell, Cumberland. The Cumbrian mountains, a cluster of rugged peaks, are a western offset of the Pennine, and include Scawfell, the highest elevation in E., having 3208 feet of altitude. The basin of the Severn is partly bounded on the W. by the Cotswold, and on the E. by the Malvern Hills, while the Cambrian mountains project many spurs over the Welsh frontier. Snowdon, in Caernarvon, 3571 feet, is the highest mountain in E. and W. The Cambrians also contain Cader Idris, Arran Fowddy, the Beacons, &c. Cornwall, Devon, and Somerset are traversed by the almost continuous Devonian ranges, in which may be included the Mendip Hills. The other southern ranges are the Dorset Hills, and the N. and S. Downs. To the N. of the Thames, in Bucks and Cambridge, are the Chiltern Hills, which form part of a low, broken chain continuing in a north-easterly direction into Norfolk. The wolds in Lincoln and York are slight elevations parallel with the coast. The E. coast is low, and broken mainly by sweeping bays; on the W. the irregular shores are lined with cliffs, and frequently project in bold and precipitous headlands.

The plains are numerous and extensive. The heart of the country is a great fertile flat, varying in height from 200 to 400 feet, and extending from the Cotswold Hills to the confines of the Wash, from the Pennines to the basin of the Thames. To the N., hemmed in by the Pennines and the Wolds, the Plain of York stretches along the E. coast to the Tweed, and includes many large coal-fields. The Cheshire Plain, in the basins of the Dee and Weaver, lies between the Pennine and Welsh hills. The lowest land in E., the Eastern Plain, is partly separated from the great central one by the Chilterns, and includes the coast country from the Thames to the Wash. It comprises the Fens, the richly productive flats of Lincoln, Huntingdon, Norfolk, and Cambridge. The broad valley of the Severn is celebrated for its rich beauty and fertility. Salisbury Plain in Wilts, and Dartmoor in Devon, are tablelands. The Weald, enclosed by the N. and S. Downs, is a wide pastoral expanse.

Hydrography.—The rivers of E., which are well supplied with water, are of the utmost importance in the various industries, as well as for purposes of irrigation and commerce. By far the greater volume of water flows into the North Sea, the line of water-parting traced from N. to S. falling considerably to the W. of the centre of the country. The drainage area to the E. is 29,759 sq. miles; that to the S. into the English Channel, 7306; and to the W. into St. George's Channel and the Irish Sea, 21,255. To the S., and also generally to the W., the streams are short, and their basins narrow. The longest and noblest river in E. is the Thames, the valley of which is famous for its wealth of richly-wooded scenery. Among others conspicuous for length are the Severn, Trent, Ouse, and Great Ouse. The Mersey and Tyne are great commercial and shipbuilding rivers. Among the chief rivers of Wales are the Dee, Teify, Towey, Tawy, Usk, and Wye. As compared with Scotland or Ireland, E. is singularly deficient in lakes. Indeed, the only sheets of water of any size are confined to a portion of Cumberland and Westmoreland known as the 'Lake District.' Windermere, the largest of the English lakes, is not more than 10 miles long and 1 broad, with an area of 3 sq. miles. Another small lake is Bala, in Merioneth, N. Wales.

Climate.—Its insular position secures to E. a mild, moist climate and an unusually equable temperature. The parallel of latitude that passes through the heart of E. also traverses Labrador on the W., and Central Russia on the E., where the winters are colder by some 30° F. Free from the extremes of heat and cold to which continental countries are exposed, the mean temperature of E. in January is about 39° F., in July 62°. The W. side is particularly mild, being visited in summer and autumn by the prevailing W. and S.W. winds which bear across the Atlantic the warm air generated by the 'Gulf Stream' of Florida. Cold N. and easterly winds alternate during winter and spring, and tend to reduce the temperature of the E. side. Rain falls in greatest quantity with W. and S.W. winds; those from the E. or N. are generally either dry or foggy. The distribution of rain is very unequal, being most abundant in the W., and gradually decreasing towards the E. At Seathwaite in Borrowdale, Cumberland, the annual fall amounts to 134 inches, while the average along the W. coast ranges from 40 to 80 inches; whereas on the E. coast the average is from 23 to 30 inches—at London 24, at Cambridge 20, at York 23, at Newcastle 25. The mean number of rainy days on the E. coast is 165, on the W. 208. This difference is partly owing to the configuration of the land, partly to the prevalence of westerly winds charged with vapour from the Atlantic.

Geology and Mineralogy.—By far the greater portion of the surface of E. and W. is of sedimentary, fossiliferous strata, reaching back to the Cambrian. Only the north-western and south-western counties are covered by the older Palæozoic formations. The north-eastern portion has a basis of carboniferous limestone, which extends intermittently S. and W. into Devonshire, and contains the Cornish lead-ores. Above the limestone lie the coal formations, beginning in Northumberland, and continuing through Durham, York, Lancashire, and Stafford, into S. Wales. The coal deposits support the new red sandstone and magnesian limestone, which stretch in a narrow belt from Shields to Warwick, abounding in salt and gypsum in some localities. To the E. again of the coal and sandstone districts, the Oolite and Lias formations occupy the country, extending in a wavy line from the E. coast of Dorset to Whitby. Further E. these are succeeded by greensand and chalk, and the Wealden beds of Sussex. The Tertiary series and Diluvial clays are mainly confined to the basins of the Ouse and Thames. Wales consists for the most part of Cambrian and Silurian strata; the coal measures in the S. are very extensive. Proceeding from N. to S., the various formations of E. and W. appear in the exact order of geological arrangement, thus as it were presenting to view a complete geological section of the earth's crust.

The minerals of E. and W. constitute a main element in their industrial prosperity, and in proportion to the area greatly surpass those of any other country. The vast supply of fuel in the coal basins of Northumberland, Lancashire, Durham, Warwick, Stafford, and S. Wales, has led to the growth in these localities of immense and flourishing manufactures. Wales, Stafford, and Yorkshire are the chief sources of iron ore. As in remote times, tin is supplied by the Devonian and Cornish mines. Cornwall is also most plentiful in copper, which occurs besides in Stafford, &c. In Derby, Somerset, and Cumberland, lead is found, and some quantity of silver is extracted from the ore. Plumbago is procured in a pure state in Borrowdale, Cumberland. Solid salt is mined in Cheshire to the extent of over 1,000,000 tons in a year. Among the other more valuable natural products are zinc and nickel, arsenic and manganese, potter's clay, granite and freestone.

Botany and Agriculture.—The flora of E. generally belongs to Schouw's N. European region, and closely resembles that of Germany, comprising but few peculiar species. E. is not regarded by botanists as 'a centre of vegetation,' but as having been overrun by a series of vegetable migrations, reaching back, according to Edward Forbes and others, to the Middle Tertiary epoch, when Britain formed part of the continent of Europe. The oak, the king of native British trees, is grown (formerly for the building of men-of-war) in the 'wealds' of Sussex, Kent, and Surrey. Among the other useful indigenous forest trees are the fir, birch, beech, ash, alder, elm, hazel, willow, yew, maple, aspen, and holly. Of those introduced by man are the chestnut, lime, walnut, Norwegian spruce, larch, Lombardy poplar, mulberry, cedar, and weeping willow. The surface is now well wooded, and royal forest-lands are reserved for the growth of timber. Of these, the largest are the New Forest in Hampshire, the woods extending from Bagshot to Windsor, and the Dean Forest in Gloucestershire. There is a great variety of fruit-trees, of which the chief are the apple, pear, cherry, plum, peach, walnut, currant, and gooseberry. A rich appearance is given to the rural scenery of E. by the hawthorn hedgerows, with their wealth of wild-flowers, at times overtopping the bosky lanes.

The soil is not on the whole naturally fertile. A considerable portion of the surface is covered with marshy plains, sand downs, and rugged hills. Industry and science, however, are rapidly vanquishing every obstacle, and even at the present time E. holds the first place among the countries of the world in regard to productiveness and the development of agriculture. In part this is due to the study of agricultural chemistry, and thorough systems of drainage, but partly also to the facilities for intercommunication, which so essentially second the efforts of the farmer. Of the 37,317,885 acres constituting the area of E., there were 27,737,672 under cultivation in 1894—6,545,354 under corn crops, 2,663,106 under green crops, 2,925,963 (1,728,934 for hay) clover, sainfoin, and grasses in rotation, and 15,110,592 of permanent pasture. There were also 1751 acres under flax, 59,535 under hops, 63,533 under small fruit, and 367,838 under bare fallow or as uncropped arable land. Mountain and heath land were estimated at 3,041,278 acres. Woods and plantations covered 1,788,816 acres and 11,397 were laid out as nursery grounds. In the same year the crops were in the following proportion:—Wheat 1,883,096, barley or bere 1,877,714, oats 2,229,178, potatoes 374,595, and turnips and swedes 1,473,320. Other cultivated plants were rye 83,024 acres, beans 230,423, peas 241,919, sugar-beet 42, &c. According to the agricultural returns 'the wheat crop of 1894, so far as apparent bulk and yield were concerned and apart from the question of the very bad condition in which much of the grain was necessarily harvested, contrasted very favourably with the scanty crop of 1893, but the average yield for 1894 represented considerably varied experiences in different localities.' The crop in England was estimated at 56,087,603 bushels, and that in Wales at 1,420,082. On comparing these returns with those issued for 1885 we find that the yield of wheat in England was very much greater in that year, having been 74,021,248 bushels, as was also the case as regards the yield in Wales, which was 1,672,917 bushels. The potato crop in England in 1894 was 1,974,539 tons, but in 1885 it was 2,182,712 tons, while in Wales the crop was returned as 186,491 tons in 1894 and 212,269 in 1885. In hops, which are not grown in Wales, there was a slight increase in 1894 as compared with the yield in 1885, the weights being 636,846 cwts. and 509,170 cwts., respectively. Both in England and Wales the oats crop was very much larger in 1894 than in 1885—88,289,392 bushels in 1894, 66,933,934 bushels in 1885 (England), and 9,012,652 bushels in 1894, 8,023,645 bushels in 1885 (Wales). The yield of hay in 1894 compared favourably with that in 1885 both in England and Wales. Wheat, which thrives at an elevation of 1000 feet, is chiefly grown in the S. and E.; barley mainly in the central districts. Oats form the principal crop in the N., where they are cultivated to a height of 2000 feet above the sea. Middlesex and the neighbouring counties produce hay of a celebrated quality. The rearing of hops is mainly confined to Kent and Sussex, while the south-western counties are noted for their extensive orchards.

Zoology and Live Stock.—The existing orders in E. and W. represent a mere fragment of her former mammalian fauna, as indicated in the epoch of the Boulder Clay. They are limited to some sixty species, and comprise the fox, dog, weasel, ermine, badger, otter, polecat, marten, hedgehog, mole, shrew, nine species of bat, the squirrel, hare, rabbit, three species of mouse, two of rat, and four of arvicola. Several species, as the beaver, bear, wolf, wild ox, and wild boar, have been extirpated during the historical era. In the Miocene period we have animals of vast size, as the great elk, the rhinoceros, elephant, hippopotamus, and also tigers, hyænas, crocodiles, &c. Birds are comparatively numerous, the total number of species amounting to 274. Among these the most remarkable are the eagle, hawk, falcon, cuckoo, woodpecker, goatsucker, kingfisher, and nightingale. The peacock, common fowl, turkey, and pheasant are immigrants. Some 260 kinds of fish are found in English seas, rivers, and lakes. Conspicuous among these are the sturgeon, ray, salmon, trout, herring, pilchard, pike, cod, mackerel, turbot, eel, and whiting.

The rearing of live stock is an important branch of English industry. (See CATTLE, HORSE, PIG, SHEEP.) Devon, Durham, Hereford, Suffolk, and Sussex produce the most esteemed breeds. In Cambridge, Dorset, and Essex, large quantities of butter are made, while Cheshire, Devon, Gloucester, and Wilts are celebrated for their cheese. The sheep are divided into two main breeds, those yielding wool of short and of long staple. The latter are chiefly reared along the E. coast as far N. as Tees Water, the former in the southern counties. English horses are noted both for draught and pace. Hogs are numerous in the forest lands of Berks, Gloucester, Hereford, and Hampshire, the bacon from the last-named county being famous. In the Lincoln fens geese are reared extensively.

Industries.—Among the nations E. stands unrivalled in the extent of her commerce and the variety and importance of her manufactures. The great cause of her pre-eminence is undoubtedly her singular combination of mineral and agricultural resources. Of all English industries cotton spinning and weaving is the most important, whether viewed from the standpoint of capital or of labour. (See COTTON.) The adoption of powerful and ingenious machinery has enormously increased the production of all textile fabrics. The woollen manufacture, the oldest in the kingdom, and still of national importance, has its chief seat in Yorkshire, and centres in Leeds, Bradford, and Halifax. In London, Coventry, Nottingham, and Macclesfield, there are extensive silk manufactures. Bristol and Liverpool have great sugar-refineries and soap-boiling works, while equally notable are the distilleries and breweries of London, Burton-on-Trent, &c., the lace and muslin factories of Nottinghamshire; the hosiery and boot manufactures in Leicestershire, Derbyshire, and Northamptonshire, the tanneries of Oxford and Worcester, and the perfume factories of Windsor. Paper is now made in all parts of the country where good water can be obtained, and London is the great centre of the book trade.

E. supplies a great part of the world with metal goods. (See Great Britain.) The great coal-mines are estimated to contain some 133,862 millions of tons of workable coal. (See Coal.) Large iron and steel works are at Sheffield, Barnsley, Dowlais, Middlesbrough, and Barrow-in-Furness; Birmingham is the centre of the manufacture of iron and steel goods, chiefly pens, tools, and firearms; and Sheffield is the foremost place in the world for the production of cutlery. For copper and bronze working the foundries of Liverpool and Swansea are celebrated, as are those of London and Birmingham for bronze-casting. The specialties of Newcastle are steam-engines, iron ships, chains, iron bridges, glass, chemicals, &c. The Staffordshire 'Potteries,' including Stoke-upon-Trent, Burslem, Etruria, Hanley, &c., are noted for all kinds of china and earthenware. The great national industry of shipbuilding is carried on chiefly at Portsmouth, Plymouth, Sheerness, and on the Thames, the Mersey, the Tees, and the Tyne, but mercantile and coasting vessels are constructed extensively at all the larger seaports. Coal is most extensively exported from Newcastle and Cardiff. Of the coast industries, the principal are the herring fisheries from the North Sea ports, the pilchard fishery in the English Channel, and oyster rearing in the estuary of the Thames.

For information regarding the commerce, railways, form of government, industries, &c., see article Great Britain.

History.—1. *Civil.*—The history of E. up to the transient union of the country under the Wessex dynasty is treated under Anglo-Saxons and Britannia. During the second half of the 10th c. the old Teutonic constitution underwent considerable change; the king grew in dignity and power; the nobility of *ealdormen*, or nobility of birth, gave place to a nobility of *thegns*, officers at the royal court, whose rank sprang from their personal service to the king; the *folkland* was gradually becoming the king's private property; and feudalism was stealing into the land, colouring the early Teutonic customs and form of government. In the reign of Æthelred (979-1014) the great English monarchy which Dunstan had striven to build up fell to pieces. The old strife between Wessex and Mercia revived; the Danes renewed their invasions, and finally, aided by the English N. of the Thames, overthrew the Wessex dynasty, and founded a short-lived Danish monarchy in E. Cnut, by far the ablest of the Danish kings, sought to make E. part of a great Scandinavian empire, and did much to introduce a system of imperial feudalism, granting lands to vassal princes and earls, and strengthening the royal authority. Cnut's successors were coarse, savage sensualists, and E., wearied of their violence and incapacity, in 1042 recalled Eadward, son of Æthelred, from exile at the Norman court to his father's throne. Eadward was a foreigner in everything but his blood, and lavished his favour on Norman strangers, who now flocked into the country, while a truly national policy was upheld by the great Earl Godwine and his son Harold. The latter, on Eadward's death, was made king in 1066, but in the same year William of Normandy defeated him at Senlac, and ascended the throne, nominally as the rightful successor of Eadward, and the choice of the English people. The Norman conquest has been one of the most misunderstood events in English history. The invaders were simply Danes who had received a French varnish, men of the same blood as the inhabitants of Northumbria and the E. of Mercia, and no formal change was made in the old English constitution, William veiling his usurpation by advancing legal claims, which, though figments, made him scrupulously preserve the laws of King Eadward. The great results of the Conquest were—(1) that E. was welded into a compact nation, the separate kingdoms, which had flown asunder after every earlier attempt at union, being at last firmly cemented into a single state; (2) that the English were brought into closer contact with the Romance peoples, and won new culture and wider political relations; (3) that the growth of feudalism was in one respect checked—William developing the system of feudal tenure, but crushing the feudal principles which tended to curb the kingly power, and break up the nation; (4) that the old free institutions were in name strictly preserved, and rights, which might have gradually passed away under native English kings, were thus enabled to revive in practice, having always existed in theory, a fact to which we owe the peculiar feature of our constitutional history—secure progress by giving new force to old privileges. The period 1087—1127 is marked by a distinct English revival. The people side with Rufus and Henry against the barons. The charter of the latter renounces the 'evil customs' which had been exacted from Church and noble, and his marriage with Matilda completed the conciliation of the English. The town communities were composed to a large extent of Norman traders and artisans, and English bishops began to appear in the Church. The government was carried on by the clerks of the royal chapel under the Chancellor and the Justiciar of the king's court, which, in place of the old council, registered laws, sat as highest court of appeal, and as court of exchequer assessed and collected from the sheriffs the royal revenue, consisting of rent from the royal domains, feudal aids, Danegeld or tax, and the fines of local courts. In the weak and stormy reign of Stephen of Blois, elected king by the folk-mote of London, E. first tasted the oppression of the Norman feudalism. Henry II., the first of the Angevins (1154-89), came in under the influence of the priests Theobald and Becket. He had inherited Anjou and Touraine from his father, Maine and Normandy from his mother, and Poitou, Saintonge, Auvergne, Perigord, the Limousin, the Angoumois, and Guienne as his wife's dowry. The great quarrel as to royal rights of election and jurisdiction, &c., over the Church produced the murder of Becket. But the civil administrative policy of Henry was more successful. He commuted military service for scutage, revived Frankpledge (q.v.), and instituted trial by jury by the assize of Clarendon (under which trial by ordeal, till abolished by the Council of Lateran, took the place of compurgation, the English rival of the Norman trial by battle), made permanent the Eyre courts by the assize of Northampton, and by the inquest of sheriffs withdrew that important office from the great nobles of the shire. Great part of Ireland was added to the dominion of the Angevins. Under the Angevin kings the land was overrun by foreign adventurers and mercenaries, whom the Crown maintained; the country was tyrannically misgoverned; and the people, formerly the allies of the early Norman kings against the barons, now banded with the nobles against the monarch. John lost Normandy, and engaged in a contest with the pope, by whom he was placed under interdict. The great event of his reign was the granting of Magna Charta (q.v.). In Henry III.'s time we find the pope and the king united against the English people and Church. The Great Charter and that of the Forest were systematically violated. To the patriotic genius of Simon Montfort, Earl of Leicester, E. owes the conception and realisation of a form of representative government for the purpose of administering the principles laid down in the charters. Supported by the *Communes*, he secured their separate representation by the Provision of Oxford, annulled by the Mise of Amiens (January 1264); and although this plan was discontinued for a time, the principle was won, and thirty years later it became part of the settled practice of Parliament. The period 1265-84 is marked by the final conquest of Wales. This territory of the Britons had acknowledged the supremacy of Mercia and then of the West Saxon kings; but in spite of the victories of Harold the frontier baronies founded by the Conqueror with 'license to conquer,' and the half military settlements of Flemings and English under Henry I., the Welch spirit of independence remained unbroken, and was strengthened by the revival of national poetry in the 12th c. and the long reigns of the two

Llewellyns, the sons of Gruffyd ap Conan. During the Baron's war, Llewellyn ap Gruffyd, who had reconquered Glamorgan, was called 'Prince of Wales,' not merely 'Lord of Snowdon.' All this came to a sudden end in 1282. English barons were placed on the soil, which was divided into shires and hundreds, the castles of Conways and Caernarvon were built, trade-guilds were introduced to the towns, and the Statute of Wales abolished the more barbarous Welsh customs. In the years 1283-95, the growth or settlement of constitutional forms was rapid. It was the first Edward who restricted the courts Christian to spiritual, testamentary, and matrimonial causes, and laid the foundation of the justices' bench in the Conservators of the Peace. The Court of Chancery and the appeal to the king in council also practically date from his reign. The Statute of Winchester based a system of local police and criminal justice on the frankpledge; the Statute of Merchants provided for the recovery of commercial debts; and the statute *Quia Emptores*, while prohibiting subinfeudation, really tended to promote the transfer of land, and to free it from the rigour of feudalism. Undoubtedly, however, the most important change related to the introduction into the Great Council or Parliament of (1) the knights of the shire, elected by the freeholders in the shire-mote or county court; and (2) the representative burgesses from the towns. Previous to this, the officers of exchequer had to make a separate negotiation with the town-reeves, the sheriff and shire-mote of each county, and the archdeacon of each diocese. The clergy were also summoned to Parliament, but they would vote nothing except in Convocation, and before Henry VII.'s time it had ceased to be the practice for them to attend. The Parliament itself, instead of meeting at Winchester, Acton Burnell, Northampton, or Oxford, always met at Westminster. The old right of direct appeal to Parliament against injustice or oppression still lives in the election of Triers of Petitions by the House of Lords. The attempts made to govern Scotland, mediately according to the marriage treaty of Brigham, and immediately by an English council of regency, did not succeed, nor did the scheme adopted on the death of Wallace of giving Scotland ten representatives in the common Parliament. Above all, this is the period when the English boroughs completed their emancipation by obtaining the right of justice in the borough court, the right of self-government and self-taxation. Inside these boroughs the merchant-guild of land-owning traders had in many cases absorbed the earlier and minor frith-guilds, and had now the control of municipal affairs, of markets, fairs, tolls, coinage, recovery of debts. The differentiation of trades began: the cloth merchant was separated from the tailor, and the leather merchant from the butcher. Now also arose among the poorer inhabitants the craft-guilds, with their wardens and craft-boxes, enforcing uniformity of apprenticeship and work, first by voluntary custom, and then by royal charter. Especially in London there was a long and furious war between the aldermen, 'magnates,' or even 'barons' as they were called, the 'greater folk' or *prudhommes* of the merchant guilds, and the unenfranchised craftsmen, who, first under William of the Longbeard and then under Thomas Fitz-Thomas, attempted to take the town-mote into their own hands. Under the livery companies of Edward III. there was a true popular *commune*. E. now did a trade with Norway and the Hanse towns, a wool trade with Flanders, a wine trade with Gascony. Italian vessels frequented the port of London, and Italian bankers settled in London. The completion of Salisbury Cathedral and Westminster Abbey indicates wealth. But neither the traders nor the tenant farmers, whom the enclosure of commons and system of leases were creating, took any part in government. The resistance to the king's power was left to the barons. It was, indeed, from their standing committee or continual council that the first Edward received his crown. Private wars among the barons, the excesses of the 'trailbastons' or club-men, corruption of the judges, and legal and popular persecution and final expulsion of the Jews, mark this period. The important constitutional check on the nomination of the great officers of state, formerly called 'clerks of the king's chapel,' was asserted by the Lord Ordainers in their articles of reform (1310); and in 1321 the York Parliament made the famous declaration with regard to the consent of the prelates, earls, barons, and universality of the realm. In 1328, by the treaty of Northampton, the independence of Scotland was recognised. From 1337 to 1453 has been called the Hundred Years' War. While the woollen manufactures in the Flemish settlements on the E. coast and other trades flourished, the political and intellectual spirit of the nation was starved by the miserable war with France, which had no result but to fill that beautiful country with *Jacques Bonhommes*, or insurgent peasantry, and 'free companies' of disbanded soldiers. No doubt the Commons were now consolidated by the union of knights and burgesses, and the modern statute took the place of the royal ordinance. But though the Good Parliament, headed by Peter de la Mare, asserted the right of free election (the writs having been tampered with by the king), and protested against arbitrary taxation, they could do little against the Church, which numbered 30,000 priests in a population of two millions, and owned a third of the soil, while their spiritualities amounted to twice the royal revenue. The Statutes of Præmunire and Provisors asserted the control of the civil power over the publication of papal bulls and the disposition of vacant benefices. But this did not stop the influx of Italian priests to E. The religious orders had become mere landowners, and the seculars, by selfish use of their wealth, had lost all spiritual influence. Wickliffe argued against the temporal power and privileges of his order, affirmed the right of free interpretation of the Bible, and denied the cardinal doctrines of Rome. The influence on the English mind of the short tracts which the Simple Priests or Lollards diffused among the people can hardly be exaggerated. They sowed the seeds of political principles which are still bearing fruit. In 1381 occurred the peasant revolt under John Bull and Wat Tyler. This event had been prepared by the changes in the condition of the serfs and bondsmen. Many of the villeins and cottars rose to be farmers, *i.e.*, they paid a fixed rent instead of the indefinite agricultural services previously exacted. Underneath this class of copyholders the bordars or labourers also lost their servile *status* and became free contractors for hire. The harsh statutes which were passed after the ravages of the Black Death to secure labour at customary wages, and especially the 'Fugitive' law, which confined men to a parish and made the harbouring of labourers in towns a crime, led to the great socialist outbreak, of which the immediate occasion was Richard's attempts to impose a poll-tax. The gospel of equality was preached by William Langland. The landowners, unable by unjust statutes to control the labour market, turned their attention more to sheep-farming, and by evicting the tenants of the small allotments, greatly reduced the number of the villein class and augmented that of the free labourers. The attempt of Richard II. to govern by a committee of twelve peers and six commoners was followed by the Lancastrian revolution, which brought on at home the Statute of Heretics, directed against Lollard preachers, schoolmasters, and believers generally, and abroad the conquest of France, Henry V. being recognised as the future king. The English national debt was now about £4,000,000. During the 15th c. charters of incorporation confined civic power, and especially the parliamentary franchise, to the select men of the common council, and the forty-shilling freeholder was introduced in the counties. The Club Parliament shows that supreme power rested with the great barons. By 1453 all the English possessions in France, except Calais, were lost. The rising of Jack Cade, whose Complaint of the Commons referred chiefly to free election and free labour, introduced the Wars of the Roses (1455-85), in which the House of York claimed the throne by descent from the fifth son of Edward III. The King-maker, the 'last of the barons,' Warwick, is the principal figure in the contest. These wars were practically decided by artillery, the great enemy of feudal war. Fortunately the towns took little part in the struggle, and trade did not suffer. But in the period of the new monarchy (1485-1509) Parliament is superseded by royal council; arbitrary taxation, imprisonment, and espionage become common. The baronage had been greatly thinned in number by the civil war; the Statute of Liveries broke up the military households, and it is supposed that nearly one-fifth of the land passed into the hands of the king by forfeiture. A religious movement, represented by More, Latimer, and Erasmus, protested against war, interested itself in the teaching at grammar-school and college, and recalled the Church to the simple faith in Christ, and the study of the newly-edited Bible at first hand. The rule of Wolsey (1515-31), as Chancellor and Papal Legate, based the Tudor despotism on the policy of peace, but at home the wholesale enclosures and evictions produced a great agrarian discontent, and Wolsey, who fell with Catharine of Aragon, was succeeded by Cromwell, who suggested to Henry the plan of declaring his supremacy in Church as well as State. Then followed what may be called the English Reformation. By the articles of religion the sacraments were reduced from seven to three—penance, baptism, and the Lord's supper. Justification by faith was strongly asserted, while purgatory, prayers for the dead, pilgrimages, pardons, and the mass were condemned. Transubstantiation and confession were retained. The dissolution of the monasteries was the prelude to the reign of terror, and the Pilgrimage of Grace was quenched in the blood of the Catholic nobles. The intimidation of Parliament and corruption of the courts of justice made possible the disgraceful excesses of the early Protestants against the Church; and these again caused the Catholic reaction expressed in the Six Articles, and the fall of Cromwell, whose favourite policy of a Christian league with the German princes against the Empire was never carried out. In Edward's reign (1547-53) the wheel turned again; the mass was denounced, the ornaments were snatched from the churches, priests were allowed to marry, and the liturgy and catechism superseded the missal and breviary, and wooden tables the stone altars. Cranmer's forty-two articles of religion were rigorously enforced by a new set of Church laws. Amid the greatest confusion in the Church, and while the nobles were plundering the old guilds and chantries, the king founded eighteen grammar-schools. The evil times marked by the Spanish marriage of Mary (1554), the submission to Rome, and the martyrdom of Latimer, Ridley, Hooper, Cranmer, and the rest, were followed by the comparative quiet, peace, and conciliation of Elizabeth's reign (1559-1603). She founded in 1601, the English poor-law, which first distinguished between the impotent and destitute, and those broken men and sturdy beggars who were compelled to settle in a parish and work. The style of farming was greatly improved, and the spinning of yarn, and weaving, fulling, and dyeing of cloth became important. On the ruin of Antwerp (1585), London became the mart of the world, and Gresham founded the Royal Exchange, Chancellor opened the trade with Archangel, and Hawkins the slave-trade on the Guinea Coast. In domestic arrangements there was a great advance in comfort and cleanliness, even in luxury. The Elizabethan hall took the place of the baronial fortress. Members were summoned to the Commons from sixty-two new boroughs, and the exemption of members from arrest was obtained. Custom-duties were arbitrarily imposed, and money was raised by privy seals, the forerunner of the Exchequer bills, but no benevolences were raised, and in 1601 the Act for the abolition of trade monopolies was passed. The persecution of the seminary priests was forgotten in the glow of patriotism called forth by the Spanish Armada (q.v.). As a whole, Elizabeth's reign was distinguished for bold naval enterprise and a marvellous burst of original literary power. The rise of the Puritans at the beginning of the 17th c. shows the hold which the English Bible was taking on all classes. The outrageous Calvinism of the Presbyterian Cartwright was opposed by the vague and optimistic philosophy of Hooker, and a succession of primates exercised spiritual despotism through the Ecclesiastical Commission. The pamphleteering vigour of the Separatists suggested that the license of printing should be strictly limited by law; and the 'Marprelate controversy,' and attempt of Cartwright to establish synods and classes in Northamptonshire, were suppressed. The absurd blunder of King James about absolute or divine right of kings was made matter of doctrine in the canons of the Church, and was extended to the bishops. The failure of the Hampton Court Conference lent greater spirit to the opposition in Parliament, which was mainly Puritan, and which, roused by the illegal imposition of subsidies, culminated in the Petition of Right. Eliot, Pym, and Hampden are the heroes of the Parliamentary struggle, and the story of the Pilgrim Fathers is the best commentary on the High Church policy of Laud. The period 1629-40 witnessed the tragedy of the ship-money, to be followed by the civil war, in which Cromwell's Ironsides undoubtedly saved the liberties of E., not merely in battle, but afterwards by the position they occupied towards the Parliament. The succeeding years after the king's death really belong to the life of Cromwell, for he is at the head of everything. The restoration of 1660 has been described as the beginning of modern E., in which industry, science, and love of popular freedom are the moving forces. The theology of the Reformation and the dread of Tudor and Stuart despotism had both lost their influence. The narrow and intolerable rules of Puritanism were broken, and while the wilder reaction towards immorality and irreligion may have been confined to London and the court, the great mass of the people 'gladly returned to Maypoles and mince-pies.' Perhaps, however, the most powerful influence of the time was the teaching of Bacon. The Oxford Society of Wallis, Wilkins, Petty, and Ward, developed into the Royal Society (1662), and Harvey was succeeded by Halley, Hooke, Boyle, Sydenham, Woodward, Ray, Newton. Along with them appeared the Latitudinarian school of religious thought, which was founded by Lord Falkland, and contained Chillingworth, Taylor, Hales. The spirit of these men was first for toleration and then for reason, as against the infallibility of the Church and the rigid special interpretations of Scripture which the Puritans had made matter of life and death. They were succeeded by Burnet, Tillotson, and Butler. The theory of government was also profoundly affected by the daring scepticism of Hobbes, and by the moderation and sense of his disciple, Locke. In the Convention which Charles found sitting, there was in fact no dispute on any of the great constitutional struggles of the past. The royal revenue was now fixed at £1,200,000, and many oppressive feudal claims of the Crown were extinguished by the conversion of land tenures from knight-service to socage. While Royalists were allowed to regain their confiscated private estates, the Convention protected those who had purchased Church lands. The first new Parliament was, however, entirely Royalist, and failed to carry out the promises of religious freedom made in the Declaration of Breda. The Test and Corporation Acts were passed against Puritan influence in the boroughs, and the Act of Uniformity drove 2000 rectors and vicars from the Church, with Howe and Baxter at their head, and thus created dissent, one of the great political as well as religious forces of modern E. This was followed by the Conventicle and the Five-Mile Acts. Episcopacy was restored in Scotland by the Drunken Parliament, and Cromwell's temporary union of the three kingdoms was broken up. The Declaration of Indulgence was only part of a scheme which Charles formed for establishing the Catholic religion. It was at once recalled, and Shaftesbury carefully fanned the rage of the 'Petitioners' for war against Catholic France, a feeling excited by the Popish plot. The 'Petitioners' and the 'Abhorrers,' who answered them, are the germs of the early Whigs and Tories, the great issue then being whether hereditary succession was to admit a Catholic to the throne. The Parliament of 1681 was called to Oxford, and Charles went there with troops; but the danger of civil war was averted by the flight of Monmouth and the death of Shaftesbury. And yet it was in this disgraceful reign, while the Triennial Parliament Act was constantly broken, that in 1679 censorship of the press was put an end to, and the grand principle of Habeas Corpus was reaffirmed. The period 1682-88 has been called the Second Stuart Tyranny. This was rendered possible by the forfeiture of a great many borough charters on the pretended ground that they had abused their privileges; and it was supported by such means as Jeffrey's Bloody Assize and a standing army of 30,000 men. The Church and the Universities were bullied, and the Nonconformists were bribed by a second Declaration of Indulgence, annulling all penal laws against both them and Catholics. The trial of the seven bishops and the organization of Catholic power in Ireland by Tyrconnell brought matters to a crisis, and Danby, Compton, and Cavendish invited William of Orange to come to the rescue of the constitution. He landed in 1688, and James II. fled to France—this dethroning of the last Stuart king being known as the English Revolution. In the Convention which William summoned, a great deal of wrangling as to whether the crown had been forfeited, whether there should be a regency, whether Mary had succeeded, or whether the throne was vacant, ended in the recognition of William and Mary as joint sovereigns on the basis of the Declaration of Rights, which denied the right of the sovereign to exercise a dispensing power, or to exact money or maintain an army save by the assent of Parliament. Henceforth the right of the British sovereign to the throne becomes purely statutory (the Bill of Rights and the Act of Settlement). The rights of petition, free election, free debate, and pure justice in the courts were also asserted. Scotch affairs were settled by the Claim of Right, which restored Presbyterianism and the Confession of Faith, with the unwelcome addition of an Act of Toleration. Instead of life-grants, the vote of supplies was made annual. The Mutiny Act for the standing army, now become essential, was also made annual. Hence annual Sessions were now a vital function of the state. The Act of Grace was a wise concession to the Nonjurors within the Church and the Jacobites, outside. All this time the Grand Alliance had failed to curb the ambition of France, and on the advice of Sunderland the first homogeneous Ministry was formed by William out of the junto of Whigs who were favourable to war. Montague, Chancellor of the Exchequer, adopted Paterson's plan of a Bank of England, and courageously reformed the coinage. In the meantime the desperate resistance of Ireland had been overcome. When France threw overboard the Partition Treaties, E. necessarily entered on the war of the Spanish Succession (1702-13), in which the victories of Marlborough revived the memories of Creçy and Agincourt. In 1707 occurred the Union of E. and Scotland, delayed by the Scotch objections to the National Debt and Episcopacy, and the English love of colonial monopoly. The Scotch Parliament had indeed struck the name of Princess Sophia from the Act of Parliament. It is to the patriotism of Lord Somers that the chief credit must be given for the defeat of the Nationalists and Federalists, and the securities given for Scotch law and the Scotch Church, along with a fair representation in Parliament and complete freedom of trade. In this, however, he only followed the more enlightened policy of Cromwell. From this point the history of E., along with that of Scotland, becomes the history of GREAT BRITAIN (q.v.).

2. *Ecclesiastical.*—Christianity, which entered Britain in the Roman period, but was for a time swept away by the Teutonic settlers, was reintroduced in 597, when Augustine, despatched as a missionary to the English by Pope Gregory, landed at Thanet and converted Æthelberht, King of Kent. The new faith spread over the land, and in the beginning of the 7th c. was diffused by Paulinus through Northumbria, which was also influenced by Christian missionaries from the Culdee monasteries in Scotland, offshoots from the Irish Church, then pursuing an isolated career independent of Rome. After a bitter struggle with heathenism in the Midlands, and with the Irish Church, which at one time seemed about to annex the North country, the English Church established its supremacy, and was organized by a Greek monk, Theodore of Tarsus. As in E. the early Christian Church of the Roman period had been quite eradicated, Theodore's organization was determined by the existing political divisions of the country. He appointed bishops, whose sees corresponded with the kingdoms to whose rulers the first missionaries had attached themselves, settled the clergy in parishes, which were at first conterminous with the estates of the great nobles, made Canterbury the central see, and severed all alliance between the English and the Irish Church. E. was thus brought into contact with the civilising influence of Rome; learning and art entered the land; and the English clergy were freed from the lax discipline, confusion, and narrowing isolation of the Irish Church. The new Church grew rapidly in wealth and power, fostering literature and taking an active part in political events, Dunstan in particular being at one time both ecclesiastical and secular head of the kingdom, and doing much to increase the Church's influence in civil affairs. The Conquest broke this intimate association of the clerical with the secular power. William of Normandy supplanted English by foreign churchmen, who were cut off from their flocks and very largely dependent on the king. From William Rufus to Henry II. there were frequent disputes between the Crown and the Church, in which the people always took the ecclesiastical side. In one respect the English Church differed from the Churches of continental Europe. In other countries the clergy were a separate *estate* in the government; in E. the greatest churchman mingled with the nobles in the House of Lords. They were more bound up with the national interests, and were less of a class depending on the pope in E. than in the rest of Christendom. The contest between the king and the clergy soon shifted its aspects. In the dispute between Anselm and Rufus and Henry I., the churchman represented the claims of Rome; in the reign of Henry III. the king and the pope struggled together against the English Church and the English people. In the 14th c. the Church, which had sheltered freedom and learning, and done much to soften the evils of feudalism, sank into apathy and worldliness, and called forth the bold censure of John Wickliffe, 'the first Protestant.' He declared that the gospel is a perfect rule of life without clerical intervention, and combated the doctrines of papal supremacy, indulgences, pardons, absolutions, and worship of saints and images. He gained many disciples, nicknamed Lollards (q.v.), who, though cruelly persecuted, increased in numbers after Wickliffe's death. In the reign of Henry VIII. the ties between Rome and the English Church were broken. Thomas Cromwell's aim to reduce the Church to a department of the state was achieved for a time through Cranmer's suggestion that Henry should appeal to the Universities for the divorce from his queen, which the pope refused to grant. This expedient proving successful, a series of measures were passed which totally changed the character of the English Church. Henry was made Protector and Head of the Church, which became during the rest of his reign the tool of his despotism; the bishops were mere royal nominees, all connection with Rome was severed, first-fruits of the Church livings, formerly enjoyed by the pope, were confiscated to the throne, and the monasteries suppressed (1536). During Edward VI.'s reign the Reformation, now become a popular movement, advanced swiftly; the Common Prayer-book received its present form (1552), and men were commanded to subscribe to the forty-two articles of faith drawn up by Cranmer and Ridley, and afterwards under Elizabeth reduced to thirty-nine. At this time the English Church seemed tending to become Genevan, but on Edward's death Mary restored Catholicism, and subjected the Reformers to a terrible persecution. Her successor, Elizabeth, had to decide between the Church of Rome, the extreme Protestants, many of whom had been exiled to Geneva, and the moderate Protestants, led by Parker. Elizabeth enlisted with the last party, which wished to exclude papal authority from England, and to preserve as much of the old Church discipline and belief as was compatible with the removal of error and corruption. Thus was formed the present English Church, which still bears traces of the conflicting beliefs amid which it arose; its creed showing the influence of the Genevan party, and its liturgy and ritual recalling the older Church from which it sprung.

The English Church does not recognise the validity of orders unless conferred by a bishop, and she recognises the ordination of the Eastern and Western Catholic Churches. The English bishop, moreover, is entitled to refuse ordination. The present division of England into bishoprics (though many of the sees are old, and the two provinces also) rests on the Act 6 and 7 Will. IV. c. 77, which gave effect to the report of the Ecclesiastical Commission. (See BISHOP.)

Every diocese is divided into archdeaconries, whereof there used to be sixty; every archdeaconry into deaneries, and deaneries into parishes. The Archbishop of Canterbury, formerly legate of the pope, is primate of All England, the Archbishop of York is primate of England. Then come the Bishops. For the inferior dignitaries of the Church, see Priests, Parsons, Deans, and Ordination. Curates are either stipendiary, the temporary assistant of the rector or vicar, or perpetual, officiating in a parish or district to which the impropriator has nominated them. The latter institution arose from the transfer of benefices (in which there must always be a vicar) from spiritual societies to a single lay person, who of course could not serve the cure. There are a few peculiar preferments called donatives, because the patron can instal the donee without presentation to, or institution by, the bishop; *e.g.*, the church in the Tower of London is the king's donative. The stipendiary has to make a solemn declaration that a certain stipend has been agreed upon, and that no abatement is to be made for rent of the glebe, &c. The bishop may appoint curates where the incumbent is absent so many months in the year, or where the duties are ill performed; and he also fixes their salaries in cases of non-residence. The salary is never less than £80, unless the value of the benefice be less. (See Curate.) The bishop has complete power over him by direct removal, and indirectly by revoking license. The 'departing bell' and the alms given at funerals are probably founded on the old practice of 'masses satisfactory,' or prayers for the dead. Burial is still sometimes permitted in the church, but discouraged for sanitary and economical reasons. Every parishioner, even a suicide, is entitled to burial in the churchyard, if it has not been closed by the local authority and if there is room, but not to burial in any particular spot, iron coffin, or vault. A faculty obtained from the ordinary will, however, give him that right also. The Cemeteries Clauses, the Burials Act of 1880, and those constituting Burial Boards for parishes or boroughs, &c., provide for a portion of the ground being unconsecrated for the use of Nonconformists, for burial in churchyards *without church rites*, for the purchase of ground for cemeteries, &c. While the parson may not refuse burial, it must be accompanied by the Church service (if he be requested to conduct it), according to the rites of the Church of England, and he is entitled to a fee, the origin of which was the oblation for prayers at religious houses. Of a similar kind are mortuaries, or corse presents, depending on custom. The Catholic form, 'Pray for the soul,' &c., is permitted. The liturgy and ritual of the Church strongly suggest her continuity with that before the Reformation. The Prayer-book contains the Breviary, the Missal, and the Ordinal. It is a translation of ancient Catholic liturgies. The rites, or services expressed in words, and ceremonies (gestures and acts which go along with words, including the use of lights, incense, and vestments) are not new.

An enormous revenue, under the name of 'tithes,' was drawn by the Church from every description of annual produce down to 1837, when the series of Tithe Commutation Acts brought in a corn-rent fixed in quantity though fluctuating in money value, and subsequently a rent-charge which ultimately frees the land. (See Tithes.) The name of offerings, oblations, obventions, apply chiefly to Easter dues (2d. per head, and in London 4d. a house), Pentecostal or Whitsun farthings, and the small sums paid at the other two great feasts (Christmas and Dedication). Fees proper are taken when the surplice is put on, or other act done by the priest for behoof of individuals. They arise on marriage, burial, &c., but not on baptism; the old name is *altarage*. Large landed estates belong to the various sees and to the deans and chapters, and single prebendaries and minor cathedral corporations have also estates. Much of the property and of the administrations belong to the Ecclesiastical Commissioners (q.v.). It is subject to Annates (q.v.), tenths, land-tax, and several public rates. In 1868 all compulsory church-rates were abolished, but voluntary rates may still be agreed upon.

For an account of the great assembly of the Church, see Convocation. Besides her former exclusive connection with the universities, the Church had a power of visiting the grammar-schools and licensing teachers. It was long debated whether a conscience clause could be permitted in these schools, and whether Dissenters might be appointed trustees. An Act in 1860 gave relief in the first of these matters, which was extended in 1868 to the seven public schools. The latter point was gained in the Endowed Schools Act of 1869, which also destroyed the episcopal power to license, and removed the necessity of masters being in holy orders. The Education Act of 1870, in section 97 (1), provided that no grant of money shall be made in respect of any instruction in religious subjects; it also provided that the religious instruction, if any, should be given at the beginning or end of the secular instruction, and that no child, attending a public elementary school of whatever description but earning a grant, should be required, as a condition of his or her admission to the school, to attend any religious lesson, lecture, &c., either at the school or elsewhere. For an account of Church extension, see Ecclesiastical Commissioners and Queen Anne's Bounty.

To enforce its law the Church has a system of courts of archdeacons, diocesan consistorial courts, and the courts of the primates or provincial courts.

See the Histories of Freeman, Stubbs, Froude, Macaulay, Green, &c.

Englanté.

Englan'té, or **Fruc'ted**, in heraldry, means fruited or fruit-bearing (usually an oak-twig bearing acorns of a different tincture from that of the leaves), and the expression is used of trees when tree and fruit are of different colours.

Eng'lish Bazar' (Angrazabad), the chief town of Maldah district, province of Bengal, British India, on the Mahananda River, close to the ruins of Gaur, and 188 miles N. of Calcutta. E. consists of a series of trading villages lining the river bank. It has some silk-weaving industry, and the vicinity is very productive in the silkworm mulberry. There is a considerable trade in grain. The town is protected by an embankment from the continually occurring inundation by the waters of the river. Pop. 13,818, of whom 8057 are Hindus, 5746 are Mohammedans, and 8 are Christians.

English Chann'el (the *Oceanus Britannicus* of the Romans; Fr. *La Manche*, 'the sleeve'), the narrow sea separating the southern shores of England from the northern coast of France. It extends from the Atlantic to the North Sea, covering an area of 23,900 geographical sq. miles, and is 100 miles wide at the Chops, between Land's End and Ushant Isle. Reaching its greatest breadth of 140 miles between Portland Bill and St. Malo, it narrows at Dover Strait to 21 miles. It contains the Scilly Isles, Channel Isles, Isle of Wight, &c. Strong westerly winds prevail, and a strong current runs in the direction of the North Sea. The depth of the Channel varies from 5 fathoms where there are sandbanks to 60, where the bottom is a coarse gravel. The Strait of Dover—12 to 30 fathoms—is paved with a chalk ridge, linking the two countries, and through this it is proposed to carry a submarine tunnel, the experimental works of which were begun on the French and English sides in 1877. The Channel is noted for its pilchard, mackerel, and oyster fisheries.—**E. Harbour** is the name of two fine havens, one on the S. coast of the British island of Antigua, the other on the Pacific shore of Costa Rica, in Central America. On the Antigua haven there is a trading town of the same name.—**E. River**, the estuary of the Manhissa, enters Delagoa Bay to the N. of Zulu Land, on the E. coast of S. Africa.

English Drama. See Drama and English Literature.

English Language. The English speech was originally a pure Low German dialect of the Teutonic group of the Aryan or Indo-European family, its nearest cognates being the old Frisian, old Saxon, Dutch, and Flemish. It was brought from the Continent to Britain by various Teutonic tribes, who, beginning their settlements about the middle of the 5th c. [Skene in his *Celtic Scotland* (vol. i. chap. 2-3) discusses this point, and argues with much cogency for an earlier date—the latter half of the 4th c.], gradually exterminated or drove westward the native Celts, and called the country Ængla-Land ('land of the Angles or English'). The history of the E. L. may be thus divided :—(1) Old or Early English, A.D. 450-1120 ; (2) Middle English, 1120-1300 ; (3) New English, 1300 to present time.

I. *Early English.*—The language of the Teutonic settlers in Britain, to which the misleading name Anglo-Saxon has long been applied (see ANGLO-SAXONS), was, on its introduction into the island, fully inflected and almost free from foreign alloy. It was only slightly modified by the speech of the conquered Celts, few Celtic words appearing in English writers up to A.D. 1100. Such as were absorbed by it were mostly what the English would learn from Celtic slaves, *e.g.*, *basket, barrow, button, coat, funnel, gown, mattock,* &c. After the Christianization of the English in the 7th c., various Latin words, chiefly ecclesiastical, were introduced by churchmen and English translators of Latin writers, *e.g., saint, priest, candle, altar, church* (Greek), &c. This element is called Latin of the Second Period ; while the earlier Latin infusion left by the Roman colonists, chiefly seen in names of places, such as *castra*, is styled Latin of the First Period. The Northmen or Danes, who began to invade England in the first half of the 9th c., and made a permanent settlement in the N.E. of the country in 878, helped largely to strip English of its inflection—a simplification incident on the mingling of peoples speaking different tongues—and introduced numerous Scandinavian words, such as *are, until, fro, ill, bark, bask, brave, dash, fly, ransack, earl,* &c. In the S., where the Danish element was almost entirely absent, the old inflections lingered much later than in the N., where the Norse influence is still visible in the names of places and in the provincial speech. Before the Norman conquest there were two great dialects of English—the Northern, which, after taking the lead as a literary medium, gave way, from a variety of political causes to the Southern, or language of Wessex. These dialects arose from the original differences in the speech of the Teutonic settlers, the N. being colonised by Angles, and the S. mainly by Saxons. Old English was largely monosyllabic, pithy, picturesque, and copious, although somewhat rugged and wanting in melody and pliancy, qualities gradually gained after the Norman conquest of 1066, which at first threatened to destroy English as a literary language. It must not be supposed, however, that the Normans deliberately strove to root out the English speech, though such a notion is still vaguely entertained by many. There is not a shadow of evidence to show that they cherished any dislike to it whatever. Through the force of political circumstances it was lowered for a time from a literary, courtly, and official language to a popular dialect. At first English and Norman-French stood quite asunder. French was taught at school, and used in literature and law ; no man who knew English only could advance in public life ; and even rustics sought to speak in French, the language of the court, clergy, nobility, and authors. But the mass of the people clung to their old idiom, which, as is seen in the *English Chronicle*, underwent almost no change for about fifty years after the battle of Hastings.

II. *Middle English*, 1120-1300.—The influence of the Norman conquest, though great, is apt to be overrated. The disuse of English as the fashionable and literary tongue hastened the omission of inflections, the breaking up of the grammar, and the rise of great dialectic differences in the absence of an acknowledged literary standard. The loss of inflections and the simpler grammar which distinguish Chaucer's language from Ælfric's are not, however, solely due to the Conquest, for like changes have occurred in Low German tongues unaffected by events similar to the Norman invasion. The popular belief that modern English is the result of a mixture of Old English and Norman-French is utterly false. English is radically a Teutonic tongue, and the large French infusion in our present speech was mainly introduced since the end of the 13th c., after English had revived as a literary language. While Englishmen and Normans were two hostile classes, few French words crept into the E. L., nor was French chiefly used even for government documents until the 13th c., when it was the official tongue of half of Europe. In the 12th c. grammatical disruption went on more actively than the adoption of new words, but English, as it re-arose, absorbed much of its Romance rival, and in the 13th c. many old Teutonic words were displaced by French equivalents. Middle English is mainly distinguished from early English by the substitution of auxiliaries and prepositions for the old inflections, the general contraction in spelling, the softening of certain consonants, the use of *to* before the infinitive, and the adoption of *s* as the plural ending, after a struggle with the *n* termination still seen in *men, oxen, children,* &c. The genitive is still in *es*, and there is still an accusative in *en* ; but the inflectional endings tend to change into a silent *e*, which has been since shaken off from most words. The grammar is very confused and clearly transitional. The chief literary remains in Middle English are the last part of the *English Chronicle*, Layamon's *Brut*, the *Ancren Riwle*, and the *Ormulum*. In the two texts of the *Brut* (about 1200), which comprise 56,800 lines, there are not above 90 words borrowed from the Norman-French. In the *Ancren Riwle* (about 1220), there is the comparatively large proportion of 3 per cent. of French words. In these works English revived as a literary speech, while Norman-French was gradually sinking into a provincial dialect distinct from the language of Paris.

III. *New English*, 1300 *to the Present Time.*—In the 14th c. English had become the natural speech of the Normans, while French was acquired at school, almost as a foreign tongue, to equip men for literature and polite society. The wars with France helped to kindle a revolt against this undue preference of French as the speech of fashion and culture. In 1363 it was enacted that henceforth law pleadings should be carried on in English, as French was becoming unknown in the kingdom ; and before the end of the century English was securely reinstalled as the language of the court and of such writers as did not express themselves in Latin. The English speech, which was thus restored to its old position, had, in the times following the Conquest, been broken up into many local varieties, but had only three strongly-marked dialects—the Northern, spoken in most of York, in Durham, Northumberland, and the Scottish Lowlands ; the Midland, spoken in the centre and E. of England, from the Humber to the Thames ; and the Southern, spoken in England S. of the Thames, and in Gloucester, Somerset and part of Worcester and Hereford. These dialects are most easily distinguished by their various manners of inflecting the present plural indicative, in all forms of which the Southern employs *eth*, the Midland *en*, and the Northern *es*. The Midland was, moreover, divided into W. Midland, spoken in Cumberland, Westmoreland, Lancashire, Cheshire, Shropshire, &c. ; and E. Midland, spoken in Lincolnshire, Norfolk, Suffolk, Cambridge, Northampton, &c. The latter variety, aided by its geographical position between the N. and S., became the dominant form. First made widely current by Robert of Brunne, who about 1303 composed the *Handlyng Sinne*, it was used by Wickliffe and Gower, and was fixed as the classic dialect by the genius of Chaucer, since whose time the E. L. has changed comparatively little. In the 16th c. there were three dialects—the Northern, the Midland, which had spread over the S.E. counties, and the Western or old Southern. The once ruling speech of Wessex sank into a mere provincial variety, but the Northern dialect survived in Scotland, was there adorned by a series of great poets, and is now the purest relic of Early English, embracing many fine Teutonic words lost to the classic dialect of the south. The E. L. on its revival in the 14th c., while it had become by French influences more rich, flexible, and polished, was radically the speech of Ælfric. Chaucer's language is essentially Early English, with a new element of lightness, flowery delicacy, and dainty brilliance gained from the French, with Gallic fluency and grace wedded to Gothic vigour. But the effects of the Norman conquest on the E. L. were not solely beneficial. One evil result was the loss of many Teutonic words which were driven out by weaker French synonyms. The old English poetic diction especially suffered, about a third of it being held to have vanished before 1200. The Romance infusion also checked the free expansion of the Teutonic element, the language losing its power of making fresh compounds from Teutonic roots, as writers preferred to borrow new words from the Latin and French. Besides swelling the vocabulary, the French exerted a certain formative influence over our speech, as, for example, by adding the Romance ending *age* to the English *bond* in *bondage*, by changing the English *u* into *ou*, by substituting *qu* for the early *cu* in such words as *quick*, *qualm*, *queen*, *quoth*, &c. On the other hand, many French words received an English form in which their Romance origin can scarcely be detected, while another effect of the long predominance and large influx of French was to give a modulation to the speech quite distinct from the old English accent and rhythm. From the subtle interaction of English and French during the rise of the present form of our language, it is often difficult to say whether a word is of Teutonic or Romance origin; and, moreover, several apparently Latin derivatives brought in by the Normans were Celtic or more often Teutonic roots, while Norman-French, though essentially a Romance tongue, was at the time of the Conquest thickly sprinkled with Scandinavian words.

In the 15th c. the East Midland continued to spread; inflections still further fell away; Romance prefixes and affixes were welded to Teutonic words, and *vice versâ*; the language became more uniform as the Romance element was slowly fused with the Germanic. The introduction of printing by Caxton (about 1470) aided greatly to fix the grammatical structure of English. During the 16th c., when the Renaissance spread into England, and enthusiasm for the classics was at its height, Greek and especially Latin words, many of which have since been forgotten, poured into our vocabulary. Even in the Elizabethan period the E. L. was in a partly transitional state. The national speech had then to express a vast wealth of new thoughts, feelings, and discoveries, and fresh words were needed, especially to convey abstract ideas. Many words were culled from the Latin which are now obsolete, as *stelled*, 'starred,' *aidant*, *disnoble*, *rubious*, *renege*, 'to deny,' *ruinate*, *continuate*, *rondure*, 'a circle,' *accite*, 'to summon,' *charactery*, 'what is written,' *antres*, *ingen*, 'ingenious,' *copy*, 'plenty,' &c. Latin and Greek words which have since been limited in meaning were used in a general sense, as *aggravate*, 'to add to,' *journall*, 'daily,' *exorbitant*, 'uncommon,' *travail*, 'work,' *extravagant*, 'wandering,' *conceited*, 'fanciful,' &c. Other Latin and Greek words occur in a narrower sense than now, as *abridgment*, 'a dramatic performance,' *influence*, 'the influence of the stars,' *ovation*, *triumph*, *decimate*, &c. Also numerous English verbs were employed in many various senses, as *take* for to consider, to understand, to bewitch, to interrupt, to resort to, &c., *pass* for to surpass, to pass sentence, to assure, to care for, &c. There is a strong and sometimes excessive fondness for compound words and phrases, as *marble-constant*, *furnace-burning*, *back-return*, *wind-changing*, *honey-heavy-dew*, &c. This tendency to strike out new words was often at variance with the nature of the language, as when a Latin ending was fastened to a Teutonic root, or *vice versâ*, *e.g.*, *bodement*, *increaseful*. The Renaissance led the Elizabethan prose-writers to imitate Latin authors, to frame long round periods, somewhat tangled and cumbrous, but showing a grandeur of phrase and rhythm novel in our literature; while the Elizabethan poets lent their style the charm of racy facile vigour by free recourse to the popular idiom, and played wild freaks with grammar, bending syntax to their whim, using adverbs as verbs, verbs as nouns, and nouns as adjectives—a daring laxity partly due to their wayward fancifulness, partly to the transitional state of the language. Their strange constructions are often experiments prompted by the loss of the old inflections, or are caused by the secret suasion of the old syntax. Compared to our present English, the Elizabethan is superior in freedom and terse strength, but inferior in clearness and correctness. Gradually syntax became more strictly observed, and as the Renaissance enthusiasm cooled, Latin and Greek words were less wantonly pressed into service. The authorised version of the Bible (1611) has done much to preserve many exquisite old English words, and has been an abiding influence for good on the English style. In the 18th c. the Teutonic element was sacrificed to the Latin, the result being a style generally heavy and pompous, but sometimes, as in Gibbon, full of a splendour that would be august if it were not artificial. In the present century, a healthy reaction has set in for Teutonism, which may, however, be likewise carried to excess.

English Literature. 450-1066.—The earliest E. L. in the vernacular consisted of songs of war and adventure, such as *Beowulf* (q.v.), paraphrases of Scripture, &c., which are treated of under ANGLO-SAXON LITERATURE. Alongside of these war-songs, hymns, and translations, there grew up a literature written in Latin by Englishmen and Welshmen, of which the chief specimens before the Norman conquest are the *Historia Britonum*, ascribed to Nennius, the *Epistola de Excidio Britanniæ* of Gildas, the *Annales Rerum Gestarum Ælfredi Magni*, commonly ascribed to Asser (q.v.) (but both the authenticity and genuineness of this work are now strongly challenged), the *Historia Ecclesiastica Gentis Anglorum* of Bede, and the *Colloquy* and *Glossary* of Ælfric. This learned literature was born in Northumbria and Strathclyde; but, on Wessex winning supremacy, flourished most abundantly in the S., where scholarship was especially fostered by Ælfred. At the Norman conquest literature in English was for a time crushed; while works in Latin continued to be written, and a foreign literature in French, produced mainly by Norman *trouvères*, arose. The 11th c. has few names of note. Among its leading authors are Osbern of Canterbury, who wrote a history from the creation to 1083, and Turgot, who composed a chronicle of Durham monastery. The 12th c. is prolific in names, but none are of high rank. The Conquest, besides for a time stifling English verse and prose, and introducing a French literature quite alien in style and theme from the first writings in English, permanently affected E. L. Rhyme, which certainly occurs in the old English hymns and sagas, and which may have stolen into English verse from Wales, was first popularised by the Normans, and drove out the ancient system of alliteration; while, instead of the old heroic poetry which sang of the deeds of Englishmen on the Continent and in England, long romances were woven celebrating the exploits of mythical and semi-mythical heroes. When the vernacular literature revived, the old national themes were forgotten, and Englishmen adopted subjects which the Normans had rendered familiar. The early heroic lays were thus hushed for ever, but the early devotional poetry was prolonged, though in humble form, until in the 13th c. we see in Ormin a genuine successor to Cædmon. The French literature, thus for a time dominant in England, was narrative rather than lyrical, being transplanted from the N. of France, the region of the *Chansons de Geste*. Compared to the English literature which it displaced, it was wanting in earnestness, fire, and energy, was more gay and shallow, with a novel fineness and quaint floweriness of style. This French nicety of diction ultimately blended with and toned down the rude strength of the early Teutonic verse, and imbued English poetry with a lightness and grace which it could not have developed from its original resources alone. Prose annals were plentiful during the 12th c., the chief chroniclers being Florence of Worcester, Eadmer, Orderic, Henry of Huntingdon, and William of Malmesbury. In the last a new historic spirit begins to dawn, shown by a tendency to weigh facts and look into the state of the rest of Europe; and healthy patriotism and independence glance out from Eadmer, Henry of Huntingdon, and the *Legend of Hereward*. In this century the *English Chronicle* ends with a dark graphic picture of the woes of King Stephen's reign, and the cycle of Arthurian romance is firmly ingrafted on our literature by the fabulous Latin history of Geoffrey of Monmouth, which first popularised the stories of Arthur and the Round Table, so often retold by our poets. Through the influence of Geoffrey's work, E. L. adopted a body of Arthurian and pre-

Roman legends, which despite its mediæval and fanciful colour, perhaps keeps some strangely-altered fragments of the history of W. Wales, mingled with wild stories created by Welsh and Armorican bards, and which unfortunately came to be viewed as sober truth, and blinded men to the real acts of the Teutonic settlers in Britain. In the 12th c. Alfred of Beverley recounted the Arthurian tales in the form of a genuine chronicle, and the *trouvères*, Gaimar and Wace, recast them in French verse. Towards the end of the century literature becomes secularised, a keen inquisitive faculty appears, and a political rather than a monkish spirit breathes through history. Satire and criticism spring up in the gifted Walter Map, in Nigel Wireker, whose *Brunellus* assails the monkish orders, and in Gerald de Barri, or Giraldus Cambrensis, the earliest English political pamphleteer. Ranulf de Glanvil writes the first work on English law, John of Salisbury gathers up the learning of the time in his *Polycraticus*, literary criticism is begun by Geoffrey de Vinsauf, and history is compiled by William of Newbury and Roger of Hoveden, who carry us into the 13th c. Meanwhile the vernacular literature maintained a lowly existence in the shape of homilies, translations, and other religious works, and in treatises on the knowledge of the times. The 13th c. is an age of fresh intellectual activity, of ardent zeal for learning—a fleeting and premature foreshadowing of the Renaissance. New ideas and a more liberal culture were diffused by the Moors of Spain and by the influence of the Crusades; the splendours of Oriental fiction were wafted from the far East, and the rudiments of science stole in from the schools of Cordoba and Granada. The English universities began to affect literature, and Latin was zealously studied. Adelard of Bath introduced the elements of science from Spain; Roger Bacon reflected the rebellious spirit of inquiry which was abroad, and sought to embody the encyclopædic idea of knowledge which was then arising; Robert Grossetete was the foe of the Pope, and forerunner of Wickliffe; and William Occam was the trenchant assailant of scholastic Realism. History became filled with a patriotic spirit in Roger of Wendover, and Matthew Paris, who is the best of the monkish chroniclers. Long French romances of Arthur and Charlemagne, of Havelok and King Horn were abundantly produced, often based on Scaldic or Saracenic tales, and tedious from their fluent minuteness. But the great feature of the century was the revival of English as a literary tongue in the *Brut* of Layamon; the English history of Robert of Gloucester, where the patriotic English spirit shines out brightly; in the *Ormulum* of Ormin or Orm; and in the *Handlyng Sinne* of Robert of Brunne, written about 1300. These works are mostly of linguistic rather than of purely literary value, the finest poetry of the time blossoming forth in the short English lyrics and ballads, sweet and simple verses, lit with a quaint tender passion, tinged with a charming love of nature, and blending the old Teutonic strength with French grace and refinement. Such a union of qualities is seen in the *Owl and the Nightingale*, a true English *fabliau* written in the reign of Henry III. New rhythmical forms are introduced, and octosyllabic verse becomes a favourite medium for narrative. Many of the ballads cluster round the favourite hero Robin Hood, and similar outlaws. The 14th c. is a time of great political and religious movement, the age of Lollardism and the peasant wars. The inquiring spirit which awoke in Walter Map becomes bolder and more democratic, and English completely overthrows French as the literary speech of the land. Lyrical poetry still blooms, pleasantries like the French *fabliaux* are numerous, and the brooding earnestness of the pre-Norman literature reappears in severe homilies, such as Richard Rolle's *Pricke of Conscience* (about 1340), and Dan Michael of Northgate's *Ayenbite of Inwyt* (about 1350). Laurence Minot's war-songs (about 1360) echo the national pride in the victories of Edward III. The chief writers of the century are William Langland, John Wickliffe, John Gower, Sir John Mandeville, and Geoffrey Chaucer. Langland, in the satire *Piers the Plowman*, gives voice to the misery of the people, and mirrors the dark side of the age, while its brilliant aspect is reflected in Chaucer. Two streams of poetry unite in Langland's work—the satiric, which began in the 12th c., and the religious, which began with Cædmon. Wickliffe translates Scripture into racy, homely English, and spreads the Lollard reform. Gower writes huge allegorical poems full of learning. Mandeville is, next to Sæwulf, our earliest great traveller, and, along with Wickliffe and Chaucer, may be called the father of modern English prose. Chaucer is our first great poet, and his works are the crowning flower of the playful satiric, and amorous mediæval poetry which takes a frank interest in human character and daily life, as distinguished from the mystic mediæval poetry, of which the loftiest representative is Dante.

1400-1580.—After the death of Chaucer, the struggle with France, the Lollard controversy, the Wars of the Roses (1430-1485), and the Anglican Reformation, caused a literary decadence during the 15th and earlier years of the 16th c. Men were alienated from verse to polemics, and the best poetry of the 15th c. is found in the simple, forcible ballads of the North and Midlands. Most of the Robin Hood ballads, the *Nut-brown Maid*, and a version of *Chevy Chase*, belong to this period. The chief writers in verse of the 15th c. whose names we know are Occleve, Lydgate, and Hawes, who produced long, cold, and gaudy allegories. In the beginning of the 16th c. popular poetry revived in the boisterous Skelton, and the dawn of the English Renaissance is visible in the works of Surrey and Wyatt. They were imitative rather than original, but through their adoption of classic and Italian metres, such as the sonnet and the blank verse introduced by Trissino, and the sparkling, limpid fluency of their style, they helped largely to adorn and chasten the language, and bring in a more refined and ornate school of poetry. They are sometimes regarded as the fathers of 'subjective' poetry in England. As the century advances, the growing influence of the Renaissance and the rise of a new poetry are seen in such works as Tottell's *Miscellany* (1557) and Edward's *Paradise of Dainty Devices*, collections of moral pieces and love songs in the *Mirrour for Magistrates* (see SACKVILLE), and in the varied writings of Gascoigne. Comedy dawns in Udall's *Ralph Royster Doyster*, tragedy in Sackville's *Gorboduc*, and the historical play or history in Bale's *King John*. (For the rise of the English drama see MIRACLE PLAYS and DRAMA.) The increasing love of literature and interest in foreign works are shown by the number of translations, especially from the Italian, such as Painter's *Palace of Pleasure* (1563); and popular fiction underwent a change, the place of the Arthurian and other long chivalrous romances being taken, to a great extent, by tales from the Italian and new stories of English life. Among the English prose romances, 'the Waverley Novels of the 16th c.' are *The Six Worthy Yeomen of the West*, *Tom-a-Lincoln*, *George-a-Green*, *Robin Hood*, *The Seven Champions of Christendom*, &c. The chief prose writers of the period are, in history, Caxton, Fabyan, Lord Berners, Cavendish, Bale, Hall, Leland, Foxe, Hollinshed, Linacre; in polemics, Pecock, Fisher, Tyndale, Elyot, Coverdale, Cranmer, Latimer, Ridley, Gardiner, Pole, Foxe, and Jewell. The *Paston Letters*, the correspondence of the Paston family from 1420 to 1505, give valuable social details. Perhaps the finest prose of this period is Sir Thomas Mallory's (see MALLORY) *Morte d'Arthur* (1485), but in the 16th c. we see clearly, in More and Ascham, the dawn of a new prose style. In 1470 Caxton introduced printing, but the art did not give a powerful impulse to literature until the Elizabethan era. This period was rife with change, the systems of chivalry and feudalism vanished, the Church was revolutionised, thought was freed from scholasticism, and the new learning flowed into the country, where it was diffused by writers and scholars such as Cheke, Colet, Grocyn, Linacre, Warren, Ascham, and More. (For the English translations of the Bible belonging to the period see BIBLE.)

1580-1625.—This period, known as the Elizabethan, is the golden age of E. L., rich in poetry and prose, in imaginative and speculative writings. It is peculiarly the palmy epoch of the English drama. Its greatness was especially due to the Renaissance powerfully stirring the English mind at a time of splendid national progress, of victory and discovery, of patriotic and religious awakening. Instead of meeting with an emasculate society, and flowing into sculpture and painting as in Italy, the Renaissance in England found a people in unprecedented national vigour, and was centred wholly upon literature. The invention of printing was now bearing fruit, maritime discovery kindled the poetic imagination, and England's attitude as the defender of Protestantism heightened patriotic enthusiasm. The new literature is broadly distinguished by its keen interest in human action and passion, and by the extent to which it is affected by Italian writers. This Italian influence takes two forms—on the one hand flushing the Elizabethan narrative and love-poetry with a Southern affluence of lovely colour, and instilling a fondness for soft melodious verse, while on the other it leads the dramatists to choose their themes from the blackest episodes in Italian tales and annals. The principal dramatists were Peele, Greene, Marlowe, Lodge, Kyd, Munday, Chettle, Nash, and, immediately succeeding these, Shakespeare, Jonson, Beaumont, Fletcher, Dekker, Webster, Ford, Chapman, and Massinger. The Elizabethan drama is unrivalled for grandeur, comprehensiveness, and variety, revealing the keenest insight, and the most lavish fancifulness, the most aërial sublimities, and the most grotesque incidents, grappling with the deepest problems of life, and revelling in the wildest sallies of wit. (See DRAMA.) Of non-dramatic poets the greatest is Spenser, whose glowing colour, sweetness of verse, and taste for allegory were imitated by Sidney, Harrington, Daniel, Drayton, Sylvester, Chapman, Giles and Phineas Fletcher, and William Browne. Long narrative poems, dealing with English legend, history, and scenery, were written by Daniel, Drayton, and Warner; metrical satire by Donne and Hall; and lyric poetry was exquisitely developed by the dramatists. Pastorals, imitative of Italian poetry, were written by Spenser, Fletcher, Drayton, Jonson, Browne, &c.; sonnets and love-songs abounded. Throughout this poetry there runs a love for fantastic conceits and strained refinements, which, arising from Euphuism, a natural growth of the Renaissance popularised by Lyly, and chiming with the courtly taste, disfigures the writings even of the greatest dramatists, and becomes the chief feature of English poetry in the first half of the 17th c.

The chief Elizabethan prose-writers are, in history and scholarship, Foxe, Stowe, Speed, Camden, Raleigh, Spenser, Hooker, Bacon, Burton, Usher, and Selden; in science, Bacon, Napier, Harvey, and Lord Herbert of Cherbury; in controversy, Whitgift, Cartwright, Robert Brown, Nash, Donne, and Hall; in fiction, Greene, Lyly, Sidney, and Bacon. The prose is for the most part stately and periodic, as in Hooker, but is also, in the euphuistic writings of Lyly, Greene, and others, antithetic and full of conceits.

1625-1688.—From 1625 to 1640 E. L. held its Elizabethan characteristics; Jonson, Marston, Massinger, Ford, and Shirley were active as dramatists; and, though the Puritanic hatred of the theatre was strengthening, as shown by Prynne's *Satiromastix* (1632), plays, and especially fantastic pieces called *masks*, were highly popular. The pastoral and allegorical poetry, founded by Spenser, was continued by William Browne, and Giles and Phineas Fletcher; and the early poems of Milton, which belong to this time, breathe the Spenserian spirit. The taste for intellectual subtleties and far-fetched analogies, which the Elizabethans borrowed from Italy, became more conspicuous in the verse of Habington, Henry More, Crashaw, and Cowley, who was now beginning his poetic career; vigorous metrical satires were composed by Jonson, Hall, Davenant, Wither, and Cleveland; charming love-songs, anacreontics, and epigrams, full of sportive grace, and tripping music, were written by Jonson, Wither, Carew, and Herrick; and prose, for the most part retaining the Elizabethan intricacy of style and wealth of classic allusions, was represented by Donne, Usher, Jonson, Selden, Burton, Herbert of Cherbury, Wither, and Chillingworth. From 1640 to 1660 literature, excepting polemics, was almost silenced by the civil wars and subsequent Puritan rule. The closing of the theatres by the Puritans in 1642 put an end, for a time, to play-writing, and the higher prose was almost stifled by a vast outcome of pamphlets for and against the king—Presbyterian and Independent, Cromwellian and anti-Cromwellian—Milton plunging into the controversy, and vindicating the Roundheads in gorgeous polemical treatises. The chief prose writers were—in philosophy Hobbes, and Sir T. Browne; in theology, Jeremy Taylor; in history, Clarendon and Fuller; in polemics, Milton, Laud, Hall, Prynne, Fuller, and Whitlocke. Excepting parts of the works of Davis, Marvell, Denham, Davenant, and Wither, verse was confined to Cavalier songs and lampoons on Royalists and Roundheads, the ablest of such song-writers and satirists being the Royalist Cleveland. The Restoration, in 1660, suppressed controversial writings, restored the drama, and introduced a new literature, deeply marked by French influences, by profligacy, scoffing wit, and a strong anti-Puritan bias. Only a few writers held aloof from the general tendencies, notably Milton, who now returned to poetry and wrote his great epics; Butler, who flouted Puritanism in the style of the conceit-writers; and Cowley, who continued to weave subtle frigidities into serious verse. Mainly through the influence of Dryden, a new poetry arose, modelled on the French critical school, which, under Boileau's guidance, had crushed euphuism in France; English verse, stripped of conceits, became more direct, simple, and mechanical; and brilliant didactic energy took the place of idealism and imaginative fervour. Rhyming tragedy was imported from France, and Dryden sought vainly to found a new drama uniting Elizabethan fire with French symmetry of form. The chief writers of tragedy were Dryden, Lee, Crowne, and Otway. Romantic plays had vanished; but comedies of city life, coarsely broad, but glittering with wit, were written by Congreve, Wycherley, and Vanbrugh, a purer drama at last arising with Farquhar. Verses of society, sometimes with a pleasant *naïveté* in their florid badinage, were composed by such noblemen as Dorset, Sedley, and Rochester.

The influence of French literature on the prose of the period produced a more correct and elegant syntax, the chief prose writers being, in philosophy, theology, and polemics, Hobbes, Browne, Taylor, Cudworth, Barrow, Tillotson, Sherlock, South, Leighton, Pearson; in scholarship and history, Clarendon, Aubrey, Evelyn, Pepys, Dugdale, Rushworth; in fiction, essays, criticism, &c., Dryden, Cowley, Walton, and John Bunyan.

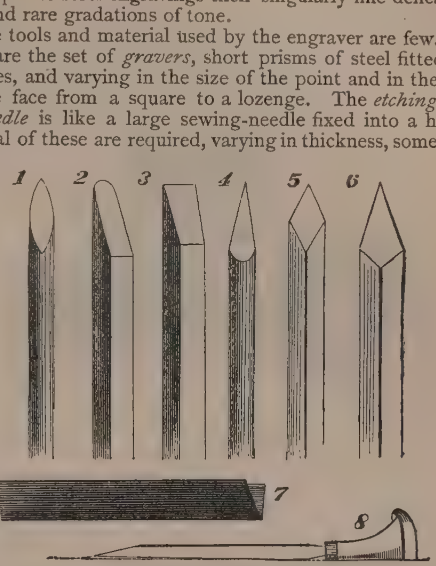
1688-1788.—This period, from the English Revolution to the French Revolution, may be called the period of the 18th c. It is markedly an age of great prose authors, none of our very best poets, but many of our foremost prose writers, belonging to it. In the early part of the century satires and pamphlets were abundant, and during Queen Anne's reign literature became mainly a party tool, the chief writers enlisting with Whigs or Tories, and receiving preferment for their services. The principal poets of the first half of the century were Arbuthnot, Gay, Swift, Pope, Phillips, Prior, Young, Warton and Thomson. The poetry of this era, known as the English 'Augustan' age, is distinguished by fastidious metrical art, displays the perfection of polished verse, but wearies by the sameness of its cadences, and the absence of true passion and spontaneous grace. It was largely didactic, was mainly devoted to satire and pictures of town life, having lost the aroma of the country, and was cast almost wholly in the heroic couplet, which in the hands of Pope, the master-poet of the time, constantly sparkles into jewels of epigram. The chief prose writers in the beginning of the period were Bolingbroke, Locke, Swift, Berkeley, Butler, Addison, Steele, and Defoe, the writings of the last three clearly marking the decline of patronage and the revival of popular influence. In place of the many-linked, sonorous prose of the 17th c., a lighter, simpler style was adopted; Defoe and Swift writing with racy vigour, Addison and Steele with careless, idiomatic grace. Comedy died out before realistic prose fiction, which was admirably developed by Defoe, Swift, Richardson, Fielding, and Smollett; and afterwards received a more graceful and idyllic, though less robust, treatment from Sterne and Goldsmith. To the second half of the century belong several of our noblest monuments of history. Prose became heavily Latinised, more precise and ornate, and more stately in rhythm than Addison's or Steele's in the works of Johnson and Burke, and of the historians Gibbon, Robertson, and Hume; while Goldsmith united the polish and accuracy of the Johnsonese with the graceful abandonment and lighter structure of the Addisonian style. The chief writers in philosophy were Hume, Paley, and Adam Smith. The foremost poets were Gray, Goldsmith, Shenstone, and Collins, who partly clung to the 'Augustan' manner, partly broke away from it in lyrics and idylls, which, despite their artificiality, show true fervour and delicate pensiveness; Blake, a strange mystical genius; and, above all, Cowper and Burns, in whom natural and impassioned poetry revived. During the latter part of the century authors lean again upon the public, patronage decays, periodical criticism arises, and the newspapers gain vastly in power, and usurp the functions of the political pamphlets.

1788-1894.—This period is second only to the Elizabethan for the number and splendour of its names. The chief poets of its earlier years were Byron, Shelley, Keats, Coleridge, Landor, Wordsworth, Scott, Moore, Crabbe, Campbell, Rogers, Southey, Wells, and Leigh Hunt. Many of these writers, deeply moved by the French Revolution, filled their verse with stormy passion, fiery rebellious protests, and a kind of nature-worship partly borrowed from Rousseau; while others led a strong reaction against the poetic style of the Queen Anne writers. Romantic poetry revived, new metres were adopted, Gothic and Eastern tales displaced the old 'classical' themes, lofty philosophic musings were cast into verse, and nature was described with novel subtlety of insight and freshness, novel energy, and felicity of language. The chief prose writers in fiction, philosophy, and criticism were Scott, Coleridge, Southey, Bentham, Mill, Godwin, Stewart, Galt, Miss Austen, Jeffrey, Wilson, Hazlitt, Lamb, Leigh Hunt, Landor, De Quincey, &c. Gradually the revolutionary glow faded from poetry, and at length a new school was founded by Tennyson. The greatest Victorian poets are Tennyson, R. Browning, Mrs. Browning, Hood, Arnold, Taylor, Dobell, 'G. Eliot,' W. B. Scott, D. Rossetti, C. Rossetti, Morris (2), Swinburne, Austin, and E. Arnold. There seem at present to be signs of the dawn of a new lyric and dramatic school. (See DRAMA.) Of prose writers, recent or living, the chief are, in history, Hallam, Alison, Macaulay, Carlyle, Grote, Thirlwall, Merivale, Milman, Buckle, Finlay, Stanley, Helps, Kinglake, Burton, Froude, Stubbs, Freeman, Greene, Stephen, Kitchen, Walpole, and May; in biography, Forster, Lewes, Masson, and Dixon; in philosophy and science, Hamilton, Carlyle, J. S. Mill, Newman, Maurice, Bain, Kelvin, Spencer, Tyndall, Huxley, Darwin, and Maxwell; in criticism, De Quincey, Ruskin, Arnold, Carlyle, J. Morley, Swinburne, Archer, Escott; in fiction, Lytton, C. Brontë, Disraeli, Dickens, Thackeray, 'G. Eliot,' Kingsley, Trollope, Reade, W. Collins, Black, Blackmore, Mrs. H. Ward, Stevenson, Caine, Hardy, Mallock, Meredith, C. Doyle, Buchanan, Miss Braddon, Burnand, &c.; in religion, Liddon, Martineau, &c.

Engra'ving (Gr. *en*, 'in,' and *graphō*, 'I write'), the art of inscribing figures, letters, or ornaments on surfaces of metal, wood, or stone. E. is usually practised either for ornamentation or for printing impressions from the incised lines. E. on stone, as distinct from lithography, belongs to the first class, and is known as sculpture or stone-carving, and ornamental E. on wood is termed wood-carving. The production of engravings on wood (woodcuts) for the transfer of impressions to paper is designated wood-E. Ornamental E. of metallic surfaces is called chasing. The term E. is principally applied to the art of engraving pictures on copper or steel plates. In the higher ranges of the art fine instinctive touch and pure artistic feeling are as necessary as technical or manipulative skill. Here, however, we have only to do with the technical aspect of E.

In printing from types, stereotype plates, or woodcuts, it is the elevated portions which receive the ink and transfer their impressions to paper; but with engraved copper or steel plates the case is exactly reversed, and it is into the incised lines or dots that the printing ink is placed, to be brought in contact with the paper by pressure. The breadth and depth of the incised lines, therefore, determine the boldness of the impression, and it is this circumstance that gives to copper or steel engravings their singularly fine delicacy of line and rare gradations of tone.

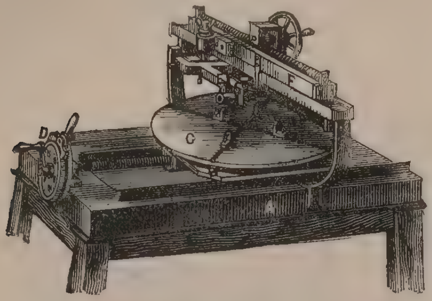
The tools and material used by the engraver are few. The chief are the set of *gravers*, short prisms of steel fitted into handles, and varying in the size of the point and in the form of the face from a square to a lozenge. The *etching-point* or *needle* is like a large sewing-needle fixed into a handle. Several of these are required, varying in thickness, some being oval-shaped to produce the broader lines. The *dry-point*, similar in shape to the etching-point, is used for more delicate lines, and differs in its effect from the graver by not taking the metal clean out, but throwing it up on each side. The *scraper* has three fluted sides, and is used to remove the barb left by the action of the graver, needles, or dry-point. The *rubber*, a roll of cloth dipped in oil, smooths the surface. The *burnisher* is employed to erase any scratches, to polish and soften any parts engraved or bitten in too dark. The engraver also uses a *bridge*, or thin board for raising his hand above the level of the plate, and a *blind* of tissue paper to direct light on the plate. The different styles of E. on metal plates are known as etching, line E., mezzotint, and aquatint.



Tools for Wood Engraving.

1, Elliptic; 2, Gouge; 3, Chisel; 4, Tint; 5, Lozenge; 6, Graver; 7, Tool for pine; 8, Tool in handle.

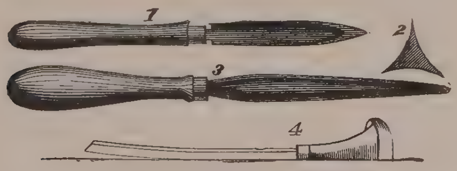
In etching, the plate of copper is first covered with a composition known as *etching-ground*, capable of resisting the action of aquafortis. It consists of black pitch, white wax, burgundy pitch, asphaltum, and gum mastic, mixed by firing. A pencil drawing of the subject on paper is then placed face down on the plate, and transferred by being passed through a press. The workman with his points or needles follows the lines of the drawing, removes the ground, and thus exposes the part of the plate covered by the drawing. A wall of wax is put round the plate, the acid is poured on and left till it has *bitten* deep enough, when it is washed off. Those parts which are corroded enough are covered with a *stopping ground* of lamp black and Venice turpentine, and the acid is again applied, this being repeated till the required depths are obtained. Steel plates, owing to their hardness, require a different biting agent, consisting of a mixture of pyroligneous and nitric acids and water, after the application of which the plate is carefully dried to prevent rust. In *line E.*, so called from the effect being produced by lines of different thicknesses running more or less parallel, the plate is first etched and afterwards finished with the graver, or it may be solely cut by the graver or dry-point. The former is the method usually employed now. Line E. produces the best work, and occupies the foremost place in the art of E. A ruling machine, which produces parallel lines with great rapidity, is frequently used, but its effects are inferior to those produced by handwork. *Mezzotint* differs considerably in appearance from any other style, and is not so difficult work as line E. The ground is carefully indented all over by an instrument called a *cradle*, having a serrated edge, the parts requiring lightness of shade being smoothed with the scraper and burnisher, those parts left untouched giving the deepest shades. Sometimes the design is first etched on the plate. In *stipple E.* the plate is first covered with the etching ground, and the design transferred in the usual way. The outline, instead of being drawn in lines, is put in by dots, wide or near, as light or dark shades are required; it is then bitten with the acid, and finished off with the graver. *Aquatint E.* is the most difficult of any of the styles, and is now superseded by lithography. The plate is covered with a ground of rosin held in solution by spirits of wine, which on drying leaves a granulated surface. The drawing being transferred, those parts requiring the highest lights are 'stopped out' before exposing the plate to the action of the acid, which eats through the granulated ground. This process is repeated as each portion becomes of the desired shade, as many as ten or more separate bites being sometimes required. On paper the aquatint, consisting of flat washes, is like a drawing in India-ink.



Ruling Machine.

A, Foundation; *B*, Bed plate; *C*, Revolving plate; *D*, Feed wheel and screw; *F*, Carriage; *G*, Wave roll.

Plate-printing is very simple. The plate is first slightly heated, and the ink rubbed in with a linen rag; the face is then cleansed, and the workman rubs off the surplus ink with his hands, which he first covers with whiting. This requires to be done with great care. Damped paper is placed on the plate and covered with blanketing; it is then passed between the cylinders of the press—being raised or lowered by means of a lever—which are turned by a large star handle. The first copies, termed *proofs*, are the finest impressions, as the rubbing of the plate tends to erase or smooth the lines. After a certain number are taken the plate requires to be re-cut. By a valuable process, termed *acierage*, an engraved copperplate may now be protected with steel. It was invented by Garnier, and introduced from France by Joubert. By means of electricity an infinitesimally thin skin of iron is deposited upon the copperplate, which may be removed and replaced by a new deposit. See the works of Georges (Par. 1862); Ottley (Lond. 1816); Passavant (Leipz. 1860-66); Bartsch (21 vols. Vienna, 1803-21); Bryan (Lond. 1858); Hamerton (1866).



Steel Engraver's Tools.

1, Scraper; 2, End view of Scraper; 3, Burnisher; 4, Burin.

Engravings, Copyright in.—The right of property in engravings is for twenty-eight years from the date of publication, which date, with the name of the artist, must be inscribed on the plate. A purchaser of an *original* plate may lawfully print from it. To photograph an engraving is an infringement of copyright. To possess an engraved plate for imitating the notes of any bank, or to print from it is felony.

Engross'ing (Fr. *engrossir*, 'to increase'), in law, is the purchasing of victual at a fair or market, or of corn in the field, with the view of reselling at an advanced price. E. was at one time criminal in England, under statutes repealed by 12 Geo. III. c. 71. It was then found that E. was an offence at common law; but statute 7 and 8 Vic. c. 24, called an act for abolishing the offences of forestalling, regrating, and E., and for repealing certain statutes passed in restraint of trade, did away with the offence of E. altogether; so that any person (provided he be otherwise permitted) may purchase anywhere commodities with a view to sell them again at a profit.

Enharmon'ic In'terval, in music, a small interval between a pair of notes which go by one name but which differ slightly with the key of the music. Thus suppose a note to vibrate 768 times per second, and to be the tonic of a piece of music, the supertonic, a whole tone above it, will vibrate $\frac{9}{8}$ times as fast, or 864 times per second. If, however, the given note be the Dominant (q.v.), the next note above it in the same scale, the superdominant, will vibrate only $\frac{10}{9}$ times as fast, or $853\cdot\dot{3}$ times per second. Upon such instruments as the piano these two notes are represented by one only, but with the human voice, the violin, &c., they can easily be distinguished. The interval between them—having in this case the vibration ratio $864 : 853\cdot\dot{3} = 81 : 80$, and being therefore equal to a Comma (q.v.)—is one of the most common examples of enharmonic intervals.

Enkhuiz'en ('Narrow houses'; in Lat. *Enchusa*), a decayed town of N. Holland, on the E. shore of the Zuider Zee, 20 miles E.N.E. of Alkmaar. It has a fine townhouse, a cannon foundry, and some shipbuilding, &c. E. was formerly a place of 40,000 inhabitants, with a large herring-fleet, but the silting up of the harbour led to its decline. Paul Potter was born here in 1625. E. was founded in the beginning of the 13th c. Pop. 6332.

Enlist'ment in the Army, Law Regarding. By the Army Enlistment Act of 1870 (slightly modified and re-enacted by the Army Act) no one can be enlisted as a soldier for longer than twelve years. The Act provides that enlistment shall be either for the whole of the said period in any service, or for a portion thereof, to be fixed from time to time by the Secretary of State, and specified in the attestation paper, in army service, and for the residue of the period in the first-class reserve force established in 1867. But it is provided that the Act of 1870 shall not interfere with her Majesty's power to enlist men for a shorter period than twelve years. The Secretary of State is empowered from time to time to make general or special regulations, varying the conditions of service, so as to permit a soldier who has served for not less than three years to enter the reserve force for the residue of his term of twelve years. The Act makes provision in case of imminent national danger or of great emergency. If an apprentice enlist, his master may recover him under the Army Act. Every recruit must appear before a magistrate and declare that he enlists willingly; this attestation was to prevent a man being entrapped or empressed, and dates from 1694. If he repent of his engagement with the recruiting officer and decline to become a soldier, he, having received no pay, cannot be arrested or compelled to pay smart money (£1) as used to be the case; but if he attest, and afterwards desire to get off his engagement, then he must pay £10 within three months of E. Servants enlisting before the expiration of their engagement may be held to be validly enlisted under the Army Act. Aliens may be enlisted, but only in the proportion of 1 to every 50 natural-born subjects (see Army Act). No alien so enlisted can become an officer. Natives on the W. coast of Africa and Lascars in the E. Indies may, however, be recruited in any reasonable numbers for services in the W. Indian regiments and E. Indian service respectively. Of course every naturalised British subject may be enlisted in the British army.

Enlistment, Naval, Law Regarding.—By 16 and 17 Vic. c. 69 the compulsory service of seamen extended to ten years; it has now been provided that service, after first joining or re-entrance, should be ten years in place of five; and by

47 and 48 Vic. c. 46 it is provided that boys of 18 should be entered for service for 12 years and those under 18 for no longer service than beyond their 30th year; after which they may re-enter. The new service is to be in accordance with the regulations of the Admiralty. The bounty has been abolished, except money for first clothes. The Act 22 and 23 Vic. c. 40 provides for a reserve volunteer service (not to exceed 30,000 men) of five years in time of emergency. This force may be trained for twenty-eight days each year on shore or on board, and may be required to join any ship the Admiralty think fit. The corps may be called to actual service by proclamation. By 26 and 27 Vic. c. 69 the Queen may accept offers of merchant masters, mates, or engineers to serve in the Royal Navy, subject to rules framed by the Admiralty, and officers of the reserve may be enrolled in the Royal Navy. Men called out for training receive pay; if disabled in service, they are entitled to allowances; and if killed, their widows receive pensions.

Enn'is (Gael. *inis* or *innis*, 'an island,' also 'a meadow girdled by a river'), the capital of County Clare, in the province of Munster, Ireland, on the Fergus, 25 miles N.W. of Limerick by railway. The chief buildings are the court-house, the endowed and national schools, an infirmary, and a public library. A colossal white limestone statue of O'Connell, by Cahill, was erected in 1863. The Fergus is crossed by four bridges. E. has flour-mills, breweries, distilleries, and an active trade in grain, cattle, and limestones. Pop. of township 5460.

Enniscorth'y, a town of Wexford county, in the province of Leinster, Ireland, on the Slaney, 27 miles S.S.W. of Arklow by railway. It has a splendid church, a factory for frieze, flannels, and blankets, a large distillery, and a river-trade in coal, corn, timber, &c. The two parts of the town are linked together by a stone bridge. E. grew up around the castle of the Anglo-Norman invader, Raymond le Gros, which is still almost entire. Pop. of township 5648.

Enniskill'en (Gael. *Inis-Cethlenn*, 'Cethlenn's island'), the capital of County Fermanagh, in the province of Ulster, Ireland, on the Erne, 75 miles W.S.W. of Belfast. It stands near the S. end of Lower Lough Erne, and has manufactures of linen, strawplait, cutlery, whisky, leather, &c., and a trade in coal, provisions, and timber. It was founded by Protestant settlers, and received a municipal charter in 1612. It supported the Protestant cause in 1689. Here the troops of William III., 1500 strong, gained a signal victory over the forces of James II., consisting of 6000 men, 30th July, 1689. The famous regiment of the 6th Dragoons ('Enniskilleners') was originally recruited at E. Pop. of mun. bor. 5570.

Enni'us, Quin'tus, the father of Roman epic poetry, fondly styled by his countrymen *noster Ennius*, was born at Rudiæ, in Calabria, B.C. 239. He claimed descent from the ancient lords of Messapia, and is said to have served with distinction as a soldier, and risen to the rank of centurion. Cato the Elder on his way home from the African war met E. at Sardinia and brought him to Rome. During the Ætolian campaign he accompanied M. Fulvius Nobilior, by whose son's influence he afterwards obtained the rights of a Roman citizen. E. maintained himself by teaching the Greek language to patrician families. He died of gout, B.C. 169. By the desire of Africanus he was buried in the tomb of the Scipios. E. wrote, in eighteen books, the *Annales* of Rome in hexameter verse, besides dramatic and satirical compositions. His style is necessarily rough, but the vigour of his verse won the admiration of Cicero, Horace, and Virgil. The works of E. are said to have existed as late as the 13th c., but only fragments now remain. Of the collections, the first is that by Robert and Henry Stephens (Par. 8vo, 1564); the best are those of Hessel (Amst. 1707), and Vahlen (Leipz. 1854).

Enns, a picturesque river of Austria, rises in the S.W. of Salzburg, in the Noric Alps, and flows S.E. by E., then N., entering Upper Austria (*Ober der Enns*), which for 15 miles it separates from Lower Austria (*Unter der Enns*), and eventually joins the Danube, 11 miles S.E. of Linz, after a course of 160 miles, in part navigable.

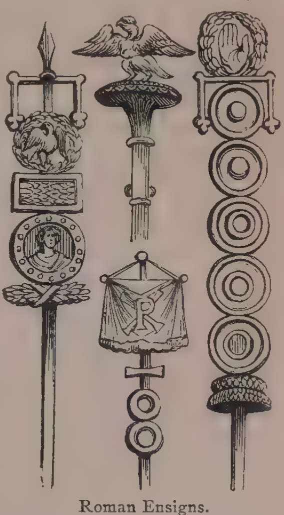
E'noch. 1. The eldest son of Cain.—2. The son of Jared, who 'walked with God: and he was not; for God took him,' at the age of 365 years (Gen. v. 18-24). This was understood by later Jews to mean that he was taken up to heaven without dying (Heb. xi. 5). Comparative mythology, however, professes to see in the history of E. an old myth about the year, which after 365 days is not. The name may be translated 'Renewal,' and his age, which is shorter than that of any of the other patriarchs, is exactly as many years as there are days in a solar year. This interpretation is curious, but not convincing.

Enoch, Book of, one of the principal of the Old Testament Apocryphal books, written, according to the best authorities, in Hebrew, wholly or in part, about a century before Christ, was widely circulated, and exercised a great influence during the first Christian centuries. From the time of Augustine (354-430), however, it was only known in fragments till 1773, when an Ethiopic version (probably made from the Greek version known to the early Fathers), in three MSS., was brought from Abyssinia by Bruce the traveller. The author gives elaborate descriptions of the world of spirits, of the future life, of the Sheol, with its different divisions, the place of the wicked and of the fallen angels, of the person and times of the Messiah. A great deal of the language of the New Testament—in Christ's discourses, the Epistles, and the Apocalypse, especially that describing the judgment of the last day—seems to have been derived from the B. of E. A translation was published by Archbishop Lawrence in 1821, as well as an edition of the Ethiopic text in 1838. The best edition is Dillmann's (1851). Among special works on the subject are those of Ewald (1854), and Philippi (1868).

En'sign (Fr. *enseigne*, Lat. *insigne*, 'a mark, or flag,' from *in* and *signum*), the generic name for a flag used as a signal, is specifically employed to designate the large flag that floats at the gaff of a ship when under sail, and above the poop when at anchor. Since 1864 all British ships of war carry the St. George's E., a white flag with a large red cross and a small union-jack in the left-hand upper quarter. The red E. with union-jack is used by transports, &c.; the blue in the merchant service.

Ensign, properly *E.-bearer*, was formerly a commissioned officer of the British army, called into existence for the discharge of a special office. The E. was the bearer and defender of the regimental colours; and when battles were decided by a series of hand-to-hand encounters, his office was one of honour and responsibility. The colours are now kept by the colour-sergeants. The junior subaltern rank is now that of 2nd-lieutenant instead of E.

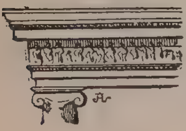
Ensign, a military standard, consisting of an upright staff surmounted by a device, peculiar to the nation or monarch to whom the ensign belonged. The Roman E. consisted of a pole with a metal eagle fixed to the top, while that of the Roman Empire after the time of Constantine, in place of the eagle, was decorated with some emblem of Christ.



Roman Ensigns.

Ensilage. Green herbage converted into fodder for animals by means of storage in pits. It is now being much used by stock-keepers, and is most wholesome for all kinds of animals, and valuable both as a milk-producer and meat-former. The method of formation is as follows:—The herbage is cut when in full bloom, and may consist of almost any green vegetable matter that is wholesome and nutritious for animals when green. The crops which make the best quality of ensilage are grass, clovers, rye-grass, vetches, maize, lucerne, trifolium, and oats. The two latter must be cut before they come into bloom. The herbage when cut is called *silage*, is carted at once to the pit or out-building where it is to be made—which is called a *silo*. It may be chopped into lengths of two or three inches long, or it may be put in unchopped. It matters not if it is stored wet or otherwise, but it is a *sine quâ non* that it is placed in the silo full of sap, without being withered by the sun or wind. The great point is to use sufficient pressure to keep out the air and regulate fermentation. As a rule, two hundredweights to the square foot is found sufficient. When the ensilage is taken from the silo, it is of a greenish-brown colour, and has a very strong smell, much resembling a newly emptied beer-cask. It is passing strange that, although the silo has been used in foreign lands by benighted nations from almost the beginning of time for preserving crops, it has been so long overlooked in Britain. The greatest advantage to the farmer in making ensilage is that he can defend himself against rainy and untoward seasons.

Entab′lature, in classical architecture, is the superstructure which lies horizontally (like a 'table'—from Fr. *table*) upon the columns, and which is divided into three sections—the *architrave*, which rests immediately upon the columns; the *frieze*, the intermediate space; and the *cornice*, the upper section. To each of the orders belongs a special E. of its own, the height and relative proportions of which are regulated according to a scale, the diameter of the column being the unit of measurement. Each of the divisions of the E. is in the different orders enriched with appropriate mouldings, facial, foliage, scroll-work, &c.



Entablature.

Enta′da, a genus of Leguminous plants, belonging to the *Mimoseæ*, or 'gum-arabic' group, and represented by the *E. scandens*, a climbing-plant of the W. Indies. These plants have pinnate leaves and large pods containing the seeds embedded in a glutinous substance. *E. pursætha* grows in the E. Indies, and its pods attain a length of from 4 to 5 feet long, containing beans or seeds of proportional size.

Entail′ (Fr. *tailler*, to 'prune'), a term in English and Scotch law. In the latter it is frequently called *tailzie*. By a deed of E. the legal course of succession to land is barred, and an arbitrary one substituted, the object being to preserve lands in one family, or in one portion of it. (See Donis, Statute de.) There are two kinds of entails—*general* and *special*. When lands are given to a man and the heirs of his body without restriction, this is called an estate tail general; but where there is a limitation to certain heirs, it is an estate tail special. There are also estates tail *male* and estates tail *female*. In the former the succession is limited to males, in the latter it is limited to females. Formerly tenants in tail in England used to evade the limitation by a process called a recovery (see Recoveries and Fines), but by the Act 3 and 4 Will. IV. c. 74 they can now make an effectual alienation by a deed enrolled in the Chancery Divisional Court. Under this statute an expectant tenant-in-tail may bar his own issue without the consent of the *protector of the settlement*, but an expectant tenant-in-tail in remainder requires that consent before he can bar either his own issue or those persons in remainder. And by 1 and 2 Vict. c. 110 an estate tail is rendered liable for the debts of the tenant; that is, the interest of the debtor in the property may be vested by the order of the court at once in the provisional assignee, but, of course, nothing can be done to the detriment of the expectant estate under a valid settlement. In Scotland various amendments of the law of E. were introduced by the Act of 1848, and subsequent amending Acts. By these Acts an heir of E. in possession is empowered to disentail an estate, in some cases without, and in some cases with, the consent of one or more of the substitute heirs. In entails dated on or after 1st August, 1848, an heir born *after* the E., being of full age, is entitled to execute a disentail under the authority of the court, without any consents. Born *before* the E., he may do so with the consent of the heir-apparent, which expression is defined by the Act to mean 'the heir who is next in succession to the heir in possession, and whose right of succession, if he survive, must take effect.' The heir-apparent, however, must have been born after the date of the E., and at the time of giving his consent must be twenty-five years of age, and of legal capacity. The Act of 1882 removed many of the restrictions on E. estates in Scotland. Under it, hardly any private land exists in Scotland at the present day which the owner for the time being cannot dispose of, should his title be any higher than a life-rent. It gives facilities for borrowing money for improvements, and empowers owners of estates to sell without the consent of the next heir, on obtaining a valuation of his interest in the estate, and paying the money into court.

Entell′us Monk′ey, a species of Catarrhine or Old World monkeys, distinguished by the last molar of the lower jaw possessing five tubercles. The E. M. is the 'sacred monkey' of the Hindus, and is protected by law.

Enter′ic Fever, commonly called **Ty′phoid Fever,** is one of the most fatal scourges of this country. It is a continued fever, associated with an eruption on the skin, occurring in crops, each spot continuing visible for about three days. The eruption occurs on the eighth or twelfth day, and varies much in degree. It is sometimes preceded by a very delicate scarlet tint of the whole skin, resembling the rash of scarlet fever, and consisting of slightly elevated papulæ, which may escape detection owing to the faintness of the colour, unless the skin be examined by passing the finger gently over its surface. The apices of the papulæ are invariably lens-shaped or rounded; they are circular and rose-coloured, and *they disappear completely on pressure*, and resume their characteristic appearance whenever the pressure is removed. The eruption is most common on the abdomen, thorax, and back. Each spot continues visible only for three or four days. This eruption, however slight, is absolutely diagnostic of E. F. The disease may be always recognised when there is *in the evening* a persistent elevation of temperature and a remission *in the morning*. In mild cases the disease continues at its height for a week or a week and a half; in severe cases it lasts from two weeks and a half to three weeks and a half. The period of abatement is irregular. The mean duration of E. F. is twenty-four days. The disease varies much in intensity, and is often accompanied by delirium from the first. E. F. ranks among infective diseases of a contagio-miasmatic character, the poison being a living organism, which, when transmitted from a diseased to a healthy individual, produces the same disease in the latter. By sanitary precautions, scrupulous cleanliness, the use of disinfectants, and the isolation of patients, the disease may be eradicated.

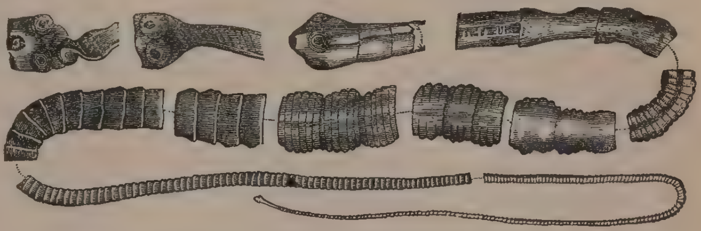
Enteri′tis, or **Inflamma′tion of the Bowels,** may attack the muscular or serous coats, and most frequently has its seat in the ileum. The chief seat of pain is the region of the umbilicus, or the right iliac fossa. E. is frequently confounded with cholera, a disease with which it has nothing in common, except abdominal pain and serous diarrhœa. E. may be caused by external injury, by poison, by irritating indigestible substances in the bowels, by cold, or by the action of other diseases, as enteric fever, cholera, dysentery, &c. When the causes are so diversified, no single mode of treatment can be indicated; but it is usually advantageous to administer a purgative of castor-oil, with an opiate for an adult, and to apply fomentations or turpentine stupes over the abdomen. The diet should consist entirely of arrowroot, sago, tapioca, gruel, barley-water, milk, and occasionally beef-tea. E. is a common disease amongst cattle, and should be treated on the same general principles. Aloes, or any purgative of an irritating nature, should never be given, but only oil and large clysters.

Entomol'ogy (Gr. *entomon*, 'an insect,' *logos*, 'a discourse'), the department of zoology devoted to the investigation of the habits, structure, and classification of Insects (q.v.). The special cultivation of E. was characteristic of a past era in zoology. The labours of naturalists are now limited not to the mere collecting and naming of species, but extend to the study of structure and development and of the relations of one species to another. The entomologist of the past was a mere collector of insect species. The entomologist of the present is a thorough general zoologist with a special aptitude for the investigation of the organization of the insect class. The study of the insect world necessarily becomes most attractive in view of the many uses which insects serve in the economy of nature, such as the fertilisation of flowers and the removal of decaying matter. But no less do the phenomena of Metamorphosis (q.v.), and of insect structure generally, offer subjects of the highest interest to the zoologist. The special study of E. dates from about the 17th c. Ray, Leeuwenhoek, and Swammerdam are the chief representative writers of this date on insects, and Linnæus also did much to promote the study. Latreille was an earnest investigator in E., whilst the famous writings of Kirby, Spence, and Newport bring us to more modern times. The Entomological Society of London devotes itself exclusively to the study of insects.

Entomos'traca (Gr. *entomon*, 'an insect,' and *ostrakon*, 'a shell'), a division of *Crustacea* represented by such forms as water-fleas (*Cyclops*, *Daphnia*, &c.) and other related organisms. The E., in modern acceptation, are aquatic animals, and possess a horny shell or carapace of one or more pieces. The gills are attached to the feet or jaws, and the limbs are jointed and provided with *setæ* or bristles. E. exhibit *ecdysis*, or moulting of their shells. The typical E. belong to the orders *Cladocera*, *Copepoda*, and *Ostracoda*. The latter group includes the common water-flea of fresh waters, which possesses a bivalve shell. The orders of E., which appear to possess a less evident relationship with the commoner forms, are the *Phyllopoda* or brine-shrimps, *Trilobita* or trilobites, and the *Merostomata* (soldier or king crabs), &c. The fossil species of E., chiefly forms belonging to the *Ostracoda*, &c., appear first in Silurian rocks. The Carboniferous rocks contain plenty of E.; and species still living are found in Mesozoic and Kainozoic strata, as *Cypris*, *Cythere*, and *Bairdia*.

En'tophytes (Gr. *entophuta*, from *entos*, 'within,' and *phuton*, 'a plant'), a name given to plants growing parasitically on animals—chiefly lower Fungi (q.v.) and Algæ (q.v.). Diseases of various kinds may be produced by the growth of vegetable parasites. Many caterpillars are infested by fungoid growths which kill these larvæ; and in *man* fungi appear to be the chief, if not the sole, causes of such skin and scalp affections as ringworm, &c. The term E. is also applied to plants which are parasitic on other plants, but it is used vaguely in botany. Many of the so-called E. are capable of producing serious disease in their plant-neighbours. Thus wheat is attacked by a low form of plant life named the *Uredo caries*, which attacks and wastes the wheat grains. Smut or dust-brand in corn is produced by the *Uredo segetum*, which destroys the inner parts of the flower. Another fungus (*U. rubigo*) produces disease in corn and grasses. The well-known Ergot (q.v.) of rye, wheat, and barley is supposed to result from the attack of a special fungus. The potato disease, through the researches of Worthington Smith and others, appears to be caused by a fungus (*Peronospora infestans*), the filaments of which emerge from the *stomata* or breathing-pores of the leaves, and produce seeds, which in their turn burrow into the leaves and perpetuate the disease.

Entozo'a (Gr. *entos*, 'within,' and *zōon*, 'an animal'), a term given to such animals as live parasitically in the interior of other animals. It was formerly used in a zoological sense, but is now discarded because of the heterogeneous assemblage of forms which this name brought together. As used in a general sense—the only way indeed in which the term E. can be used—this name indicates such animals as the tapeworms, flukes, roundworms, threadworms, and other animal organisms which reside permanently or temporarily within the body of man or of other animals. The most common habitat of E. is the digestive system. The tapeworms infest this system in their mature state, as also do the round and thread worms. They are also frequently found in the muscular system. While immature, many of the tapeworms in the form of cystic worms or *Scolices* select the muscular system as a resting-place. Some of these cystic forms inhabit the brain, liver, and other organs. The presence of an immature *Tænia* in the brain of the sheep produces 'Staggers' (q.v.), while the larval forms of another tapeworm in the liver of man produces the serious lesion known as *hydatids*. The common fluke has its seat in the liver of sheep, and causes the 'rot' of veterinarians. Certain peculiar forms of E. named *Hæmatozoa* occur in the blood of man and other animals; and, although still a matter of doubt, *Bacteria* and *Vibriones* may also be included as E., since they appear plentifully in morbid as well as healthy tissues. The great majority of E. belong to the class *Scolecida*, one of the divisions of the *Echinozoa* or *Annuloida*. Some insects, such as the larvæ of the bot-flies, are parasitic in horses and other animals during the earlier stages of their existence, and afterwards escape from the digestive systems, to pass in the ground their pupa or chrysalis stage. Some remarkable instances of *pseudo-parasitism*, named *commensalism*, have been related—fishes living in the stomachs of sea-anemones and of sea-cucumbers, and passing freely in and out of the bodies of their hosts. Certain pea-crabs are only known as parasites within molluscs, such as mussels, and sea-squirts or Ascidians. A pea-crab an inch long has been taken from the interior of a mussel-shell, and the same crabs have been seen to emerge from the bodies of sea-squirts in aquaria to seek for food, and again re-enter. Such animals are truly E. The history and development of E. bear an important relation to public health, since these parasites are capable of causing serious disease. (See TRICHINIASIS.) Preventive measures are examination of food and attention to cooking.



Common Tapeworm, with different views of the head.

Entr'act, a short piece of music between the acts of a play.

En'tre Dou'ro e Min'ho, or **Minho**, a maritime province in the N.E. of Portugal, lies between the rivers Minho and Douro, as its name implies, and is bounded W. by the Atlantic, and E. by Traz oz Montes and by the Spanish province of Orense. It includes the districts of Braga, Porto, and Vianna do Castello. It is famed alike for the rich beauty of its scenery, and for its rare fertility. In the E. it is entered by three hill ranges, which reach their greatest height in Monte Cavarra (7880 feet). Along the coast there is a fine stretch of undulating cultivated country. The chief rivers, besides those that form the N. and S. boundaries, are the Limia, Cavado, Ave, Neiva, and the Tamega, an affluent of the Douro. Among the productions are wine, oil, flax, maize, wheat, barley, oats, and Southern fruits. The province is noted for the excellence and quantity of its port-wines. Braga is the capital, and the chief towns are Guimarães, Caminha, Vianna do Castello, and Pavoa de Varzim. Oporto, included in Beira, is the principal harbour and place of trade. Area, 2807 sq. miles; pop. 1,091,936.

En'tre Ri'os (Sp. 'between rivers'), a state in the E. of the Argentine Republic, bounded W. and S. by the Paraña, E. by the Uruguay, and N. by the state Corrientes. It is intersected from N. to S. by a range of hills, but the plains are swampy, and are exposed to yearly floods. The chief occupations are cattle-rearing and hunting, and the exports comprise hides, horns, tallow, &c. The chief town is Concepcion. Area, 45,000 sq. miles; pop. 296,447.

Entro'pium (Gr. *en*, 'in,' and *trepō*, 'I turn'), a turning in of the eyelashes or eyelids against the eyeball, causing much irritation, and often inflammation of the cornea. Relief may be obtained by plucking out the cilia with the forceps, but a surgical operation is generally necessary.

En'try, Right of, a term of English law signifying the right of one who has been wrongfully ousted from land or from a tenement, through abatement, intrusion, or disseisin. No. R. of E. exists where a discontinuance or deforcement has taken place; for in either case the owner cannot enter, the previous entry being lawful; the owner is therefore compelled to bring his action. The entry, where a R. of E. does exist, is accomplished by a formal and peaceable entry upon the property, or part of it where the whole consists of separate portions in different districts of the *same* county, and by a declaration of the party entering that he takes possession. Under the Real Property Limitation Act of 1874, the action must be commenced within twelve years after the plaintiff became possessed of the R. of E. The limit used to be twenty years.

Entry of an Heir. In Scotch feudal law this term is applied to the recognition of the heir of a Vassal (q.v.) by the Superior (q.v.). On the death of the vassal the *Dominium Utile* (q.v.) returns to the superior, to be again given to the heir. The superior, however, is bound to grant a warrant for infefting (see INFEFTMENT) the heir pointed out by the charter in virtue of which the *dominium utile* is held by the superior.

Enure', a term of English law signifying to take place or to be available.

En'velope (Fr. *envelopper*, 'to wrap up,' formed from a root *velōp*, whose origin is unknown), a cover for letters or papers which has only come into common use since the introduction of the uniform charge for postage (1840). The consumption of envelopes is now prodigious. In his report for the year ending 31st March, 1895, the Postmaster-General estimates that the number of *letters* delivered in the United Kingdom alone was 1,770,900,000, or an average of 45·6 to each person. This estimate is quite apart from the numbers of postcards, circulars, and samples. Many ingenious machines have been devised for automatically performing the operations of cutting, folding, and gumming envelopes. In cutting out the blank shapes waste is avoided by using angular cutters or a cutting die on a pile of paper. The folding, embossing, and gumming are done by girls or machines. The most perfect E.-making machines are those of De la Rue, Poirier & Antoine, of Paris, and G. W. Reay, of New York, the latter performing all the operations of picking up single blanks, creasing, gumming, folding, and delivering, and requiring but one attendant.

En'voy (Fr. *envoyer*, 'to send,' from Lat. *in* and *via*, 'a way'), a person despatched on a mission, a diplomatic minister of the second order. E. extraordinary and minister plenipotentiary is the chief foreign representative of the United States. See EMBASSY.

E'ocene (Gr. *eōs*, 'dawn,' and *kainos*, 'recent'), the name given by Lyell to the series of strata at the base of the Tertiary formations, which contains among its fossils not more than 5 per cent. of existing species. It is subdivided into three great groups. 1. *The Lower E.*, forming the London basin, rests in apparent conformability upon the chalk, and comprises (*a*) the *Thanet Beds*, light-coloured quartzose sands; (*b*) the *Woolwich* and *Reading Beds*, a mixture of sands and clay; (*c*) *London Clay*, chiefly a dark-coloured clay containing nodules of ironstone. 2. *The Middle E.* consists of (*a*) the *Bagshot Beds*, light-coloured sands and marly clay; (*b*) the *Headon Series*, two groups of calcareous fresh-water deposits, separated by sandy strata of marine origin; (*c*) the *Osborne Series*, shelly sandstone and yellow limestone below, and light-coloured sands, clays, and marls above. 3. *The Upper E.* is divided into (*a*) the *Bembridge Beds*, pale-yellow limestone, capped by an oyster-bed and several beds of clays and marls; and (*b*) the *Hempstead Series*, dark, white, and coloured marls and clays. In the Brussels and Paris basins a very similar series of beds is found, and large masses of rocks belonging to the Middle E. are met with from the Alps along the Mediterranean shores, through Egypt to the Himalayas. In America there are two contemporaneous series, the Lignitic and the Alabama—the former furnishing a passage from the chalk to the true E. The traces of life in E. are of a tropical nature. The flora is especially rich in America, comprising cinnamon, fig, and melon trees, gourds, palms, conifers, &c. Among the fauna there is a large development of Gasteropods. Reptiles, such as turtles, crocodiles, snakes, are plentiful, and among mammals the *Pachydermata* are typical fossils. The more important divisions of the E. are treated under separate articles.

E'olis, or **Œ'olis,** a genus of Gasteropodous mollusca, of the family *Œolidæ*, section *Nudibranchiata*. They have no shell, the gills being on the sides of the body. They are found on our coasts, crawling over the stones at low-water mark like slugs, are usually of bright colour, and have the sides provided with flexible processes.

Eon de Beaumont. See D'EON, CHEVALIER.

Eötvös, Jozef, an illustrious Hungarian author, born in Buda, 3rd September, 1813, studied for the bar at Buda Pesth, after giving up all his means to pay his father's debts. Entering the public service, he at the same time cultivated literature with success. Dramatic writings, such as *The Critics*, a comedy, were followed by *The Carthusian* (1838-41), a sentimental philosophical novel. Several political essays on prison reform, Irish pauperism, and emancipation of the Jews, were the fruit of a tour through Europe. But the works of imagination by which E. is most endeared to his country and best known abroad are *The Village Notary* (Eng. trans. by Wenchstern, 1850), in which he ridicules the county institutions of Hungary; and *Hungary in* 1514, a story of the great peasant insurrection, the moral of which was that the nobles should surrender their feudal privileges in peace. E. ranged himself with the Centralist party of Deak and Batthyanyi, Von Pulsky and Kossuth. He wrote in the *Pesti Hirlap* in favour of equal taxation, &c. In 1848 he became Minister of Education under Batthyanyi; but conscious of practical incapacity, and perhaps afraid of the revolution, he retired to literary life in Munich, where he published a work on modern political ideas, a subtile pamphlet on the rights of nationalities. On the publication of the *Diploma* of 1860 and the *Patent* of 1861, E. once more cooperated with Deak in securing the Dual Constitution, which has given self-government and political strength to Hungary. In 1867 he became Minister of Education and Public Worship, and had to encounter very delicate problems of religion and language. He died 3rd February, 1871.

E'ozoön Canaden'se ('Dawn-of-Life Animalcule'), a most interesting organism, supposed to have been a large reef-building species of *Foraminifera*, the fossil remains of which occur in the Laurentian rocks of Canada and in contemporaneous strata in Europe. The E. derives its interest from its being the oldest known fossil of any kind, and, secondly, from the doubt which has been cast upon its fossil nature. The organic character of E. is denied by many palæontologists. Dr. Carpenter of London and Principal Dawson of Montreal —the discoverer of the E.—accumulated, however, such a mass of evidence in favour of the truly fossil nature of the E., derived from a study of existing *Foraminifera*, that the balance of probability is very greatly in favour of the E. being a true fossil organism. The E. consists of a series of chambers lying in tiers one above another. These chambers were occupied by the *sarcode*, a living matter seen in existing *Foraminifera*. Certain living members of the latter group (*Polytrema* and *Carpenteria*) grow in reef-like masses, and hence the reef-like nature and growth of the E. is further established. See Dawson's *Dawn of Life*.

Epacrida′ceæ (Gr. *epi*, 'upon,' and *akros*, 'the top'), a natural order of Exogenous plants in the sub-class *Corolliflora*, mostly natives of Australia, the Indian Archipelago, and the S. Sea Islands. They are shrubs or small trees, and are chiefly notable for their fine heath-like flowers, on account of which they are frequently cultivated in greenhouses. There are 31 genera and about 320 species, the principal one being the *Epacris*. The corolla is generally tubular; the fruit an edible berry or a capsule. The fruit of *Lissanthe sapida* is known as the *Australian cranberry*.

E′pacts (Gr. *epaktos*, 'additional'), were a set of numbers substituted for the golden numbers of the ecclesiastical calendar when Lilius carried out the reforms of Gregory XIII. in 1582. The golden numbers (marked with red letters) indicated the position of any particular year in the cycle of nineteen solar years, in which the difference of the solar and the lunar year is cancelled by the insertion of six intercalary months of thirty days, and the addition of one month of twenty-nine days. This cycle is supposed to begin with the 1st of January when the moon is new; and as this occurred in the year before the Christian era, the rule for ascertaining the golden number is:—Add 1 to the date, divide the sum by 19; the quotient is the number of cycles elapsed, and the remainder is the golden number. As, however, the lunar cycle was 1 hr. 29 min. longer than the actual length of 235 lunations, the new moons gradually began to anticipate the golden numbers at the rate of one day in 308 years. After Gregory corrected the excess of the Julian year, the system of golden numbers became unsuitable to the reformed calendar, and the epact was introduced to denote the age of the moon at the beginning of each year of the cycle of nineteen. This increases each year by the difference of the solar and lunar years, viz., eleven days; but every three years the epact is reduced by the thirty days of the intercalary month, except in the first year of the next cycle, when the twenty-nine days of the seventh additional month must be deducted. The E. are therefore 11, 22, 3, 14, 25, 6, 17, 28, 9, 20, 1, 12, 23, 4, 15, 26, 7, 18, 29. The solar equation, however, requires the diminution of the E. by one day three times in 400 years; while the lunar equation requires their increase by one day every 308 years. To avoid confusion, this latter correction is effected in a period of 2500 years, *i.e.*, once in 300 years for seven periods, and then at the end of 400 years. The two equations cancelled each other in the year 1800. A perpetual calendar requires thirty sets of E. In the Church calendar the epact 30 is represented by an asterisk, and epact 25 by an Arabic character, the others being in Roman numerals. If the golden number of a year be above 11, the epact 25 for six months of the year answers to the same day in the calendar as 26; otherwise, to 24. See CALENDAR.

Epaminon′das, the illustrious Theban soldier and statesman, was born towards the close of the 5th c. B.C., of a poor but noble family. In youth he displayed high intellectual aspirations, which were strengthened by his intercourse with several philosophers, especially Lysis the Pythagorean. E. remained in private life till 379, when he took part with his friend Pelopidas in the revolution by which Thebes was freed from the Spartan yoke. In 371 he represented Thebes in the general peace congress at Sparta, and opposed the ascendency of the latter with such spirit that Thebes was excluded from the treaty. Cleombrotus was dispatched against the Thebans, whom he encountered at Leuctra, 371, but his army was completely beaten by the skill of E., and the prestige of Sparta destroyed. In 369 E. and Pelopidas invaded the Peloponnesus, ravaged the country, threatened Sparta, founded Messene and Megalopolis, and restored the power of the Messenians, who had been most active enemies of Sparta. The victorious generals returned to Thebes to be impeached for retaining the command four months longer than the legal term, but were acquitted. In 368 E. made a brief inroad into the Peloponnesus, in which he took Sicyon and Pellene. In 366, after the 'tearless battle' in which the Spartans defeated the Arcadians, he returned thither, and without changing the existing oligarchies, accepted the Achaian cities as allies of Thebes; but the Thebans reversed his policy. In the same year E., serving as a private soldier, saved the Theban army sent into Thessaly to rescue Pelopidas, and afterwards, at the head of a second army, secured his friend's release. In 363 E. sailed to the coast of Asia with the fleet which the Thebans had equipped against Athens; and on his return from this fruitless expedition, he learned that Orchomenus had been destroyed, and that Pelopidas had been slain in Thessaly. The political complications of the Peloponnesus rendered Theban intervention again necessary, and in 362 E. invaded it for the fourth time. He attacked the enemy near Mantineia, and by renewing the tactics of Leuctra gained a complete victory, though he himself was mortally wounded. The surgeons declared that he must die as soon as the spear-head was withdrawn from his breast. They assured him that his shield was safe, and that Thebes was victorious; but when he learned that the commanders who should have succeeded him were slain, he said, 'You must make peace.' The spear-head was then withdrawn.

Epaule′ment (Fr. *épaule*, 'shoulder;' Old Fr. *espaule* and *espalle*, from the Lat. *spatula*, used by Apicius) is the shoulder-like 'flanking return' or terminal portion of a battery or earthwork. Its object is to secure men and guns against a flank fire or Enfilade (q.v.). The shoulder of a bastion placed at the point where one of the faces and one of the flanks of a fortified work meet is called an *épaule*.

Ep′aulette, a distinctive ornament worn upon the shoulder by naval and military officers. It is a relic of the plates that were introduced in the 14th c. as a defence for the shoulder from sword-cuts. The E. has not been worn in the British Army since 1855, but still forms part of the full-dress uniform in the Navy.

Epée, Charles Michel de l', born at Versailles, 25th November, 1712, became an abbé, but had to leave the Church on account of Jansenist opinions. He devoted himself to the education of deaf-mutes, and erected an institution for that purpose at his own expense (1760-65). He died 23rd December, 1789. The Constituent Assembly gave effect to E.'s request for a public institution in 1791. E.'s writings all relate to his method, embodied in *La Véritable Manière d'Instruire les Sourds et Muets* (Par. 1784). His *Dictionary of Signs* was continued by his successor, Abbé Sicard. Sicard also extended to syntax the system of signs which he had applied only to nomenclature.

Epei′ra, a genus of spiders (*Arachnida*) forming the type of a family, *Epeiridæ*, in which the jaws are widened from the base. The eight ocelli or eyes are arranged in a quadrangular fashion, and the skin is soft. The common garden spider, or cross spider, is a good example of this genus, as also is the two-horned spider. The former makes the well-known geometrical web, and is distinguished by the triple cross-marking on its abdomen. The females greatly exceed the males in size.

Eper′ïes, or **Eperjes** (Lat. *Eperesinum*, Hung. *Preschov*), the chief town of Sáros, Hungary, is picturesquely situated on the left bank of the Tarcza, 148 miles N.E. of Buda Pesth. It is walled, is the seat of a bishop, has six churches, a Lutheran college, manufactures of stoneware, linen, and cloth, and a trade with Poland in cattle, linen, and Tokay wine. Near E. is a royal salt-mine. E. was founded by King Geysa II. in the middle of the 12th c. Pop. 10,371.

Éper′nay (Lat. *Aquæ Perennes*), the chief town of the department of Marne, France, on the left bank of the Marne, here crossed by a bridge of seven arches, 20½ miles W.N.W. of Châlons, and on the railway from Paris to Strasburg. It is the centre of the Champagne wine trade, and has vaults cut in the soft tufa capable of containing 5,000,000 bottles. There are also potteries, wool-spinning mills, tanneries, brandy distilleries, and a trade in wine flasks, stoppers, &c. Pop. of commune 18,361; and of arrond. 99,067.

Ephah, a Hebrew measure of capacity, = 27·83 pints, or 3 English pecks and 3 pints.

Ephe'lis (Gr. 'a sun-freckle'), is the scientific name for sun-burn. E. can be removed when recent by an emulsion of bitter almonds with spirits of wine, or the benzoated oxide of zinc, beaten into a cream with orange or elder-flower water, and when chronic by a lotion of bichloride of mercury, or nitro-muriatic acid.

Ephem'era (Gr. 'for a day'), a genus of Neuropterous insects, including those forms popularly known as 'day-flies' and 'May-flies.' Many are really born in the morning, only to be scorched by the heat of the noonday sun, the evening finding them dead in countless numbers. The family *Ephemeridæ* is distinguished by the five-jointed tarsi and by the large front wings. The abdomen has three appendages, and the head of the larva possesses a 'horn.' These insects undergo an incomplete metamorphosis, the larvæ inhabiting water. One species, the 'May-fly,' is familiar in our ponds and streams. The metamorphosis may take more than a year. The body is slender and the wings long. The pupa casts off its skin, leaving it attached to water-weeds, and flies into the air as the perfect form or *imago*. Vast numbers of these insects appear suddenly in some localities. They are much used as bait by anglers.

Ephem'era, or **Feb'ris Dia'ria,** is a mild febrile attack having a slight local cause, and lasting no longer than a single day.

Ephem'eris (Gr. 'a diary'), an astronomical table giving beforehand the positions of a heavenly body. Ephemerides of the sun, moon, planets, and stars are calculated and published annually; those of periodic comets are usually given when they are approaching their perihelia. The *Nautical Almanac*, the French *Connaissance des Temps*, and the German *Jahrbuch* are publications of this nature, and are invaluable to the mariner and traveller as a means of fixing longitude.

Ephe'sians, Epistle to the, according to the unanimous tradition of the Church, was written by the Apostle Paul to the Church he had founded at Ephesus. External evidence is very strong that it was addressed, as stated in chap. i. 1, 'to the saints at Ephesus;' a number of particulars in the epistle, on the other hand, have forced some critics to the conclusion that it was not written by Paul. The difficulty of Paul having written it to the Ephesians may have given rise to the omission from some MSS. of 'which are at Ephesus,' and to the substitution in some of 'to the Laodiceans.' Those who hold the Pauline authorship suppose it to have been written from Rome during the apostle's captivity (Acts xxviii.), about the same time as those to the Colossians, Philippians, and Philemon were written (or about A.D. 62). According to some, it was written from Cæsarea (Acts xxiv.-xxvi.). See Davidson's *Introduction to the New Testament*.

Eph'esus, the chief of the twelve Ionian cities on the coast of Asia Minor, said to have been founded by Androclus, son of Codrus, at the Ionian migration, stood at the mouth of the river Cayster, in a marshy plain, bounded on E. and S. by the two hills Prion or Lepre and Coressus. The buildings of the city were partly on these two hills and partly on the plain about the harbour—a lake communicating with the Cayster, the mouth of which formed the outer harbour (Panormus). To the N.E. of the city was the celebrated Temple of Diana. This magnificent building, reared in the 6th c. B.C. by the contributions of all the Greek cities of Asia Minor, in place of the original temple, was destroyed by fire on the night Alexander the Great was born, 13th October, B.C. 356. It was restored by the joint efforts of all the Ionian states, was regarded as one of the wonders of the world, had the privileges of a sanctuary, and was again destroyed by the Goths. Nothing now remains but some traces of its foundations. The ruins of several other large buildings are to be seen, besides the foundations of the walls of the city. E. fell successively under the sway of Crœsus, the Persians, Macedonians, and Romans, the last of whom made it the capital of the province of Asia; and from its easy access to the interior and its excellent harbours, it became the chief emporium for trade and the greatest city in Asia Minor. E. was emphatically a sacred city, both from its heathen temple, the rebuilding of which was an epoch in architecture, as then the Ionic order was perfected, and also from its connection with Christianity. Several episodes in St. Paul's life are associated with it (Acts of Apostles). According to Eusebius, St. John also spent the last years of his life here.

Eph'od (Heb. from *aphad*, 'to gird on'), was a vestment worn by the priests among the Israelites when they consulted the Deity or practised divination. It consisted of two parts—one covering the breast and the other the back—fastened to each other on the shoulders by two jewels, on which were engraven the names of the twelve tribes—six on each; and further confined by a girdle passing round the middle. According to Rationalistic critics, the right of wearing the E. and using the Urim and Thummim (q.v.), *i.e.*, of giving oracles, belonged, in the earlier stage of the Israelitish religion, to the priests in general (1 Sam. ii. 18, 28, &c.). Hence Israelites who instituted for their families a religious service of their own, with a priest attached, were said 'to make an E.' (Judges viii. 27; xvii. 5). It was the later priestly legislation (they affirm), reduced to its present form after the Captivity, which assigned the E. and the oracular power to the high priest alone, and by introducing such passages as Exod. xxv. 7; xxviii. 4, *seq.*; xxix. 5; xxxv. 9, 27; xxxix. 2, *seq.*; Lev. viii. 7, produced a manifest anachronism, since they are irreconcilable with such passages as 1 Sam. ii. 18, 28; xxii. 18; 2 Sam. vi. 14; 1 Chron. xv. 27; Deut. xxxiii. 8. But the orthodox school of critics meet the difficulty by supposing that there were *two* kinds of E. in use at the same time, one for the ordinary priest and one for the high priest.

Eph'ori (Gr. *ephoraō*, 'I oversee'), a directory of five men in the Spartan government, at first intended to be a check on the kings, but who gradually won the entire control of the state. The E. were said to have been instituted by Lycurgus, but were more probably appointed at a later period. They were chosen from the people, and held office for a year.

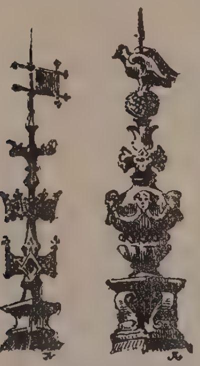
Eph'raem Sy'rus ('Ephraim the Syrian'), an ecclesiastical writer, was born probably at Nisibis, and was educated by the bishop of that place, whom he accompanied to the Council of Nice (325). After Nisibis was ceded to the Persians (363) he settled at Edessa, where he became a deacon in (some say abbot of) a monastery, and remained till his death in 378. He was a most ardent devotee of monachism, and a prolific writer against idolaters, Jews, and heretics of all kinds—Arians, Sabellians, Novatians, Manichæans, Gnostics, Marcionites, &c.; he wrote also commentaries on most of the books of the Old Testament (except the Psalms and Book of Proverbs), sermons, hymns, &c. All his writings—which were so popular that they were read in church along with the Holy Scriptures, and got their author the name of the 'Prophet of the Syrians,' 'Column of the Church,' 'Harp of the Holy City,' &c.—were in Syriac. Those said to have been originally written by him in Greek are partly versions of the original Syriac and partly spurious. They were translated into Greek, Latin, Slavonic, and Armenian. The best edition appeared at Rome (vols. i.-iii. Gr. and Lat., vols. iv.-vi. Syr. and Lat., 1732-46), edited by the Maronite Petrus Benedict and Stephan Evodius Assemani. As an interpreter of Scripture E. adopted a highly allegorical style, often artificial and extravagant. This spiritualising exposition was probably adopted in opposition to the Marcionites, who endeavoured to bring the Old Testament into antagonism with the New by adherence to a grossly literal, unfigurative interpretation.

The name of E. S. is associated with one of the most ancient and valuable extant MSS. of the Bible—Codex C., No. 9, in the Imperial Library at Paris—which contains portions of the LXX. and fragments of every part of the New Testament. The original writing was almost entirely removed about the 12th c. to make room for some of the writings of E. S. in Greek, but has been to a certain extent restored by means of chemicals. Brought from the East to Florence in the 16th c., it came to Paris with Catharine de'

Médici, and was published by Tischendorf in 1843-45. See Assemani in *Biblioth. Orient. Vatic.*, and Mosheim's *Church Hist.*

Eph'raim was the younger of the two sons of Joseph, and was counted, like his brother Manasseh, along with his uncles, the sons of Jacob, as one of the twelve patriarchs. The tribe numbered 40,500 at the first census (Num. i.), at the second (Num. xxvi.), 32,500. Its territory lay in the centre of the land of Canaan, and after the separation under Jeroboam, E. was the leading tribe in the kingdom of Israel; indeed it might be said that the history of the latter is neither more nor less than the history of E.

Ép'i, in architecture, is an ornament of glazed earth or lead which is sometimes placed on the summit of pointed roofs. During the 13th and 14th centuries earthenware épis were used, but afterwards those made of enamelled faïence. In the 15th c. to the É. was added a capital richly decorated with foliage and surmounted by a vase of graceful form. Above this was placed a fir cone, a basket of flowers, or a bird poised on a globe. Lead had become the popular metal, and continued so till recent times, when on the ground of economy zinc superseded it. See *Art Dictionary.*


Epi of the 15th c.

Epichar'mus, a Dorian of Cos, according to Plato 'the prince of comedians,' was born about 540 B.C. E. is said to have studied philosophy under Pythagoras. He resided for a time at Megara in Sicily, and subsequently at the court of Hiero. He gave a new form to the early comedy by freeing it from some, at least, of its buffoonery, and by introducing a regular plot. The titles of thirty-five of his comedies are known. They are generally on mythological subjects. The *Menæchmi* of Plautus is said to have been founded on a comedy of E. Krurmann has edited the extant fragments of E.'s writings (Haarl. 1834).

Epicoroll'æ, or **Epipetal'æ,** a division of Exogenous plants forming one of the subdivisions of *Corolliforæ*, and characterized by the stamens being inserted on the corolla. To this group the natural orders *Gentianaceæ*, *Convolvulaceæ*, *Solanaceæ*, *Labiatæ*, *Primulaceæ*, &c., belong.

Epic Poetry (Gr. *epos*, 'a discourse'). An epic is a long narrative poem dealing generally with heroic or superhuman persons and events, with romantic or supernatural exploits and adventures. It is distinguished from the narrative poem by greater dignity of style, cohesion of plot, and symmetry of structure; from the drama, in which the author never speaks in his own person; from the lyric, by its great length, and by making the narration of action rather than the expression of emotion its predominant feature.

The three great classical epics are Homer's *Iliad* and *Odyssey*, the former relating the siege of Troy, the latter recounting the wanderings of Odysseus, and Virgil's *Æneid*, on the voyages of the Trojan Æneas and his conquest of Italy, an elaborate glorification of the Augustan age of Rome. The *Niebelungen Lied* is the great Teutonic epic, in which we dimly trace historic persons and events of the 5th c. Its author is unknown; it seems to have been composed between the 7th and 11th centuries. A still older product of the Teutonic muse is the *Tale of Beowulf* (q.v.), which may be regarded as the epic of the Old English peoples. The *Shah Nameh* of the Persian poet Firdusi (937-1020); the *Lusiad* of the Portuguese Camoens (1524-79), on the voyage of Vasco da Gama to India; the *Gerusalemme Liberata* of Tasso (1544-95), on the siege of Jerusalem in the First Crusade, are also famous specimens of the epic; but the *Divina Commedia* of Dante (1265-1321) and the *Paradise Lost* of Milton (1608-1674) are the only two which challenge comparison with the Grecian masterpieces. Besides the great regular epics, there are collections of epic legends, such as Hesiod's *Theogony*, the Norse *Edda* and *Heldenbuch*, the Indian *Mahabhârata*, and the Spanish *Romancero*. The historical epic adheres closer to fact than the heroic; of this class the *Punica* of Silius Italicus is an unfavourable, and the *Brus* of Barbour an admirable, example. The *Orlando Furioso* of Ariosto (1474-1533) holds an intermediate place between the stately serious epic and the mock-heroic or humourous epic, which is represented by the *Battle of the Frogs and Mice*, ascribed to Homer, Pulci's *Morgante Maggiore*, the old German poem *Reynard the Fox*, Butler's *Hudibras*, Boileau's *Lutrin*, Pope's *Rape of the Lock*.

Among the innumerable unsuccessful epics of ancient and modern times may be mentioned the *Argonautica* of Apollonius Rhodius, Lucan's *Pharsalia*, the *Thebaid* of Statius, Lope de Vega's *Circe*, Ercilla's *Araucana*, Ronsard's *Franciad*, Davenant's *Gondibert*, Voltaire's *Henriade*, Klopstock's *Messiah*, Wieland's *Oberon*, and Southey's *Madoc*. Landor's *Gebir*, though wanting in epical length, is epical in structure and style.

Epicte'tus, a philosopher of the Stoic school, was born at Hierapolis, in Phrygia, and flourished towards the close of the 1st c. E. taught first at Rome, but when Domitian banished the philosophers, he retired to Nicopolis in Epirus. The teaching of E. is preserved in the four that remain of the eight books of Commentaries by his pupil Arrian, the historian, and in the *Encheiridion* ('handbook'), compiled from his discourses, by the same writer. E. taught 'that the beginning of philosophy is the perception of one's own inability to do what is needful; that only what is within our choice is good or evil; that nothing external can control our choice; that our choice is determined by our reason; that our resemblance to God consists in our acting according to reason; and that we ought to invoke God's assistance.' It is not wonderful that E. has been considered a Christian, and, though this cannot be established, there can be no doubt that in important respects 'he approaches the Christian doctrine more closely than any of the earlier Stoics.' An excellent edition of E. is that of Schweighaüser (Leipz. 1800).

Epicu'rus, a famous philosopher of antiquity, was born at Samos or Gargettus, near Athens, about 342 B.C. His father was a teacher of grammar. When only eighteen, E. visited Athens; subsequently he went to Athens, Colophon, Lampsacus, and Mitylene. In 302 he opened a school at Athens, where he remained till his death in 272. The famous 'Garden' soon became a dangerous rival of the Porch, the Grove, the Lyceum, and the Cynosarges. Though severely libelled by the Stoics and their admirers, E. seems to have been a virtuous and amiable man. He gave his guests at the Garden barley cakes and fresh water. Philosophy he regarded, not as the instrument of absolute truth, but as the art of reaching happiness. Like Aristippus, he said happiness consisted in pleasure; but the most permanent, the least hurtful, are the pleasures of the mind: virtuous habit and the supremacy of reason are necessary to happiness. As regards the body, the chief thing is to be contented with a little of the simplest; the felt want of luxuries is a great torment. Ignorance, the great obstacle to happiness, is either of the external world or of human nature. To these two kinds of ignorance the *Physica* and the *Canonica*, or Logic, are respectively applied. The former—described in Diogenes Laertius and discussed by Seneca and Cicero (*De Fin.*)—was based on the atoms of Democritus, whose emanations produced sensations. The atoms were subject to physical laws and not to the caprice of the gods. E. added to the theory of Democritus the hypothesis that each atom in its downward course slightly deflected from a right line, and thus became capable of collision and combination. In sensation itself E. admitted there was neither truth nor falsehood; but *prolepsis*, or conception formed by repeated sensation, made possible knowledge, or the classification of the sources of pain and pleasure. Of E.'s 300 works, only three letters are preserved, and some passages of a work on nature, found at Herculaneum. His school was continued by Hermachus, Polystratus, Dionysius, Basilides, till the age of Augustus. Among Romans, Lucretius, Horace, and Lucian are his chief followers. In modern Europe the system was revived by Gassendi (1590-1655), who wrote a life of E. and a treatise on the philosophy, and adopted by Rochefoucault, Fontenelle, Voltaire, and others. All his disciples, however, do not adopt his views with regard to the fear of death and the fear of the gods, both of which he said were groundless, the soul being simply a compound of air, vapour, and heat, and the gods not being actively interested in human fate. E. also dwelt on the reciprocal advantages implied in justice and friendship. Community of goods, he said, implied mistrust. See Ritter and Preller, *Hist. Phil.*; Bain, *Mental and Moral Science*; and Zeller on *Stoics and Epicureans*.

Ep′icycle (Gr. *epi*, 'upon,' *kuklos*, 'a circle'). When the early astronomers, having fixed the earth in the centre of the universe, and given to all celestial bodies what they deemed the most perfect of motions, viz., circular motion, came to compare their system with the true facts of observation, they were necessarily astonished at the great discrepancies which existed. Ptolemy (q.v.) was especially perplexed at the retrogressions and other irregularities of the planets, and to meet this difficulty devised what he termed *epicycles*. The planets were supposed to move in circles, whose centres moved uniformly in a larger circle round the earth. Each planet he found required a different-sized E.; and though his system was extremely cumbrous, especially when viewed in the light of the Newtonian system, it was undoubtedly ingenious. See PTOLEMAIC SYSTEM.

Epicy′cloid is the curve described by a point in the circumference of a circle which is rolling on the outer circumference of a fixed circle. If the rolling take place *inside* the fixed circle, the curve described is called a *hypocycloid*. When the tracing point is not in the circumference, the corresponding curves are known as *epitrochoids* and *hypotrochoids*. If the rolling circle be equal to the fixed circle, the E. becomes the *cardioid*. A hypotrochoid of two circles whose radii are as 1 : 2 is an ellipse, whose eccentricity increases as the tracing point is moved nearer the circumference of the rolling circle, the hypocycloid ultimately produced being a straight line—a diameter of the fixed circle. The E. is of practical importance as being that form for the teeth of a toothed wheel which reduces friction to a minimum.

Epidam′nus. See DURAZZO.

Epidaur′us (originally called *Epicarus*, from its supposed colonisation at first by Carians), a town in Argolis, on the Eastern coast of the Peloponnesus. During the historical period it was in the possession of the Dorians. After passing through the phases of a monarchy, an oligarchy, and a tyranny, E. finally reverted to an oligarchy. It was at an early period an important commercial city, and its famous temple of Æsculapius drew invalids from all quarters. The sacred enclosure, in which the temple stood, is to this day called *Hieron* ('the sanctuary'). E. had also temples to Athena, Artemis, Dionysus, Aphrodite, and Hera; and a magnificent theatre 370 feet in diameter, capable of containing 12,000 spectators. E. colonised the islands of Cos, Calydnus, and Nisyrus. Ægina, another of its colonies, in time almost drained the commerce of the parent city. Its famous temple, however, was still rich in gifts when L. Æmilius Paulus visited it in 167 B.C., after the conquest of Macedonia; but by the ravages of Sulla it was swept of all its votive offerings in common with many other shrines. E. was celebrated for its vines and its breed of horses. The ancient name still survives in the modern *Pidavro*.

Epidem′ic Diseases (Gr. *epi*, 'upon,' and *dēmos*, 'the people') are chiefly distinguished by the circumstance that they attack a number of people in one place simultaneously. They travel from place to place, and break out with great violence, more especially in populous centres, and they may become extinct in a locality to reappear after many years. The best-known E. D. are cholera, smallpox, measles, scarlet fever, dengue, typhoid and typhus fevers, yellow fever, and diphtheria. Various theories have been propounded regarding the mode of propagation; but it is now generally admitted that all E. D. are communicable, and that each has its own mode of propagation. They are consequently preventable diseases. See separate articles on the various diseases.

Epidemic Mental Diseases. Popular excitements, so denominated, have nothing in common with epidemic diseases, except in so far as numbers of people are similarly affected at about the same time. Public enthusiasm is never allowed to lie long dormant, and one excitement follows another in rapid succession; but although the weaker class of mind is more liable to be affected, and may be completely upset, this does not constitute a disease. In epidemic diseases the specific poison results in the same specific disease, and in no other; whereas in so-called E. M. D. the result lacks this uniformity. Particular crimes, and modes of crime, frequently prevail; but disease is not necessary to explain the phenomena. There is, however, some influence, apart altogether from human communication, by which numbers of people may be affected simultaneously, and which may be called E. M. D. This is best seen in large communities of the insane, where similar delusions and propensities simultaneously affect numbers of the patients who have had no communication with each other. The best-known E. M. D. are St. Vitus's dance, wolf-madness, demonomania, incendiarism, suicide, and panic. See the *Psychological Journal*, and the works of Calmiel and Hecker.

Epider′mis (Gr. *epi*, 'upon,' *derma*, 'the skin'), or **Ec′teron** (the 'outer,' *i.e.*, skin), the name given to the outer and upper layer of the skin in higher animals The E. in man is composed of layers of flat or squamous *epithelial cells*, the deeper cells being elongated, and having their long axes arranged vertically to the skin-surface, whilst the more superficial cells are of flattened shape and lie lengthwise. The deepest layer of the E. is named the *rete mucosum*, and it is in this latter layer that pigment or colouring matter is deposited. The growth of the E. is effected from below, new layers of cells being produced to take the place of those that are gradually lost or worn away by friction, ablution, &c. The deeper cells become more or less scaly and horny as they approach the surface, and lose the more typical character of the deeper cells. The thickness of the E. varies greatly in different regions of the body. Thus on the soles of the feet and palms of the hands the E. is very thick and horny. In such situations, the thickness of the E. prevents evaporation from the true skin or *dermis* beneath. The E. is frequently named the *cuticle*. It is not sensitive, possessing no blood-vessels or nerves. In lower vertebrates, such as serpents, &c., the E. is periodically exuviated or cast off. In *plants*, the name E. is given to the delicate cellular tissue or *parenchyma* which forms the outer covering of leaves and of other parts of plants. The E. of plants is made up of flattened cells, often provided with hairs. The lower E. of leaves is perforated by numerous openings or *stomata*, the respiratory or breathing apertures of the leaves. Occasionally the E. of plants becomes hardened by the deposit of woody matter in the walls of the cells of which this membrane is composed.

Ep′idote, a mineral forming monoclinic crystals, with a varying green, brown, or grey colour, hardness between felspar and quartz, and specific gravity about 3·5. E. proper consists of a combination of silica, alumina, iron oxide, and lime; but by substitution of magnesia, lime, &c., for proportions of the iron, several varieties are formed. It has no economic application. The name was derived by Haüy from the Gr. *epididōmi*, 'I increase,' in allusion to the fact that the base of the primary is often much enlarged in the crystals.

Epigen′esis (Gr. *epi*, 'upon,' and *genesis*, 'a beginning' or 'new formation'), a name given in physiology to a theory which held that all new substances in living beings, and even living organisms themselves, were formed of or upon previously existent parts or substances, new organisms being formed by a modification of the old.

Epiglott′is (Gr. *epi*, 'upon,' and *glōttis*, 'the mouth of the windpipe'), a cartilage of an ovate shape, covered by mucous membrane, placed in front of the superior opening of the larynx, and immediately behind the base of the tongue. See LARYNX.

Epig'oni (Gr. *Epigonoi*, 'the afterborn'), the term used in mythic story to denote the sons of the seven heroes—Adrastus, Polynices, Tydeus, Capaneus, Parthenopæus, Amphiaraus, and Hippomedon—who, with the exception of the first named, perished in the war against Thebes. To avenge the death of their fathers, the E., ten years thereafter, under the leadership of Alcmæon, who had collected a band of Argives, marched against Thebes. The Thebans, under Laodamas, were routed near Glissas in Bœotia, while Ægialeus, on the side of the E., was slain. Thebes was at last taken by the E., and levelled with the ground. The common list of the E. contains Ægialeus, Alcmæon, Diomedes, Euryalus, Promachus, Sthenelus, and Thersander. The war of the E. was the subject of many epic and tragic poems, not one of which has survived.

Epi'gram (Gr. *epi*, 'upon,' and *gramma*, 'a writing'), literally an inscription. The Greek E. was a short poem, mostly in elegiac verse, containing a statement of a single event or thought. Simplicity, rarely point, is its characteristic. The Greek anthology contains about 4500 epigrams by about 300 authors. Among the Romans the E. often took a satirical character. Of the many Latin epigrammatists, whose names have been preserved, Catullus and Martial are incomparably the best. The latter wrote about 1500 epigrams, and might be styled an epigrammatist by profession. The modern E. generally ranges from two to eight lines in length, and contains a witty or ingenious turn of thought pointedly expressed. Pope, Swift, Burns, Byron, Moore, and many other English writers, have evinced great epigrammatic talent, but among the moderns the French in E. stand pre-eminent.

Ep'igraph (Gr. *epi*, 'upon,' and '*graphō*, 'I write') is the name given to an inscription on a public building or other architectural structure, telling its object, use, or period of construction. In literature it is applied to a quotation or sentence placed as a motto at the beginning of a book, part, or chapter.

Epilep'sy (Gr. *epi*, 'upon,' *lambanō*, 'I seize,' future *lēpsomai*), popularly termed 'falling sickness,' is a complex nervous disease characterised by a sudden and complete loss of consciousness, associated with convulsions, which impede the respiratory process. The epileptic state may vary from simple vertigo, momentary loss of consciousness, and a totter of step, to the most severe convulsive paroxysms. E. was known by the ancients, and was made the foundation of the doctrine of demoniacal possession in the Jewish, Grecian, and Roman philosophy. The attack is sometimes preceded by a premonitory symptom called *aura epileptica*, in which the patient has the sensation of a fluid creeping from the fingers or toes upwards towards the trunk, or as though a spider or insect were crawling over the skin. Some have slight vertigo or headache, swelling of the veins, or throbbing of the arteries of the head, and others have illusions of one or other of the special senses. In general there is immediate loss of consciousness; the patient utters a loud cry, falls down in convulsions, which may be trifling and transient, or terrific and long-continued struggles. Each patient generally falls in a definite position, and injures by the fall one part of the body, as the nose, or side of the head; and some invariably protrude the tongue, which may be bitten through, or much injured by the spasmodic clenching of the teeth. Death may take place during the fit; but the great danger is from the position occupied when the fit comes on; thus the patient may fall from a height, or into the fire, or water, or on some sharp-cutting instrument, or the fit may come on during the act of swallowing and cause suffocation. Attacks of E. vary in frequency of occurrence, and there is often a very definite periodicity. In severe cases the attacks may be daily, or several times daily; but, in other instances, considerable intervals may elapse. In asylum practice the experienced physician can frequently prognosticate, from slight appearances, that an attack is impending. E. is common among congenital idiots, and is of frequent occurrence among the insane, as a cause or a coincident, and the two diseases are intimately associated. E. is an hereditary disease. It may pass from parent to child, or it may skip over a generation or two. The originating causes of E. are but imperfectly known, although physiologists have of late years made great advances in the study of its etiology. *Post-mortem* examinations throw but little light on the disease. The seat of E. is most probably in the brain, the medulla oblongata, or upper portion of the spinal cord. In most epileptics there is probably an hereditary or a latent tendency, and in some the disease may originate *de novo* from causes which are usually called exciting. In the former class of cases, apparently slight causes, such as functional derangements, interruptions in the circulation which may cause congestion of the brain, may give rise to an attack. The proper treatment during the fit is to place the patient flat on his back, with the head and shoulders a little elevated. The neck-tie and tight-fitting clothes should be loosened, and he should be exposed to a free current of air. Beyond preventing self-injury, no effort should be made to restrain the convulsive movements, nor to rouse by cold water and stimuli. Epileptics should make their health a constant study, as the slightest derangement or excess of any kind may bring on a seizure. They should never expose themselves in any dangerous position. Hygienic treatment is of more avail than any of the specifics that have been recommended, such as nitrate of silver, iodide and bromide of potassium, valerian, zinc, &c. The disease is not curable by any known specifics, nor is it often cured spontaneously. When associated with organic disease of the brain it is incurable; but in very many cases the frequency of the attacks and their severity may be lessened, or they may altogether disappear, by very careful attention to the laws of health, and the avoidance of excesses of every kind. E. must never be confounded with Fainting, Apoplexy, Hysteria, Catalepsy, Eclampsia, or Infantile Convulsions, &c.

Epilo'bium, or **'Willow Herb,'** a genus of Exogenous plants belonging to the order *Onagraceæ*. These plants have four sepals and four petals, a four-sided seed-capsule, and seeds provided with hairs at one extremity. The long pod-like ovary is adherent to the tube of the calyx, the petals and stamens being epigynous. Species of E. are found both in temperate and cold climates. The British species occur in damp situations. One species, known as 'French willow,' has dissimilar petals and rose-coloured flowers. It is common in shrubberies. The pith of E. is used in Kamchatka for making a kind of ale and vinegar.

Ep'ilogue (Gr. *epi*, 'after,' and *logos*, 'a speech'), in oratory, means the peroration or summing up of a discourse. In theatrical language, it is a short speech in prose or verse at the end of a play. The E. was much in vogue in former times, especially in the case of comedies; and was apologetic, conciliatory, or even rollicking in tone, its object being to acknowledge the indulgence, win the sympathies, and excite the good humour of the audience.

Epimen'ides, a poet and prophet born at Phæstus in Crete. While yet a boy, being sent for a sheep by his father, he entered a cave, and fell into a sleep which lasted fifty-seven years. On awaking he was astonished to find all around him changed. The Greeks looked on him as a favourite of the gods; and the Athenians, whom he delivered in 596 B.C. from the plague that followed Cylon's sacrilege, greatly honoured him. He is said to have attained a very old age, one legend assigning him a lifetime of 299 years. When or where he died is uncertain. By some E. was reckoned—instead of Periander—one of the seven sages of Greece, but he seems rather to have belonged to the class of Orphic bards. Besides other works, two epics—one on Jason and the Argonauts, the other on Minos and Rhadamanthus—are said to have been written by him. E. is supposed to be the prophet alluded to by St. Paul in his Epistle to Titus (i. 12).

E'pinal (Eng. 'Thornton;' Fr. *épine*, Lat. *spina*, 'a thorn'), the capital of the department of Vosges, France, on the left bank of the Moselle, beautifully situated at the foot of the Vosges, 35 miles S.S.E. of Nancy by railway. It lies in a valley, 1120 feet above the sea, and has fine promenades, quays, fountains, public baths, the ruins of an old castle, a church (St. Maurice) of the 10th c., a small university, a public library of 22,500 volumes, a hospital, an art gallery, schools for music and drawing, and a theatre. The Moselle is here crossed by an iron suspension-bridge and by several stone bridges. There are manufactures of edge-tools, chemicals, machinery, paper, lace, &c., and a trade in wine, ironwares, linen, and cattle. About 6 miles S.E., on the Moselle, are the famous paper-mills of Archettes. Pop. of commune 23,223; and of arrond. 109,738.

Épinay, Louise Florence Pétrouille de la Live d', a French authoress, born about 1725. She was the daughter of an officer, Tardieu d'Esclavelles, and in 1735 married her cousin D'Épinay. The union was unhappy, D'Épinay neglecting his wife, of whom Grimm professed himself the lover. Afterwards Madame d'É. formed a warm attachment for J. J. Rousseau, for whom she caused the famous hermitage to be built in the valley of Montmorency, near her country-seat of La Chevrette. Rousseau, however, becoming jealous of Grimm, quarrelled with Madame d'É., and in his *Confessions* assailed her and the *Encyclopédistes*, with whom she was familiar. During her last years Madame d'É. lived in retirement, consorting chiefly with men of letters, and composing memoirs, &c. She died 17th April, 1783. Her chief work, *Mémoires et Correspondance de Mme. d'É.* (Par. 1818), is a full, accurate, and vivid picture of 18th c. manners. See Sainte-Beuve's *Causeries du Lundi*.

Epipha'nius was born in Palestine about A.D. 320, of Jewish parents. Converted to Christianity at an early age, he went to Egypt, and joined the monks there. He afterwards returned to Palestine, and founded a monastery near his native place (Eleutheropolis). In 367 he was made Archbishop of Constantia (Salamis) in Cyprus, and died in 403. E. was learned in one sense, being acquainted with Hebrew, Syriac, Greek, Latin, and Egyptian, but at the same time extremely ignorant and credulous, not to say dishonest; but was nevertheless pious after his fashion, though extremely bigoted and dogmatic. His chief work is entitled *Panarion*, a discourse against (eighty) heresies. See his Life by Gervasius, 1738; his works were edited by Petavius (Par. 1622), and by W. Dindorf (Leipz. 1859-63).

Epiph'any (Gr. *epiphaneia*, 'the appearance of a deity to aid a worshipper') means in ecclesiastical usage the manifestation of Christ to the Gentiles. It is observed on the 6th January, twelve days after Christmas (hence called Twelfth Night), and now commemorates specially the guiding of the three magi to Bethlehem by the star (hence called also the Festival of the Three Kings), but originally also his nativity or incarnation, and the manifestation of his divinity at his baptism (Theophany), in his first miracle at Cana (Bethphany), and in that of feeding the 5000 men (Phagiphany). Formerly many lights were used at the festival, ostensibly in reference to Christ as the light of the world (John i. 9; Luke i. 78, 79), but in reality adapted by the Church from pagan ceremonies like those of Christmas and St. John's Day. See Bingham's *Eccl. Ants.*, and Walcott's *Sacred Archæology*.

Epiphe'gus, a genus of *Orobanchaceæ*, the 'broom-rape' order of Exogenous plants, of which *E. Virginiana*, 'the beech-drops' of N. America, is a familiar species. The root of this species is used as an application to cancerous affections, and has hence received the name of 'cancer-root.'

Epiph'ora is a disease of the secreting lachrymal organs, commonly called 'watery-eye.' E. must be distinguished from watery eye caused by obstruction in the lachrymal duct, and may be cured by vapour of laudanum or belladonna, or a solution of nitrate of silver, from two to four grains to the ounce.

Epiphy'tes (Gr. *epi*, 'upon,' and *phuton*, 'a plant'), plants which grow in the air attached to the stems and parts of other plants. Tropical orchids are examples, the roots not reaching the soil. They are of green colour, and possess *stomata*. The roots often possess hairs. Species of *Pothos* and *Tillandsia* are typical E. Many common plants, such as mosses and lichens, might, strictly speaking, be named E., but the name is rather given to higher or Phanerogamous plants which appear to select abnormal habitats, and to become somewhat parasitic in their habits. E. generally tend to injure the plants upon which they grow.

Epi'rus (Gr. *ēpeiros*, 'the mainland'), so called in contradistinction to the islands on the coast, was the name given to the north-western division of ancient Greece. It was bounded on the N. by Illyricum, on the E. by Macedonia and Thessaly, on the S. by the Ambracian Gulf, and on the W. by the Ionian Sea. In ancient times it was sparsely peopled, but contained a great number of tribes, chief of which were the Chaones, Thesproti, Molossi, and Athamanes. The inhabitants were a mixture of Pelasgians, Macedonians, and Illyrians. The country was mountainous, and produced excellent cattle and horses, and the renowned breed of Molossian dogs. The chief rivers were the Achelous, Arachthus, Celydnus, Thyamis, Acheron, Cocytus, and Charadrus. Its most ancient town was Dodona, famous for its oracle of Zeus; others of note were Ambracia, the capital of Pyrrhus, and Nicopolis, founded by Augustus to commemorate the victory of Actium. One of the earliest kings of E. was Pyrrhus or Neoptolemus, son of Achilles, the reputed founder of the Molossian line. In historical times its most famous ruler was Pyrrhus (B.C. 295-272), who harassed Rome for a long period. On the death of Ptolemy, grandson of Pyrrhus, E. became a republic, and remained so till the conquest of Macedonia by the Romans, B.C. 168. The Epirotes being accused of assisting Perseus, King of Macedonia, L. Æmilius Paulus, by order of the Roman Senate, razed seventy of their towns to the ground, and sold 150,000 of the inhabitants as slaves. From this blow E. never recovered. It followed the fortunes of the Roman and Byzantine empires till 1204, when a new dynasty, known as the *Despots* of Albania, was founded by a member of the Byzantine family of Comnenus. E. remained under this rule till 1466, when it was annexed to the Ottoman Empire. In 1881 a strip of territory east of the river Arta was ceded to Greece, and is now known as the nomarchy of Arta. The remainder of E. is part of the Turkish vilayet of Janina.

Epis'copacy (from the Gr. *episkopos*, 'a bishop') is that form of Church government in which there are several orders of clergy, those of one of the orders (the bishops) superintending the others—the presbyters, deacons, &c. Episcopalians hold E. to be essentially 'the dignity of a bishop,' which is the fulness of the priesthood and is comprehended in the apostolic office, and to be an apostolic and therefore divine institution, existing from the very first organization of the Church. From the same point of view E. has an indelible character, and possesses a threefold power—of *order* in the ministration of the sacraments, of *interior jurisdiction* in the conscience, and of *exterior jurisdiction* in the Church. Presbyterians, on the other hand, maintaining that E. came into existence as a later hierarchical development, hold the complete parity in respect of office and authority of all the clergy. The Roman Catholic, Greek, Lutheran, and Anglican (including the American and Scotch) are all Episcopal Churches. See BISHOP, and Blunt's *Dict. of Doctr. and Hist. Theology*.

Episco'pius, in Dutch **Bisschop, Simon**, a celebrated Arminian divine of the 17th c., was born at Amsterdam, 1st January, 1583, studied at Leyden, where he heard both Gomar and Arminius lecture, and at Franeker, where he heard Drusius. Joining the anti-Calvinist party (which was then in a minority), he obtained a church near Rotterdam, and in 1611 was chosen one of the committee of six Arminians sent to meet the Counter-remonstrants before the States-General. In 1612 he was appointed successor to Gomar at Leyden, though the Remonstrant feeling against him was so strong that his brother's house at Amsterdam was sacked. E. not only repudiated 'election,' and taught the universal offer of salvation, but generally depreciated the value of pure dogma, bringing into prominence the ethical and emotional aspects of religion. Even to the doctrine of the Trinity he endeavoured to assign a practical importance. Toleration, which is involved in the idea of human brotherhood, seemed to him a leading duty, and in this he was supported by Grotius and Barneveld, and the Republican party in civil matters generally. When Maurice of Orange, wishing to strengthen Calvinism for political purposes, called the Synod of Dordrecht (1618), E. made a noble but unavailing stand for free speech. He then withdrew to Antwerp and Rouen, but on Maurice's death resumed preaching at Rotterdam, and finally, in 1634, became Rector of the Arminian College at Amsterdam, where he died 4th April, 1643. E. is the great expositor of Arminianism. Among English divines Hammond and Tillotson owe much to him. His most important works are the *Confessio Remonstrantium* (1621), *Apologia pro Confessione* (1629), and the unfinished *Institutiones Theologicæ*. A complete edition of his works was published at Amsterdam in 1650-65.

Epi'sode (Gr. *epi*, 'besides,' and *eisodos*, 'a place of entrance, an entry'), an incidental narrative introduced by writers to give variety to their subject. In epic and didactic poetry the E., if fitly chosen and skilfully introduced, affords a pleasant relief to the reader. The stories of Hector and Andromache in the Iliad, of Aristæus and his bees in the Georgics, of Dido in the Æneid, of Ariadne in the *Peleus and Thetis* of Catullus, of Francesco da Rimini in Dante's *Inferno*, of Pastorella in Spenser's *Faery Queene*, of Damon and Musidora in Thomson's *Seasons*, of Margaret in Wordsworth's *Excursion*, and of Glaucus in Keats' *Endymion*, are familiar examples of the E. in ancient and modern poetry.

Epispas'tics. See COUNTER-IRRITANTS.

Epistax'is, or bleeding from the nose, is very common in children and young people, and usually depends on congestion of the mucous membrane. Cold applications to the forehead and bridge of the nose, with a brisk purgative, generally arrest E. In severe cases it may be necessary to plug the nose with a pledget of lint, or a sponge soaked in some astringent, as muriate of iron. When E. is copious, caused by the rupture of a vessel from violence, it may be necessary to plug both the posterior and anterior nares, but this can only be done by a surgeon.

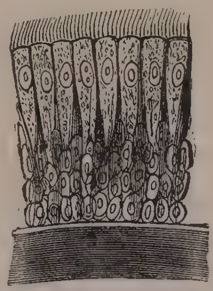
Epis'tle, in the New Testament, means a letter written by an apostle to an individual or a Church; in the Liturgy, the first lesson in the Communion Service, so called because generally taken from the apostolic epistles (hence the term 'apostle' also used), though sometimes also from the Acts, and even from the Old Testament prophets. See LESSONS.

Epistle Side of the Altar is the left or S. side, on which the Reader (q.v.) stands to read the Epistle (q.v.) in the Communion Service of the Church.

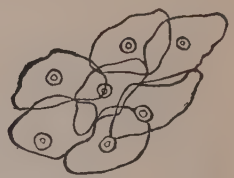
Ep'itaph (Lat. *epitaphium*, Gr. *epi*, 'upon,' and *taphos*, 'a tomb'), at first the name of a monument above a grave, now signifies an inscription on a tomb. The Greeks placed an inscription only on the tomb of a hero, but the Romans wrote epitaphs (generally beginning *Sta Viator*) on the tombs of their relatives. In England epitaphs in Latin are found written by the Romanised Britons, but the first Latin epitaphs written by Englishmen appear in the 11th c. From the end of the 12th to the middle of the 14th c. epitaphs are mostly in French, after which English is frequently used. Early Christian epitaphs are visible in the catacombs at Rome. Epitaphs form part of the literature of most countries, and large collections of them have been made, containing many fine examples of pathos, wit, and solemn brevity of expression. See Labbe's *Thesaurus Epitaphiorum* (Par. 1666), the *Anthologia Græca*, and Pettigrew's *Chronicles of the Tombs*, in Bohn's Antiquarian Library.

Epithala'mium (Gr. *epithalamion*), properly a song sung in chorus before the bridal chamber (*thalamos*), but now commonly applied to any nuptial song. Among the Greeks, Alcman, Stesichorus, Sappho, Anacreon, Pindar, and others wrote epithalamia, of which only scattered lines remain. The eighteenth idyl of Theocritus, in which twelve Spartan maidens sing the praises of Menelaus and Helen, is the most perfect specimen of the E. proper which we possess. The two nuptial songs of Catullus, and the E. of Peleus and Thetis by the same poet, are exquisite examples, and stand alone in Latin literature. In the *Medea* of Seneca we have the E. of Jason and Creusa, in Statius that of Stella and Violantella, in Claudian that of Honorius and Maria, but these cannot be compared with the hymeneals of Catullus. The E. was a favourite subject with the modern Latin poets. One by George Buchanan on Francis II. and Mary Stuart is remarkable for grandeur of thought and pomp of style. The E. of Spenser is one of the glories of English literature, and may safely be pronounced the paragon of all poems of its kind. Ben Jonson and Herrick, in their epithalamia, are largely indebted to Catullus.

Epithe'lium, a primary tissue of higher animals, composed of cells termed *epithelial* cells. This membrane is formed in the embryo from the *hypoblast*, or innermost of the three layers into which the *blastoderm* or *germinal membrane* divides. It is seen typically as the lining membrane to the digestive system, and as forming the lining of Glands (q.v.) and their ducts. The cells of which E. is composed form a continuous layer. They are *nucleated*, that is, possess central particles or *nuclei*. The outer skin is also formed of epithelial cells (see EPIDERMIS), so that this layer in reality forms both the outer and inner lining of the body. Four chief varieties of E. are found. The commonest, called *squamous*, *pavement*, or *tesselated* E., is seen in the skin, mouth, pharynx, gullet, conjunctiva of the eye, &c., and is formed of flat, oval, or polygonal nucleated cells, arranged in one or more layers. Such cells are also found in the serous sacs of the body, such as the pleura, &c., and in the blood-vessels. The *spheroidal* epithelial cells have a rounded outline, and E. formed of the latter is found as a lining membrane of glands. Hence it is also known as *glandular* E. The *cylindrical* E. is formed of cylindrical or *columnar* cells. This variety lines the stomach and intestine and the ducts of most glands. It also occurs in the gall-bladder, &c. Each cylindrical epithelial cell is packed closely amongst its neighbours, and has a flat nucleus with contained *nucleoli*. The last variety of epithelial cells is known as *ciliated* E., these cells being provided on their free extremities with delicate processes named *Cilia* (q.v.), which keep up a constant vibriatile motion, and thus aid in the diffusion and circulation of fluids, &c. These ciliated epithelial cells are found in the windpipe, larynx, Fallopian tubes, spinal cord, &c. The functions of E. are chiefly to protect the surfaces of the body, secrete fluids, and circulate fluid matters by aid of the cilia. E. contains both blood-vessels and lymphatic vessels. Its cells grow by absorption of nutritive matters from the blood, and new growths are continually taking place from beneath, to replace those cells that are worn away above.



Cylindrical Epithelium.



Cells of Pavement Epithelium.

Epizo'a (Gr. *epi*, 'upon,' and *zōon*, 'an animal'), a term applied generally to those animals which exist parasitically on the outer surfaces of others. This classification, like the use of the term Entozoa (q.v.), is founded upon no natural grounds, and is not used with any specific meaning in modern zoology. The chief E. are lice, fleas, bugs, bird-lice, &c., and certain *Acarina* or mites, such as the *Demodex folliculorum*, inhabiting the skin follicles of the human nose, may also be included under this name. The ticks and the itch-mite, causing the disease of that name in man, also belong to this group of parasites. The itch-mite, demodex, and their allies actually live within the skin substance; the lice, fleas, and commoner E. living upon the skin surface only. Bird-cages and hen-houses are much infested by the bird-mite, which lives upon the blood of the feathered inhabitants, and not unfrequently effects a lodgment beneath the epidermis of any persons who handle the cages or visit the houses. The result of this intrusion is a disease which goes by the name of *acariasis*. The bird-mite also attacks mice. Grass and fruit bushes often supply another pest called red mites, which swarm upon any intruder, and penetrating the epidermis produce sores to which the name of *rouget* is given.

Bird-Mite.

Red Mite.

Epizoöt'ics (from the same root as the foregoing) are diseases of animals, analogous to epidemics in the human species. They extend over vast tracts of country, and seem to be propagated from animal to animal, each disease having its own mode of propagation. Pleuro-pneumonia, foot and mouth disease, and vesicular epizoötic may be cited as examples.

E'poch, in chronology. See CHRONOLOGY.

Epoch, in astronomy, is the time at which a celestial body passes a certain point in its orbit which has been arbitrarily fixed. In a planet this point is usually the perihelion, and this determination of the time of perihelion passage constitutes one of the seven elements of a planet's orbit. For another signification of the same word, see HARMONIC MOTION.

Ep'ode (Gr. *epōdos*, 'singing to') was part of a lyric ode sung after the strophe and antistrophe. E. was also a name applied to poems in which each second verse was shorter than the first, or in which one of the verses was made up of two metres of distinct character, as in the *Epodes* of Horace.

Epp'ing, a market-town in the county of Essex, on the northern skirt of Epping Forest, 16 miles N.E. of London. It chiefly consists of a main street, running N. and S., on a slight elevation, and its principal industry is the production for the London market of butter, cream, cheese, &c. Cattle fairs are held here. Pop. parl. div. of county 55,416; reg. sub-dist. 5999; civ. and ecc. par. 2565.—The famous Epping Royal Forest, formerly known as Essex or Waltham Forest, has now dwindled to 60,000 acres, occupying the S.W. portion of the county, between the rivers Lea and Roding. Of its area, however, about 55,000 acres are estimated to be enclosed and private property (formerly hereditary in the family of the Earls of Mornington). Under statute 29 and 30 Vict. c. 62 all the duties and powers of management possessed by the Commissioners of Woods in relation to the forestal rights and interests of the Crown in E. F. were transferred to the Commissioners of H.M.'s Works and Buildings, and in 1871 Commissioners were appointed by Parliament to inquire into matters relating to the forest and report thereon. Since then the forest has been placed under the control of the Corporation of London. Had not Parliament interfered, the forests would most probably have been completely obliterated by this time. During the summer months the forest is a great resort of pleasure-seekers, especially from the eastern part of the metropolis. The bill of the Epping Forest New Railway was passed in August, 1894, under which a railway (either steam or electric) may be constructed from South Place, Finsbury, underground to Upper Clapton, and thence overground to High Beech, close to the most charming scenery in the Forest. The capital of the company is estimated to reach £2,100,000.

Éprouvette (Fr. from *éprouver*, 'to try'), an instrument for determining the projectile force of gunpowder. The ordinary E. takes the form of a pistol with a small strong barrel, and the propulsive force of the powder is estimated by the action that a given quantity of it on being fired exerts upon a spring or heavy weight. In British Government factories, large and fine grain gunpowder is tested with the 8-inch mortar elevated to an angle of 45°, in which are placed 2 oz. of powder and a cast iron shot weighing 68 lbs. Three firings take place, and the mean distance of the three ranges of the shot determines the strength of the powder. The test was found in practice to be fallacious, and the adoption of a more reliable system of proving powder has been under consideration.

Ep'som (anc. *Thermæ Ebbisham*, 'the warm springs of Ebba,' an early English queen and saint), an old market-town of Surrey, on the edge of Banstead Downs, 14 miles S.S.W. of London by railway. It has an elegant church, the tower of which contains a peal of eight bells, extensive nursery grounds, and some malting, brewing, brickmaking, &c., but is chiefly celebrated on account of the great racecourse in the vicinity, where races take place in April and May. (See DERBY-DAY.) E. Salts (q.v.) were originally made here at the sulphate of magnesia springs. Near E. is the Royal Medical Benevolent College (founded 1851), for the maintenance of decayed members, or their widows, of the profession, and for educating, training, clothing, boarding and lodging fifty of their boys. There are fifty pensioners who at first are elected to annuities ranging from £21 to £30 according to seniority, and in turn obtain residences at the asylum. The boys remain till 16-19. Sons of other medical men are also received at the school on payment of £60 per annum. The income is derived partly from charitable contributions (£10,133), partly from the payments for the scholars who are not on the foundation (£9011), and partly from invested funds (£639), bequests (£705), rents of lands, &c. (£70). London office, 37, Soho Square, W. Pop. par. div. of county 70,103; reg. sub-dist. 14,274; and civ. par. 8417.

Epsom Salts is the common name of sulphate of magnesia, and is so called on account of its occurring in the water of a spring at Epsom. It is found also in many other mineral springs and in sea-water, and is sometimes separated from the latter by fractional crystallization. It may also be prepared either from magnesite (native carbonate of magnesia), or from dolomite (carbonate of magnesia and lime). From the former of these two it is obtained by the direct action of sulphuric acid; from the latter by first calcining the mineral and then acting upon it with sulphuric acid. The solution of sulphate of magnesia resulting in either case is crystallized by evaporation. E. S. is a colourless crystalline substance, having a bitter and nauseous taste. When heated to 100° C., it loses six of its seven molecules of water. The remaining molecule can only be expelled at a much higher temperature. E. S. is used in medicine as a purgative in doses of from $\frac{1}{2}$ to $1\frac{1}{2}$ oz.

Ep'worth, a market-town and parish in Lincolnshire, 23 miles N.N.W. of Lincoln. The principal industries are flax and hemp dressing, and cattle, flax, and hemp are sold at the two annual fairs. John Wesley was born at E., 17th June, 1703. Pop. reg. sub-dist. 3657; and civ. par. 1903.

Eq'uable Mo'tion, known more commonly as uniform velocity. See VELOCITY.

E'qual Tem'perament, in music, the system of tuning by which the octave is divided into twelve equal semitones, as in the pianoforte, &c. See JUST INTONATION and TEMPERAMENT.

Equa'tion, in pure mathematics, is an assertion of equality between two expressions, and is represented to the eye by the symbol $=$. Thus $A = B$ is an assertion of equality, and is therefore an E. Now such an assertion may be always true, whatever the values of the quantities involved may be; as, for instance, $a = a$; $(a + b)^2 = a^2 + 2ab + b^2$; &c.

These are called equations of identity, or simply Identities (q.v.). But if we assert that $a + 3 = 5$, then we have an E. of condition, which is satisfied by only one value of a, namely 2. It is this latter class which is more particularly studied here. Into all such equations quantities of two distinct kinds enter—the *knowns* and the *unknowns*. In the E. above, 3 and 5 are of course known, while a is unknown, but may be at once given in terms of the others. This determination of the unknown is the solving of the E., and any definite value, expressed in terms of the known quantities, which when substituted for the unknown quantity satisfies the E. (*i.e.*, reduces it to an identity), is called a *root* of the E. Thus the E. $x^2 = 5x - 6$ has two roots, namely 2 and 3. The investigation of general expressions constitutes the *theory of equations*, an extremely important branch of algebra. An E. containing more than one unknown quantity, such as $a_1 x + b_1 y + c_1 z = p_1$, where x, y, and z are the unknowns, cannot be solved in a determinate manner. To render a solution possible, there must be as many equations as there are unknown quantities, so that in this case we must have for the complete determination of x, y, z, two other equations, $a_2 x + b_2 y + c_2 z = p_2$, $a_3 x + b_3 y + c_3 z = p_3$. From these any two of the unknowns may be eliminated, and the remaining one expressed in terms of the coefficients. When algebra was first brought into Europe by the Arabs, who obtained it from the Hindus, equations of the second degree had been solved. The Italians added, imperfectly, the solutions of the third and fourth, and these have in more recent times been completely solved. The general E. of the fifth was then tried, but unsuccessfully, and Abel has proved that it is impossible to obtain an expression depending on the coefficients which may have five values, and which satisfies the E. Here we cannot enter into the methods devised by Newton, Fourier, Sturm, Horner, &c., for approximating to numerical roots of equations, but must refer to the many treatises on the subject by Legrange, De Fourcy, Murphy, Young, Hymers, Peacock, Todhunter, &c.

Equation, Lunar.—The numerical expression for a perturbation of the moon. See LUNAR THEORY.

Equation of Equinoxes is the difference between the true position of the Equinoxes (q.v.) and the position calculated upon the supposition that their Precession (q.v.) is uniform.

Equation of Light, in astronomy, is the allowance which must be made for the time which the light emitted by a celestial body takes to traverse the space separating that body from the earth, and is one of the corrections which must be applied to the observed position in order to obtain the true position of a given star.

Equation of Payments, a rule in arithmetic for ascertaining the time at which a whole debt, due in different parts payable at different times, should be paid so as to be attended with loss to neither party. The rule is now of little practical use, sums of money due at a future time being generally secured by bills of exchange or promissory notes. If the time of payment is altered, it is usually with a view to immediate payment. See DISCOUNT.

Equation of the Centre is the difference between the true observed longitude of the earth and its mean longitude as calculated upon the supposition that the earth moves uniformly in a circle round the sun. This difference, owing to the small eccentricity of the orbit, never exceeds 1° 55′ 33″·3.

Equation of Time is the difference, measured in mean solar time, between the true time as given by a sun-dial and the mean time as indicated by a well-regulated clock. It arises mainly from the varying velocity of the earth in its orbit, and the eccentricity of that orbit, from which causes the true or observed right ascension of the sun must obviously differ from its mean right ascension, or the right ascension which it would have if the earth moved uniformly in a circular orbit round it during the course of a year. The obliquity of the ecliptic also influences this equation to an appreciable extent, and the moon and planets must likewise have a perturbing effect. See DIAL.

Equations, Chemical. These represent by means of symbols and formulæ chemical reactions. Thus $2H_2 + O_2 = 2H_2O$ represents the reaction which takes place when hydrogen and oxygen combine to form water. See CHEMISTRY.

Equator, Celestial or **Equinoctial,** is the great circle of the celestial sphere whose plane is perpendicular to the earth's axis of rotation, and the **Terrestrial E.** is the corresponding great circle on the earth's circumference, dividing it into two equal hemispheres, the northern and southern.

Equato'rial is the technical name of a telescope so mounted as to be capable of rotatory motion round two axes at right angles to each other, the one axis always pointing in a direction parallel to the earth's polar axis. Accordingly, if a star is in the field of view, it can be kept so by subjecting the telescope to one motion, viz., that round the *polar* axis, which motion, to ensure uniformity, is usually imparted to it by clockwork. The E. is of great importance in all observatories.

Eques'trian Order (Lat. *ordo equestris*), or **Eq'uites.** The term *equites* was originally used to denote, not an order in the Roman state, but the cavalry of the army. According to the Roman legend, the number levied by Romulus was 300. Each century bore the name of one of the three tribes—*Ramnes*, *Tities*, *Luceres*. Servius Tullius increased the E. to 3600, divided into eighteen centuries, the twelve new ones being formed alike of patricians and plebeians who had the necessary property qualification. Each *eques* received 10,000 *asses* (pounds of copper) to buy a horse, and 2000 *asses* annually to maintain it, and had to serve ten years. In 403 B.C., in consequence of the reverses before Veii, a number of people possessed of the requisite fortune voluntarily served without receiving a horse or a horse's allowance. These were styled *E. equis privatis*, and were not admitted into the eighteen *Centuriæ Equitum*, whose dignity was hereditary. As Rome increased in prosperity, a wealthy middle class arose, and in 122 B.C. the right of acting as jurors on criminal trials was transferred from the senators to those possessed of the *census equester*, *i.e.*, 400,000 sesterces. This new body was called the E. O., and all necessary connection between the E. and military service now ceased. For a time the senatorial order wrangled with the E. O., and in 70 B.C. Sulla deprived the latter of the *judicia*. The two orders were reconciled by Cicero during Catiline's conspiracy, but at last the E. O. joined Cæsar and the popular party. Under the Empire the indiscriminate admission of all who possessed the required fortune brought the order into contempt, and the *E. equis publicis*, having long ceased to be the regular cavalry, did little more than furnish cadets for military posts. The insignia of the E. and E. O. were the gold ring (*annulus aureus*) and the tunic with the narrow vertical stripe of purple (*tunica angusticlavia*). By the *Lex Roscia* (B.C. 67) the fourteen rows of seats in the theatre immediately behind those occupied by the senators were assigned to the E. O.

Equian'gular (Lat. 'having equal angles'), the name given to geometric rectilinear figures all of whose angles are equal one to another. Figures are also said to be E. to each other when their corresponding angles are equal.

Eq'uidæ, a family of Ungulate or 'hoofed' quadrupeds, sometimes also named *Solidungula*, and represented by the horses, asses, zebras, &c. This group of mammals belongs to the Perissodactyle ('odd-toed') group of *Ungulata*, as only one toe—the third—in each foot is fully developed. Thus the horse walks upon this single developed toe, which is provided with a broad nail termed a 'hoof.' The teeth form an interrupted series in each jaw. There are six incisors, two canines, six præmolars, and six molars in each jaw. The males alone possess canines, which are small. The skin is hairy, and a 'mane' exists. The E. are confined in present distribution to Europe, Asia, and Africa, although they have been imported into Australia and America. Fossil E. abound in later Tertiary deposits in Europe, Asia, and America. The earliest form has been found to belong to the Eocene period and the size of the animal is estimated to have been that of the common fox. This small horse possessed four well-developed toes, and one rudimentary.

Equilat'eral (Lat. 'having equal sides'), in geometry, is the name given to polygons whose sides are all equal one to another. The *E. hyperbola* has its conjugate diameters equal, bearing the same relation to the common Hyperbola (q.v.) which the circle does to the Ellipse (q.v.).

Equilib'rium (Lat. 'equal balance'), a state of rest produced by forces mutually balancing. When a material system, unrestrained by friction, is in E., the rate at which the applied forces act at the instant of passing through it is equal to the rate at which potential energy is gained. If the system is capable of being balanced in any position, its E. is said to be neutral, as is the case with a perfect homogeneous sphere placed on a plane horizontal surface; if, upon a slight displacement from its position, it returns and continues vibrating about this position, never increasing its distance from it, its E. is then said to be stable, as in the case of the same sphere placed at the bottom of a concave surface; but if the system can be displaced in any way so that its vibrations will not take place within definite limits as before, but will have the effect of making the system move farther and farther away from its original position, the E. is unstable, as, for example, an egg set upon one end, or a sphere set on the highest point of a convex surface. The mathematical conditions for these three kinds of E., in which a system may be, are as follow:—The E. is neutral when the potential energy is constant for all positions; stable when it is a minimum for that position with regard to every displacement; and unstable when it is a maximum for one, more, or all displacements. See ENERGY and STATICS.

Eq'uinoxes (Lat. 'the equality of night,' *i.e.*, with day), in astronomy, are the times at which the sun in its apparently annual motion round the ecliptic passes through the equator at the so-called equinoctial points, which are sometimes also called the E. At these times day and night are equal for all parts of the globe. The *vernal* equinox occurs about 21st March, and the *autumnal* about 22nd September. The interval of time between the vernal and autumnal E. is longer by nearly eight days than that between the autumnal and vernal, on account of the slower motion of the earth during the former period, when the sun appears in the northern hemisphere. See ECLIPTIC.

Equip'ment, Eq'uipage (Fr. from *équiper*, 'to furnish'; Old Fr. *esquiper*, 'to equip a ship'; Span. and Port. *esquife*, 'boat'; Old Ger. *skif;* Icel. *skip*, *scip*, 'a ship'), the furnishing of a ship with all technical appliances. Camp E. embraces all the technical appliances of a camp—as tents, kitchen furniture, saddle-horses, baggage waggons, &c. The E. of a soldier includes his dress, arms, accoutrements, ammunition, and provisions for a day or other fixed term.

Equipoll'ent is a term sometimes used in Scotch law to signify *equivalent*, or similarity of effect. Where a particular form is prescribed by the statute or by agreement, an E., that is, an act tantamount in effect, will not be held legal compliance with the prescribed form.

Equise'tum, a well-known genus of Cryptogams, or lower and flowerless plants, belonging to and forming a type of a natural order, *Equisetaceæ*. They are familiarly named 'horse-tails,' and a common example of the group is the 'field horse-tail,' which grows from a creeping root-stock with erect stems of both fertile and barren nature. The fertile stems are not branched, and attain a height of from 6 to 10 inches. They wither in spring, before the growth of the barren stems. Each fertile stem is topped by a little cone consisting of scales, bearing the spore-cases or sporangia on their under surfaces. The spores of E. exhibit hygrometric movements. They are provided with long processes, which coil up when moistened, but expand when dry. The barren stems in summer give off slender-jointed branches in verticils or whorls. A familiar species of E. is the Dutch rush, the outer skin or Epidermis (q.v.) of which contains so much silica or flint, that it is used for polishing pewter pots and metallic substances. The species of E. grow very rapidly, and sometimes annoy the agriculturist. Cattle appear to be injured by them, and they possess astringent and diuretic properties.

Eq'uity and Law. It is a common error to suppose that equity is administered at the discretion of the judge, according to the circumstances of each case, without regard to rule or precedents. What equity does is to do justice between parties where there is no legal obstacle. If the doing of justice will controvert a statute or established rule of common law, then equity has no power. Thus the law being that marriage revokes a will previously made, equity could not set aside this rule, however unjust might be the operation of it in an individual case. Here the law—presumably just in its general operation—must for the sake of the general good inflict an occasional hardship. It is considered expedient for public good in England that a man should be able to dispose of his estate as he chooses. This being so, suppose he makes a very unjust distribution of his property, equity cannot interfere, because were equity to interfere, the general harm done would outweigh the individual good. Plainly, every one who thought he had reasonable ground for discontent with a will would ask for the interference of the court, and the court would come virtually to be the general will-maker. But where there is no legal bar to equity, then equity will prevail. In Scotland, the Court of Session, as the supreme civil court of the country, combines in itself the functions of law and equity. The equitable power is called the *nobile officium* of the court, a term of Roman law, and is 'inherent in the Court of Session, as a Supreme Court, in cases where no provision is to be found in the law and the interference of a tribunal is necessary.' The *nobile officium*, or *judicium nobile*, of the Roman law was a limited power given to the prætor of legislative control over the law. While this power is not given to any court in England or in Scotland, many of the decisions of the supreme tribunals are necessarily legislation, from the fact that cases arise which there is no statute or ascertained rule of common law to meet. In deciding such cases, the claims of pure law and equity are adjusted on the considerations stated above; justice can be done in the individual case only so far as is consistent with laying down a rule of law which is the best rule for the public. Hence it frequently happens that the party in an appeal case who is found liable in costs is really paying for public legislation.

Eq'uity, Courts of, in England. These were the Lord Chancellor's court, the Master of the Rolls' court, and the courts of the three Vice-Chancellors. Each of these judges presided over a separate tribunal, and any causes or motions might be brought before them, except those relating to lunatics, which were always heard by the Chancellor. A Vice-Chancellor was bound to hear all those matters which the Chancellor might direct, in addition to those originally set down for hearing in his own court. The Master of the Rolls was not so bound. An important change has been effected in the constitution of the supreme law-courts of England by the passing of the Supreme Court of Judicature Acts. The Court of Chancery, of which the above constituted the divisions, was transmuted into a division of 'Her Majesty's High Court of Justice.' The judges of the divisional courts of the Supreme Court have been granted large powers in respect of the administration of E.; yet purely equitable matters are usually in the first instance tried before the Chancery divisional court. The most important form of relief given by a court of equity is that of Injunction (q.v.), which may be to restrain the adverse party in a suit from any act in violation of the plaintiff's right, or to restrain a person from proceeding with an action where it is strictly of a civil nature, or from enforcing judgment. Equity courts will interfere to prevent waste, infringement of copyright, negotiation of bills, and imitation of trade marks.

Equity of Redemption. Although by the law of England a mortgage is forfeited on non-payment of the sum borrowed at the time agreed on, equity will interfere to prevent the sale; and if the value of the mortgage is greater than the sum advanced, equity will allow the mortgagor within a reasonable time to redeem his estate, paying to the mortgagee his principal, interest, and expenses. The advantage thus allowed to the mortgagor is called the E. of R. But the mortgagee may call on the mortgagor to redeem his estate, and if he fail to do so, the mortgagee may foreclose, by which the E. of R. is lost. See MORTGAGE EJECTMENT.

Equiv'alent, Joule's, is the quantity of mechanical work required to be expended so as to raise unit mass of water at a given temperature by one degree. It will be sufficient here to give the final conclusions published by Joule, reserving to the article THERMO-DYNAMICS the history of the subject. In 1849, after six years' experiment, he thus gives his results:—'1st, The quantity of heat produced by the friction of bodies, whether solid or liquid, is always proportional to the quantity of work expended;' and '2nd, The quantity of heat capable of increasing the temperature of a pound of water (weighed *in vacuo*, and taken at between 55° and 60°) by 1° F. requires for its evolution the expenditure of a mechanical force represented by the fall of 772 lbs. through the space of one foot.' The value of gravity is that of Manchester, where the experiments were made.

Equiv'alents, Chemical. By the equivalents of substances are understood the proportions in which they combine or replace one another, these proportions being referred to a common standard, viz., 1 part by weight of hydrogen. Thus 56 is the equivalent of caustic potash, and 49 that of sulphuric acid, and therefore these quantities of the two substances unite, neither being in excess. 32·5 is the equivalent of zinc, and this quantity of zinc can replace 1 part by weight of hydrogen in 49 parts by weight of sulphuric acid, giving 80·5 parts by weight of sulphate of zinc. The term *equivalent* is now not often employed, the facts of equivalence being more readily explained by the Atomic Theory (q.v.).

Erasis'tratus, a Greek physician and anatomist, was a native of the island of Ceos, and lived in the 3rd c. B.C. After residing for some time at the court of Seleucus Nicator in Syria, he established himself as a teacher and practitioner in Alexandria, where he founded a school of medicine. The date and even the place of his death are uncertain, and only a few fragments of his numerous writings survive. The interest attaching to his name is that he narrowly escaped anticipating Harvey's discovery of the circulation of the blood. See Hieronymus, *Dissertatio Inauguralis exhibens Erasistrati Erasistraticorumque Historiam* (Jena, 1790).

Eras'mus, Deside'rius, the Greek and Latin equivalents of the Dutch **Gherærd** or **Gerard,** or **Gerrit** ('The Beloved'), born at Rotterdam, 27th October, 1467, was the son of Gherærd of Tergouw and Margaret of Zevenbergen, the sweet though painful story of whose lives has been told in Charles Reade's *Cloister and Hearth.* He was educated at Groot's school, kept by the Brothers of the Common Life at Deventer, and at Bolduc in Brabant, and then entered the Augustine monastery at Steyn. Before this both his parents had died. At Steyn he diligently read Latin authors with Wilhelm Hermann, and wrote his classical essay *De Contemtu Mortis.* But poetry was next to heresy in the eyes of the monks, whose drunken habits disgusted E. He was therefore glad in 1491 to be employed as the secretary of Henri à Bergis, Bishop of Cambrai. From Cambrai he went to the wretched Scotist College of Montaigu, of which the rector was the ascetic John Sandouck, and soon obtained a good deal of tutorial work at Paris University (Englishmen, such as Blunt and Grey, being among his pupils), where he remained till 1498, when he came to England for eighteen months. At Oxford, where Charnoch, Prior of Augustinian Canons Regular, was head of St. Mary's College, he met Thomas Linacre, the grammarian, afterwards physician to Henry VIII., William Grocyn, the patriarch of Greek learning in England, Thomas Latimer, and Thomas More; but E.'s chief friend was John Colet, the liberal theologian, with whom he had many a friendly *disputatiuncula.* The next six years he spent in Paris, Orléans, and the Netherlands. To this period belongs the *Enchiridion,* or 'Christian Soldier's Dagger,' a Platonic summary of human nature and its religious duties, with very little reference to Catholic dogma, which was, however, approved by Pope Adrian VI., then Principal of Louvain, though subsequently condemned as heretical by the Sorbonne. It was translated into all the Western languages; into English by Tyndale. About this time (1503) began E.'s acquaintance with the spiritual-minded Franciscan, John Vitrarius of St. Omer. In 1506 we find him again in England, where he saw his old friends at Oxford, and became Bachelor of Divinity at Cambridge. The same year he went to Italy, and got his doctor's degree at Turin. After a visit to Bombasius at Bologna, he went to Venice to arrange with the printer Manutius about a work on the *Wages of the Ancients,* and also about editions of Terence and Plautus, and some translations from Euripides. At Padua he met Musurus, and in 1509, after spending some time in Rome, he returned by Como, Chur, Strasburg, and Antwerp to England. Here he composed his famous *Encomium Moriæ* ('Praise of Folly'), which rivals Lucian in satire, and excels him in good humour. It was afterwards illustrated by Holbein. E. now lectured at Cambridge on Greek, and became Lady Margaret's Professor of Divinity. In 1514 he went to see the printer Froben (successor of Amerbach) at Basel, and on his way thither met Sebastian Brandt (author of the *Narrenschiff*), Bilibald Pirckheimer, the learned senator of Nürnberg, and John Reuchlin, the bold student of the Cabbala, then engaged in his strife with the inquisitor Hochstraten, who desired to burn all the Jewish literature. E. was appointed councillor to the young Archduke, Charles of Burgundy, who afterwards wished to make him a bishop in Sicily. In 1516 Froben published the first edition of E.'s Greek Testament, dedicated to Leo X. A good deal of sarcasm appears in the annotations, and also several odd blunders, such as putting *Neapolis* in Caria. Among other savage criticisms was that of Edward Lee, afterwards English Primate, who maintained the text of the three witnesses, which E., anticipating the labours of the Revision Commission (1876), had omitted. In this field E. was first, Laurentius Valla had only collated the MSS., and the *Complutensian Polyglott* of Cardinal Ximenes did not appear for some years after. The Testament was followed by the edition of St. Jerome, for whom E. had a deep admiration. After a stay at Brussels, where he had an angry correspondence with the German Budæus, he went to Louvain, superintending the administration of the Busleiden bequest. Here he met Von Hutten, who had just published one of the best of the *Epistolæ Obscurorum Vivorum,* and received his first letter from Luther. He left Louvain in 1521 and proceeded to Basel, whence he wrote his first letter of advice to the new Pope (Adrian III.), and where he quarrelled rather shabbily with Von Hutten, who wrote thereupon his *Expostulation.* This elicited E.'s *Sponge,* in which he tries to excuse himself from not actively taking part in the Reformation. E. also retaliates on Von Hutten in one of the *Colloquia,* a lively and interesting book which must be read, and cannot be described. The next pope, Clement VII. (1524), gave E. a pension of 200 florins, but the *Colloquies* were soon after condemned by the Sorbonne; and E. had to write his defiance to 'certain most impudent jackdaws.' He died at Basel, 12th July, 1536. E. was not a hero. Although amiable, industrious, and truthful, as well as learned and ingenious, he had some mean qualities. His supremacy was purely intellectual, and he believed that criticism would gradually remove the corruptions of Rome. He is, in some sense, the forerunner of the modern Broad Church party. It is a great tribute to his literary eminence that his works are still read and admired. Twenty-seven editions of the *Encomium Moriæ* appeared in E.'s lifetime; an English version, by Copner, was published in 1878. See *Life of E.*, by R. B. Drummond.

Eras'tus, Thomas, notable in medicine and famous in ecclesiastical polemics, was born at Baden in Switzerland, 7th September, 1524. The name E. is a translation of his German patronymic, *Lieber.* After an education in his native town, he studied divinity at Basel, and then medicine at Bologna. E. remained nine years in Italy, and on his return was made Professor of Physic in the University of Heidelberg. In 1581 he accepted the same chair at Basel, and died there 31st December, 1583. E. left by will a large sum for the education of poor students of medicine, and this bequest, called the *Erastian Foundation*, long perpetuated his name. His chief work is his *Explicatio Quæstionis Gravissimæ de Excommunicatione*. During his whole life E. was the vigorous opponent of those who argued that the ecclesiastical authority should punish crimes and offences. The right of excommunication was that which E. chiefly attacked, but absolution, interdiction, the imposition of penance, &c., are also discussed. From the opinions in this book the term *Erastianism* has arisen, which has been much used in Scotland, and generally misused. E. merely asserts that misdemeanours should be punished not by ecclesiastical but by civil authority, but in Scotland many people who never heard of E. are accustomed to describe as *Erastian* the policy which repudiates the doctrine of the spiritual independence of the Church. E.'s work, translated into English in 1669, was re-edited by Dr. Lee of Edinburgh in 1845. Among E.'s scientific and medical works are his *De Discrimine Logicæ et Scientiæ Demonstrativæ* (1565), *Theses de Contagio* (Heidelb. 1574), and *De Occult. Pharmaco-Potestatibus* (Heidelb. 1574).

Era'sure, or **Ra'sure,** as it is sometimes called in England, is in law the obliteration or alteration of any letter or word in a legal writing, without consent of the party bound by it, &c. In England the presumption of law, except as regards a will, appears to be, when there is an E. in a deed, that it has been made previous to execution. Should this presumption be overcome by evidence to the contrary, the deed is not necessarily void. If sufficient evidence can be adduced to prove the intention of the grantor, this will be given effect to. If this, however, cannot be done, E. proved to be subsequent to execution renders the writing void. In making a will, if there are any erasures or Interlineations (q.v.), the testator should put his initials on the margin opposite them, and 'notice them in the *attestation*.' (See Lord St. Leonard's *Handybook;* also WILL, CANCELLING.) In Scotch law, deeds or other formal instruments erased *in substantialibus* —that is, in those parts essential to their validity—are not held probative, and the defect cannot be supplied by parole evidence. An E. in a non-vital part of a deed should be declared in the body of the writing, by stating that the superscribed words are written on an E. But when correction is required from clerical error or other cause, the proper way is to draw the pen through the erroneous words so as to leave them still legible, and to add with a mark of reference the correct words on the margin, the addition being signed by the party to the deed writing his Christian name on one side and his surname on the other. (See Menzies' *Lectures on Conveyancing*, p. 124.) In bookkeeping an E. should never be made, as if the book were judicially inspected the E. might cause suspicion of fraud. An error should be deleted with the pen so as to leave the words or figures legible. The statute 6 and 7 Will. IV. c. 33, to increase the security afforded by the public records of deeds and instruments affecting land in Scotland, enacted that an instrument of sasine should not be rendered void by any part of it being written on an E., unless it was averred and proved that the E. was fraudulently made, or unless the record did not correspond with the instrument. There were, however, some exceptions to the operation of this statute, which was superseded by a subsequent enactment which provided for the registration of seisins.

E'rato ('the lovely'), in Greek mythology, one of the Nine Muses. She presided over erotic poetry and mimic invention, and is sometimes represented as the Muse of the lyre.

Eratos'thenes, a famous Greek writer, son of Aglaus, was born at Cyrene, B.C. 276. His preceptors were Aristo the Chian, Lysanius, and Callimachus. He devoted himself to grammatical criticism, philosophy, astronomy, and poetry. Ptolemy Euergetes appointed him librarian at Alexandria, a position which he filled till his death. E. was a man of most extensive and varied learning. He wrote on the *Old Attic Comedy* and on the *Homeric Poems*, composed several philosophical and historical works, raised geography to the rank of a science, founded geodesy, and made important discoveries in astronomy and geometry. His chief work was a treatise on geography, which Strabo made large use of. He measured the obliquity of the ecliptic, and was the originator of the process by which the magnitude of the earth is found. He voluntarily starved himself to death at the age of eighty, B.C. 196. For a complete list of his works, see *Eratosthenica* of Bernhardy (Berlin, 1822).

Ercill'a, y Zuñiga, Alonso de, a Spanish epic poet, was born at Madrid, or, according to others, in Viscaya, 7th August, 1533. At the age of fourteen he became page to the Prince of the Asturias, afterwards Philip II. In 1554 he came to London in the train of Philip, on the occasion of his marriage with Queen Mary. While there, E. learned that the Indians of Arauca, a district of Chili, had revolted against the Spaniards. He joined the expedition despatched to quell the rebellion, and made this war the theme of an epic. The poem, begun in 1558, was composed during the campaign, being written on scraps of paper, and even of leather, when no better material could be had. Philip, whom he had addressed as his Augustus in the *Araucana* (1569-90), treated him with neglect on his return to Spain; and the soldier-poet died at Madrid in want and obscurity some time after the year 1596. E.'s epic, the *Araucana*, is in thirty-six cantos of octosyllabic verse. Not only the subject, but the treatment also, to a great extent, is historical. The work has been praised by Cervantes and Lope de Vega. The best Spanish edition is that published at Madrid in 1828. A German translation by Winterling was published at Nuremberg in 1831.

Erckmann (Émile), and **Chatrian (Alexandre),** two modern French novelists, the former born at Phalsburg, Meurthe, 20th May, 1822, the latter at Soldatenthal, also in Meurthe, 18th December, 1826. Both belonging to the middle class, they met at the college of Phalsburg, and later went to Paris, where they set up a literary partnership, producing unitedly a series of plays and tales. After two years of hard struggling, their *Illustre Docteur Mathéus* (1859) at last stirred the public interest, which was afterwards kept from flagging by *Contes Fantastiques* (1860), *Le Fou Yégof* (1862), *Le Joueur de Clarinette* (1863), *Le Conscrit de* 1813 (1864), *Waterloo* (1865), *L'Homme du Peuple* (1865), *La Maison Forestière* (1866), *Le Blocus* (1867), *Histoire d'un Paysan* (1868), *Story of the Plébiscite* (English, 1872), and *Brigadier Frédéric* (1875). These are written in a simple, unaffected style, in harmony with the pathetic, picturesque studies of peasant life which form the background on which are dashed in vivid colours, and with realistic touch, the military glories and horrors of the Revolution and Empire. The most successful play of E.-C. is *Le Juif Polonais* (1869), produced in England as *The Bells* (1871), rendered popular by the acting of Sir Henry Irving.

Er'ebus, the son of Chaos. The name signifies darkness generally, and is specially applied to the gloomy region of the under-world through which the shades pass to Hades.

Erech'theus or **Erichtho'nius,** and **Erechthe'um.** Erechtheus or Erichthonius is reputed to have sprung from Attic soil in marriage with Hephæstus. He was reared by Athena. When grown up, he usurped the government of Athens, instituted the worship of Athena, and built her a temple on the Acropolis. This temple, called after him the *Erechtheum*, was the most revered of all the Athenian sanctuaries. It contained the olive-wood statue of Athena Polias that was said to have fallen from heaven, the sacred olive-tree which the goddess called forth in her contest with Poseidon, the tombs of Cecrops and of E. himself. It was burnt by the Persians, but was replaced in the beginning of the 4th c. B.C. by an Ionic structure, one of the triumphs of Athenian architecture. By his wife Praxithea E. had four sons and four daughters. The daughters, Procris, Creusa, Chthonia, and Orithyia, agreed that if one of them were to die the others should not survive her. When Chthonia was sacrificed for the welfare of Athens, two of her sisters kept their vow. The legend of Chthonia is beautifully told in Swinburne's tragedy of *Erechtheus*.

Erec'tion, Lords of. Those to whom the king, in Scotland, after the Reformation made grants *jure coronæ*, of the lands or tithes which had formerly belonged to the Popish ecclesiastical establishment, were so entitled, because under their grants they had the same rights to the erected benefices which were formerly vested in the Church. Sometimes those so gifted were called titulars of the tithes. Those grants were made under the burden of providing competent stipends to the Reformed clergy. See TEINDS.

Er'emites (Gr. *ērēmites*, from *ērēmos*, 'lonely,' 'desert'), or **Her'mits,** the name of the early Christian solitaries, who in the East, and especially in Egypt, withdrew to the desert, and spent their lives in lonely prayer, rigorous abstinence, and often in self-mortification. (See ANCHORITES and ASCETICISM.) This practice of retirement began in the 2nd c., and became common in the first half of the 4th c. It may have been suggested by the *Therapeutæ* (q.v.). The severe watchings and fastings of these recluses often gave rise to insanity, and an asylum for such as were incurably deranged was established at Jerusalem. From the strange hallucinations to which they were subject much of mediæval demonology originated. The E. were strict observers of celibacy, and gradually gathered into monastic communities, the first of which is said to have been founded by Hilarion. (See MONASTICISM.) A famous eremite was soon surrounded by imitators, who were formed into a cœnobite community, while many E., who did not join the monastery, girt it with a *laura* or circle of separate cells. E. were common during the Middle Ages, when they gathered into brotherhoods, of which the most famous were the Hermits of St. Augustine. See Helyot's *Histoire des Ordres Religieux*, and Lecky's *History of Rationalism*.

Er'furt (anc. *Erpisford*, 'the ford of Erpe'), the old capital of Thuringia, now a town of the province of Saxony, Prussia, on the Gera, in a fertile plain, 14 miles W. of Weimar by rail. E. was formerly a fortress of the second rank. Its original fortifications have been strengthened by two citadels and other outworks. Among the most noteworthy buildings are the Gothic cathedral, with a portal of the 12th c., and the great Susanna, one of its ten bells, weighing 275 cwt.; the Severikirche, of the 14th c., with three copper-covered towers; the Augustinian monastery (now an orphanage) in which Luther was a monk, and the Town Hall, opened in 1876 and built at a cost of £37,000. Of the university, suppressed in 1816, there still remain the observatory, the anatomical theatre, and the botanic garden. In the fish-market is a monument to Roland. E. has important manufactures of woollens, cottons, silks, ribbons, hosiery, carpets, tapestry, leather, tobacco, chemicals, ironmongery, and machinery. In the neighbourhood of E. is a rock-salt mine. Only an insignificant place in the 8th c., at the end of the 16th c. it was a Hanse town, and twice as large as it is now. Pop. of town 72,360.

Ergot.

1, Ear of rye, with Ergot (spurred rye); 2, Ergot; 3, Diseased grains of rye.

Er'got, a powerful and important therapeutic agent, obtained chiefly from *Secale cereale* or common rye, by the action of a fungus which changes the appearance and constitution of the grain, and thus forms *Secale cornutum* or 'spurred rye.' The fungus which produces E. is found in other grasses (*Lolium arvense* and *L. perenne*, &c.), but does not produce such characteristic effects as on rye. The E. fungus consists of a mass of polygonal cells containing an oily fluid. It appears within the seed or ovule of rye, and propagates itself at the expense of the seeds. Whatever doubts may exist as to the nature of the E. producing fungus, none exist regarding the powerful action of the substance itself. The active principle of the E. appears to exist in a fixed oil, of which it contains about 35 per cent. The active substance is *ergotine*, a reddish-brown substance, of which E. contains about 15 per cent. The therapeutic properties are extracted by alcohol and water. E. is first mentioned as a therapeutic agent by Camerarius in 1668, and in 1669 by Bautzmanni. In 1774 its use was prohibited by law in France, on account of its reputed virulence, but in 1777 Desgranges of Lyon again used E. and extolled it as an obstetric aid. The action of E. generally sets in at various periods, varying from five minutes to half-an-hour, and is supposed to be due to a special effect on the muscular fibre, but there is little doubt that it also acts on the spinal cord and nerve-centres generally. Dr. Tyler Smith says that the blood is the medium through which E. specially acts. When taken in a poisonous dose, E. appears to induce the state termed *ergotism*, characterized by depression, coldness, and gangrene or mortification of the extremities, or by convulsions. The latter form of ergotism was seen at Silesia in 1722, and at Berlin in 1723, being induced by eating bread made from ergotised rye. Pain, itching, and tingling in the feet were first observed, convulsions followed, and mania or coma in turn succeeded.

Er'iach. By the Irish Brehon Law, in a case of murder, the brehon or judge caused the murderer to give the wife or child of the murdered man a recompense, called an E. The term corresponds to the ancient *were* in England.

Erica'ceæ, or **Eri'ceæ,** a natural order of Exogens, including the heaths and allied species of plants. These plants are widely distributed in arctic and temperate zones in both hemispheres, save in Australia. They are found on the mountain ranges of the tropics. The genus *Erica* itself is very common in S. Africa. The British genera number seven, with twenty-three species. The E. are wiry shrubs, with eight or ten stamens, the latter being epigynous or hypogynous. The ash-coloured E., a Scotch heath, and a familiar example of the order, is a low bushy shrub, with linear leaves and racemose clusters of purple flowers. The corolla is persistent in many heaths, the anthers dehiscing, or opening by superior pores. The fruit in the heaths is a capsule. Amongst other genera of this order are the Rhododendrons (q.v.), azaleas, kalmias, ledum, &c.

Er'icht, or **Err'ocht, Loch,** in a dreary waste partly in Perthshire and partly in Inverness-shire, at the foot of Ben Aulder, one of the Grampians, and about 1500 feet above the sea-level. It is about 15 miles long by 1 broad, and has communication with Lochs Rannoch and Lydoch. E. is said never to freeze.

Er'icsson, Johan, a Swedish engineer, born 31st July, 1803. He came to England after serving some years in the Swedish army, and took an active part in the introduction of the screw-propeller about 1837. In 1839 he went to America, where he perfected his caloric engine in 1852, and constructed the ironclad *Monitor* in 1862. Died 9th March, 1889.—**Nils E.,** brother of the preceding, born 31st January, 1802, was head of the corps of Swedish naval engineers from 1850. He also constructed the Swedish railways (1858-63), the canal between the Saiman and the Gulf of Finland, and improved the Stockholm docks, &c. In 1860 he was made a baron, and died 8th September, 1870.

E'rie, a town of Pennsylvania, on the shores of Lake E. Its harbour, one of the best on the lake, is formed by Presque Isle, 4 miles long. The bay is 3½ miles long, from 9 to 25 feet deep, and is well protected by a breakwater. E. is also connected with the Ohio by a canal, and is the terminus of the Philadelphia and Erie Railway. Pop. 40,634.

Erie Lake, one of the five great lakes of N. America which give rise to the St. Lawrence, and with it form an unrivalled channel of inland navigation. It is fourth in size and position, having the larger lakes Superior, Michigan, and Huron above, and Ontario, the smaller, below it, with the province of Ontario on the N., and the states of Ohio, Pennsylvania, and New York on the S. E. has a length of 240 miles, with an area of 9600 sq. miles, and it is 555 feet above the ocean. It has a mean depth of only 120 feet, rendering storms frequent and navigation dangerous. The chief United States towns on its shores are Buffalo, Dunkirk, Erie, Cleveland, Sandusky, Port Clinton, and Toledo; the Canadian, Ports Dover, Burwell, and Stanley. The current of Niagara, running northward, carries the waters of the lake into the Ontario. Ice interrupts navigation from December till March or April. The Welland Canal connects E. and Ontario, and numerous railways and canals render the lake a busy scene of traffic.—*E. Canal*, a work of great utility, extends from the Hudson above Albany to Buffalo on Lake E.—*E. Railroad*, one of the chief routes to the W., extends from Jersey city near New York to Dunkirk on Lake E.

Erig'ena, Joannes Scotus, a mediæval philosopher, and, according to Hallam, 'the greatest man of the dark ages,' was born in Ireland—hence the name E.—in the beginning of the 9th c. He spent his life, which is veiled in obscurity, chiefly at the court of Karl the Bald, in whose palace-school he seems to have been a teacher, and died about 875. He was the founder of mediæval philosophy, but differs broadly from the later scholastics, who were rigid followers of Aristotle and devoted to casuistic hair-splitting, while E.'s works are imbued with Neo-Platonic idealism. He held that nature was the manifestation of God under certain forms; that God was the vital essence pervading all things. The audacity of some of his propositions was perhaps only partly visible to himself. He declared reason to be prior in time to authority, and all authority which was not based on reason to be worthless. His chief writings are *De Divisione Naturæ*, a pantheistic treatise (Oxf. 1681, and Munst. 1838); *De Divina Prædestinatione*, a work on theology (1650); a translation and commentary on the works ascribed to Dionysius the Areopagite; a homily, several pieces in verse, a treatise on the Eucharist, and a small work, *De Visione Dei*.

Erig'eron, a genus of plants of the natural order *Compositæ*. The bitter E. is a common British species, familiarly named 'fleabane,' from its odour being said to keep away fleas and other insect pests. This species is about 16 or 17 inches high, and its flower-heads exhibit pale-blue 'ray' florets, those of the centre being yellow. An American species, the Philadelphian E., has ray florets of a purple hue, and possesses diuretic properties.

Er'ik, a common name of Danish, Swedish, and Norwegian kings.

1st, *Danish*.—**E. Barn** ('the child' or 'bairn'), 840-860, began the Danish system of foreign invasions.—**E. Ejegod** (or 'good for the eyes'), one of the fourteen sons of Svend Estridsen, whose line followed the old line of Gorm, ascended the throne of Denmark in 1095. Driven from home when his eldest brother, St. Knud, was murdered at Odense, E. had travelled and acquired many languages. He cleared part of the Danish coast from the Wendish pirates, and encouraged the formation of the early guilds. Having killed a servant, he undertook, with his queen Botilda, a pilgrim to Jerusalem (although his loving people offered one-third of their substance as a blood-fine), but died at Cyprus, 1103.—**E. Emun** (or 'the Boaster'), a younger son of Ejegod, appears in history as the avenger of his brother Knud, whom the king Niels and his son Magnus had treacherously killed at Ringsted in 1134. The Boaster appealed to the 'Thing,' who gave him help; and thus he won the battle of Fodevig in Skaania. Niels fled and E. became king. Although successful against the Wends, he tarnished his memory by the murder of his brother, Harald Kezia; and his son, E. 'the Lamb,' was a monkish coward, who died in 1147, leaving Denmark a legacy of ten years' civil war, in which the *Bondar* or free peasants were oppressed. E. introduced the use of cavalry to Denmark.—**E. Plov-penning** (or 'plough-money,' so called from an unpopular tax imposed on ploughs') was the eldest surviving son of Valdemar II. He succeeded his father in 1241, and in 1250 was murdered at the instigation of his brother Abel, Duke of Slesvig, who, along with Christopher of Laaland and Nikolaus of Halland, had kept the land in continual dissension.—**E. Glipping** (or 'the Blinker'), the son of Christopher I. and Margaret of Pommern, succeeded his father on the throne in 1259. He conceded certain rights of jurisdiction to the nobility and clergy. E. was a weak, vicious king, and was murdered in 1286.—**E. Menved** (or 'with a but,' so called because he could not resolve on anything), the son of the preceding, succeeded to the throne, which was for some time practically occupied by his mother, Agnes of Brandenburg. The chief murderers of the late king, Stig and Raul Jonsen, were punished. Expensive wars with Poland and Norway led to the gradual alienation of the crown-lands, till most of the herring-fisheries were sold to the Hanse traders. E. had fourteen children by Ingeborg of Sweden, but they all predeceased their father, who died in 1319.

2nd, *Swedish*.—**E. Sejersoel** ('the Victorious'), a descendant of Ragnar Lodbrog and Björn Jernside ('Ironside'), reigned in Sweden from 983 to 993. He defeated the pagan Vikings of Jomsborg, and, according to Adam of Bremen, even conquered Svend Estridsen, the King of Denmark. The heroic song of Hjalteson, celebrating E.'s victory of Fryisvall, is one of the oldest monuments of Sweden.—**E. IX.** ('the Saint'), a member of the peasant class, succeeded in 1155 to the throne of Sverker I., who had just by negotiation with Cardinal Albinensis brought the Swedish Church into close communion with Rome. E. had three rules of policy—'to build churches, to govern according to law and right, and to overpower his enemies.' He was also called *Lag-gifware* ('lawgiver'). He warred against the Finns, and compelled them to accept Christianity. E. was killed by the Dane, Magnus Henriksen, in 1160.—**E. Knutsson** (or *Arkonung*, 'good years'), grandson of the preceding, after the long struggle between the Sverkers and the Bondars, received the Swedish crown by the help of the Church (1210). As a recompense, he surrendered part of a royal right (*sakören*) to the clergy. His son, **E. Læspe** (or 'the Halt'), nominally ruled in Sweden from 1222 to 1250.—**E. XII.**, the son of King Magnus of Sweden and Norway, was constantly disputing the sovereignty with his father till his death in 1359. **E. of Pommern** was the nephew of the wise and good Margaret, widow of Hakon of Norway, and mother of Olaf of Denmark. This remarkable woman, after the Kalmar Act of Union in 1397, conjoined E. with herself in the enjoyment of the triple crown. Margaret died in 1412, just after concluding a peace with Holstein, which E. disregarded, and commenced a cruel war that lasted twenty-five years. In 1423 the Emperor Sigismund decreed that the territory of Slesvig should be given to E., but instead of taking advantage of this, he went off on a crazy expedition to Jerusalem. A dalesman called Engelbrecht now stirred up a rebellion in Dalekarlia and Westmannland, and compelled the Council of State at Stockholm to sign a deed saying that E. had broken his coronation oath. The nobles did not join this popular movement, but in 1436 agreed to a new Act of Union of the three kingdoms. In 1439 all Sweden revolted under the viceroy Karl Knudsson Bondar, and Denmark and Norway deposed E. in favour of Christopher of Oldenburg.—**E. XIV.** was the son of the hero Gustaf Vasa and Katharine of Sachsen-Lauenberg. When he succeeded his father in 1560, he was on the point of starting for England to ask Elizabeth to marry him, a match in which Calvin interested himself. He was accomplished, but passionate, much under the influence of French acquaintances. He challenged Leicester to single combat, and afterwards sent 10,000 dollars to his envoy Gyllenstjerna that he might get rid of his rival. E. plunged into a seven years' war about a question of armorial bearings with Frederik II. of Denmark, and under the evil counsel of Göran Persson committed great excesses, and finally fell into madness, from which he was rescued by a peasant girl, Karren Mannsdatter, whom he married in 1567. By a combination of his brothers E. was, in 1569, brought to trial before the assembled states, and declared to have forfeited his own and his children's rights to the throne. He died by poison in prison eight years later, leaving a strange diary of the later events of his reign.

3rd, *Norwegian*.—**E. Blod-öxe,** the eldest son of Harald Haarfager, succeeded his father on the throne of Norway in 936. Shortly after, on account of their cruelty, he and his queen, Gunhild, were driven away. They took refuge at the court of Æthelstan, in England, where E. was made ruler of the sub-kingdom of Northumbria. His son, **E. Graafell,** was king for some years (963-977), and his son's half-cousin, **E. Jarl,** obtained the crown in 1000, after defeating Olaf Trygvassen in the great sea-battle of Svold, on the coast of Pommern. To this period belonged E. Raudi (or 'the Red'), who, with his son Leif, founded in Greenland the colonies of *Oestre Bygd* and *Vestre Bygd*, afterwards destroyed by the black death. The Icelandic chronicles assert that Leif, or his successors, passed over to Nova Scotia and S. Canada, which they called Vineland. The last Bishop of Greenland was sent in 1448.—**E. Præstehader** (or 'priest-hater'), the eldest son of Magnus *Laga-bæter* ('law-betterer') and Ingeborg of Denmark, succeeded his father in 1280. He did little but quarrel with the Danes and Scotch about the dowries of his mother and daughter (Margrete, the Little Maid of Norway), with the Hanse, and with the clergy, whose exemption from taxation he discontinued.

Erinn'a, a famous Greek poetess, was born at Rhodes or the adjacent island of Telos, about 612 B.C. Common tradition makes her the contemporary and friend of Sappho, credits her with beauty and genius, and places her on a level with Homer. She excelled in epic poetry, and also wrote lyrics and epigrams. One of her pieces, *The Distaff*, written in a dialect that is a mixture of Æolic and Doric, consisted of 300 lines. E. died at the age of nineteen. She had a place in the *Garland* of Meleager, in which the crocus, on account of its maiden paleness, was the emblem assigned to her.

Eriocaula'ceæ, or **Eriocaulona'ceæ,** the 'pipewort' order of Monocotyledonous plants, inhabit marshes. They have small unisexual flowers, with two-celled anthers, and an ovary, surrounded by a toothed and membranous tube. S. America is the chief habitat of the E. The only British species is the 'jointed pipewort' found in Galway and Skye. Some of the Brazilian species of Eriocaulon are branching plants, which sometimes attain a height of over six feet. Over 200 species of E. are known.

Erioden'dron, a genus of Exogenous plants belonging to the natural order *Sterculiaceæ*, the 'silk-cotton' order. *E. Samanna* is a typical tree of the American *selvas*, and exceeds all other trees of the Amazon forests in height. It rarely branches till it has grown above the other trees. The genus closely resembles the species of *Malvaceæ* (or cotton order) in general characters, the seeds being embedded in a woolly matter. The Indian E. and the winding E. occur in the E. Indies, and the Guinea E. in Africa.

Erioph'orum, or **Cotton Grass,** a genus of Endogenous plants belonging to the *Cyperaceæ*, or sedges. These plants derive their familiar name from their long silky or cottony hairs round the fruit. The leaves have astringent properties. The silky filaments are used for making candle-wicks, and for stuffing cushions. One species is the common sedge, and exists as a grass-like herb, the flowers of which are arranged in spikes.

Er'ith, a small town of Kent, on the right bank of the Thames, 14 miles S.W. of London. Belvedere House, a hospital for merchant seamen, was formerly the residence of Sir Cullen Eardley. Here are powder-mills, lime and sand pits (for ships' ballast), and extensive brickfields. After the signing of the Magna Charta the barons met Hubert de Burgh at the old church of E., and arranged the conditions of peace. The *Grace de Dieu*, the fine battleship built by Henry VIII., was constructed at E. in 1515. Pop. civ. par. 13,414.

Erivan', the capital of the Russian government of E., in the lieutenancy of the Caucasus, on the Zenghi, 110 miles S.W. of Tiflis. It is a fortified town, on a bare plateau 3530 feet above the Black Sea. The houses are mean, and the streets narrow and unpaved. The fort stands on a basalt rock not far from the town. The inhabitants are engaged in agriculture and gardening, and a few of them in commerce. Fruit and vines thrive well, and there is a considerable trade in dried apricots. E. was founded in the time of Timur: its fortress was built in the beginning of the 16th c. by Khan Rewan, who named it after himself. E. was formerly the capital of the Persian province of Aran, and played a prominent part in the wars between the Turks and the Persians from the 16th c. downwards. The Russian general Paskevitch took E. by storm in 1827; and in 1828 it was ceded to Russia, along with the province of the same name. E. suffered greatly by the earthquake of July, 1840. Pop. 17,050.—The *government* of E. has an area of 10,075 sq. miles, and a pop. of 703,511.

Erivan.

Erlang'en ('the dwelling near alder-trees'), a walled town in Middle Franconia (Mittelfranken), Bavaria, on the Regnitz, and on the Ludwig Canal, 12 miles N. of Nürnberg by railway. It consists of an old and a new portion, the latter having been built since a great fire in 1706. The famous Protestant university, founded here in 1746, is the principal building. It bears a high character as a school of orthodox theology, is attended by some 500 students, and has a library of 152,000 volumes, besides valuable scientific collections and botanical gardens. E. has large manufactures of cottons, hosiery, mirrors, tobacco, and is particularly famous for its beer, of which it produces 1,500,000 gallons yearly. E. was one of the asylums for the French refugees on the revocation of the Edict of Nantes. Pop. 12,723.

Er'lau ('alder-tree meadow'), a walled city of Hungary, on a river of the same name, 75 miles E.N.E. of Buda-Pesth by railway. It is the seat of an archbishop, has a beautiful cathedral in the Grecian style, a lyceum with a large library, several monasteries, a richly-endowed hospital, and carries on an active trade in a celebrated red wine. The inhabitants are mostly Roman Catholic Magyars. A bishopric, founded at E. in the 11th c., was made an archbishopric in 1804. Pop. 21,070.

Ermenonville, a village of France, in the department of Oise, 17 miles S.E. of Senlis. It was early a seigneurie, and was made a vicomté by Henri IV., whose mistress, Gabrielle d'Estrées, lived here. The Marquis René de Girardin acquired the grounds in 1763, and the château was subsequently the residence of Rousseau, who died here, 3rd July, 1778, and whose tomb on the Île des Peupliers is resorted to by many visitors. The beautiful park, which attracts so many Parisians in summer, has of late fallen into disrepair. Pop. 487.

Er'mine, or **Sto'at,** a species of carnivorous mammalia, belonging to the *Mustelidæ* or weasel family. It attains a length of about 14 inches. The summer colour of the animal's fur is not unlike that of the weasel, the prevailing tint being a pale brown tinted with red, the toes and edges of the ears being white. In winter the fur undergoes a remarkable change, then becoming of a uniform white hue, or sometimes of a yellowish-white colour. The E. is accordingly with difficulty detected amid the snow. This animal inhabits Britain, especially in its N. parts, but also occurs in Siberia, N. Europe, and N. America. It is much sought after in winter on account of its fur, which is greatly valued. The præmolar teeth number eight in each jaw.

Ermine (with winter coat).

Ermine, in heraldry, is a field *argent* with a small *sable* pattern formed of spots and small triangles spread or powdered over it. *Ermines*, also called *contre-E.*, is a field *sable* with *argent* pattern powdered over it. *Erminois* is a field *or* powdered *sable* (Boutell and Aveling).

Erne (Gael. *Eirne*, so called from a tribe of the Firbolgs), the name of a river and two lakes in the county of Fermanagh, Ireland. The river rises in Lough Gowna, and after a N.W. course of 72 miles, during which it traverses Lough Oughter and Upper and Lower Loughs E., falls into Donegal Bay. It is navigable as high up as Ballyshannon. Upper Lough E., 12 miles long by 4½ broad, is one of the most picturesque lakes in Ireland. Lower Lough E. is 20 miles long and 7½ broad. The former has 90 and the latter 109 islets. Both loughs abound in salmon and trout, and are the haunts of numerous wildfowl in winter. Beautiful country-seats enliven the banks.

Erne, the name given to certain species of Raptorial birds belonging to the family *Falconidæ*, and which are also known under the name of 'eagles.' The common E. is also known as the white-tailed or sea eagle; a bird which is common in Britain, and is a good example of the larger species of the family. This bird attains a length of three feet, and may measure over six feet in expanse of wings. The colour is dark brown, the rounded tail being white, the primary quills black, and the legs, toes, and beak yellow, whilst the head is furnished with elongated feathers. The food consists of fishes, but the E. is also known to seize the smaller animals. Another species of E. is that called by the name of bald or white-headed eagle of America, known by the white head and neck, by the deep-brown body, and by the white tail and tail-coverts.

Ernes'ti, Johann August, a German philologist and theologian, born at Tennstädt, Thuringia, 4th August, 1707. He studied at Leipzig, where he became Professor of Ancient Literature in 1742, of Eloquence in 1756, and of Theology in 1759, and where he died, 11th September, 1781. E. was an excellent linguist, and so graceful a Latinist as to be styled 'the German Cicero.' He introduced a new system of Biblical criticism, examining the grammar and style of Scripture in the manner applied to Greek and Latin classics. His chief works are an edition of *Cicero*, and grammatical criticisms of the Scriptures.

Ernst, Elector of Saxony, and founder of the Ernestine line of Saxon princes, was born at Altenburg, 25th March, 1441. He and his younger brother Albrecht were the victims in the episode known in German history as the *Prinzenraub* ('the stealing of the princes'). E. succeeded his father in 1464, ruled the entire principality conjointly with Albrecht for twenty-one years, and added Thuringia to his dominions in 1482. He eventually divided the territory with Albrecht, the founder of the Albertine branch of the family, and died at Kolditz, 22nd March, 1486. Among the later descendants of the stolen E. was the late Prince Consort, Albert of Saxe-Coburg.—**Ernst I.,** Duke of Saxe-Gotha and Altenburg, and founder of the house of Gotha, born 24th December, 1601, was the brother of the famous Bernhard of Weimar (q.v.), and a member of the Ernestine line of Saxony. He served with distinction in the Thirty Years' War as a colonel of horse under Gustavus Adolphus, and shared in the Protestant victory of Lützen (1632). After the battle of Nördlingen (1634), E. was long engaged in improving and remodelling his possessions, which had suffered terribly from the ravages of war. Many existing institutions are traceable to his wise and able rule, while his severe Lutheranism gained for him the surname of 'the Pious.' He died 26th March, 1675. His line terminated in the death of Friedrich IV. in 1825.

Ernst, Heinrich Wilhelm, a German composer and violinist, born at Brünn in 1814. He first appeared before the public as a boy, and during upwards of twenty-five years played in the principal Continental cities and in London with very great success. His health compelled him, about 1858, to go to Nice, where he died, 8th October, 1865. His principal compositions are for the violin.

Er'ode (Iródu), a well-built town in the district of Coimbatore, province of Madras, British India, 243 miles S.W. of Madras by rail and 55 N.E. of Coimbatore. It is situated on a canal issuing from the Bhawani, not far from the confluence of that river and the Kaveri. Owing to successive invasions by Marrathas, the forces of Mysore, and the British, the inhabitants were scared away from the place, but so soon as peace was declared they began to return. The chief trade is in cotton, rice, saltpetre, and chillies. A fine bridge of twenty-two arches spans the Kaveri near the town. E. has some place in early history, but its modern importance is due to its being the junction of the South Indian Railway with the main Madras line. Pop. 12,330, of whom 10,481 are Hindus, 1393 are Mohammedans, and 453 are Christians.

Er'os, the Greek name of Cupid (q.v.).

Ero'sion (Lat. *erosio*, 'a gnawing or eating away') is the name applied to the action of ice or running water upon the surface of the earth, giving rise to the striated surfaces and *roches moutonnées* indicative of Glacier (q.v.) action, and cutting out ravines and valleys of varied appearance and magnitude. In the case of streams, it is not as a rule so much to the running water itself that E. is due as to the salts which it contains in solution and the particles of sand and mud which it holds in suspension. If the water were absolutely pure there would be no chemical, and little, if any, mechanical, action. E. is also an expression used in reference to explosives. See CORDITE.

Erot'ic (Gr. *erōs*, 'love') signifies whatever relates to the passion of love. Thus Alcman, Sappho, Anacreon, Catullus, &c., whose chief theme is love, are termed E. poets, and their love-lays E. poetry. The title E. writers (*scriptores erotici*), however, is generally employed to describe the class of Greek romancers whose tales were the legitimate precursors of the modern novel. E. romance was doubtless a birth of the East—the Song of Solomon combines the passionate intensity of a hymeneal with the colour, fancy, and pictorial profusion of the most exquisite romance—but the earliest specimens of it which appeared in the Western world were the famous *Milesian Tales*, a collection which seems to have been as popular in its own day as was the *Decameron* in the Middle Ages. The E. writers flourished at a late period of Greek letters, and are generally inferior in style to the recognised 'classics'; but their aim was to please and to amuse, and doubtless their works were as eagerly sought after in the libraries of the 'Sosii' of the time as the latest novel now is at Mudie's. Of the E. writers may be mentioned Parthenius, Iamblichus, Alciphron, Xenophon the Ephesian, Aristænetus, Heliodorus, Longus, and Achilles Tatius in Greek, and the Latin writer Appuleius, whose *Golden Ass* contains many merry tales and the pre-eminently beautiful episode of *Cupid and Psyche*.

Erpe'nius, or **Van Erpen, Thomas,** born at Gorkum, 7th September, 1584, on the suggestion of J. J. Scaliger, devoted himself to Oriental languages. For this purpose he travelled to the great seats of learning, meeting Casaubon at Paris, where he acquired Arabic from an Egyptian. At Venice he picked up Persian and the Turkish and Ethiopian dialects from some resident natives. He then taught Arabic and Hebrew at Leyden, and received the important post of Oriental interpreter to the States-General. He reached singular purity and elegance in Arabic composition. E. died 13th November, 1624. His chief work was an Arabic Grammar, a classical text-book till superseded at the beginning of this century by that of De Sacy. His Arabic printing-press at Leyden produced several works, such as *Two Centuries of Arabic Proverbs*, *Fables of Locman*, an Arabic Pentateuch, the Chronicle of Elmakin, &c. E. also wrote on the Hebrew and Syriac grammars.

Erran'tia, an order of *Annelida* (q.v.) or worms, represented by such genera as *Nereis*, *Eunice*, *Aphrodite*, &c. This group includes those forms which typically represent the *Annelida*, and which comprise the greater number of large active marine worms. The sides of the body are well provided in E. with the lateral appendages, consisting of *setæ* or bristles, &c., which assist locomotion. Each joint or segment of the body bears two pairs of appendages, known respectively as *notopodia* and *neuropodia*. The gills or breathing organs are borne on the back or dorsal aspect of the segments. These animals are unisexual. The integument is soft.

Erra'ta (Lat. 'errors'), the list of errors which may have arisen in the printing or in the composition of a work with their corrections, inserted indifferently at the commencement or at the end of the book. Typographical errors are now comparatively rare in printing-offices of any character. Formerly they were sometimes introduced intentionally, that the author might express as corrections of E. sentiments which he durst not exhibit in the body of the work. (See Disraeli's *Curiosities of Literature*, vol. I. Lond. 1865.) Several ludicrous E. are known. The Vinegar Bible, printed at the Clarendon Press in 1717, is so called because in it the 'Parable of the Vineyard' is printed the 'Parable of the *Vinegar*.' The Stationers' Company incurred a heavy penalty for issuing an impression of the Bible in which the word 'not' was accidentally omitted from the Seventh Commandment.

Errhines are medicines administered to produce sneezing and discharges from the nostrils, to relieve headaches and deafness depending upon obstructions in the Eustachian tube, as common snuff, powder of *Asarum Europæum*, and *Helenium autumnale* (sneeze-wort).

Error in Essentials. An error in an essential point vitiates a contract, on the ground that consent—on which the validity of all contracts depends, without which there can be no contract—has been only apparent. But the legal difficulty lies in determining what is an essential. *Error calculi* (error in calculation) may always be rectified. See CLERICAL ERROR.

Error, Proceedings in, the form in England by which an appeal was made to the superior court against the judgment of an inferior court. The Judicature Act of 1875 (Order LVIII.) abolished P. in E., except in criminal cases, and in civil cases the course is by way of appeal. See APPEAL; ERROR, WRIT OF.

Error, Writ of. In criminal cases, the judgment of the tribunals, sessions or assizes, may be reversed by the Queen's Bench divisional court if there be some substantial defect in the indictment or error on the record. Before these proceedings can be taken, the Attorney-General's permission must be obtained. The Attorney-General may confess error, and in that way consent to the judgment being reversed. See ERROR, PROCEEDINGS IN.

Errors of Observation may be divided into avoidable and unavoidable errors. The former can easily be eliminated by comparison with other observations; and to such belong, for instance, reading the number of degrees, minutes, &c., wrongly; but the latter class comprehends cases of a much more difficult nature, arising from the imperfection of the instruments in use, refraction, temperature, atmospheric pressure, the observer's own so-called personal error, and such like. Thus the astronomer has a number of observed values for the position of a star which most probably differ perceptibly from each other. How, then, is he best to combine these results to obtain the most probable value? The simplest method is, of course, to take the mean, and this is sufficiently true if the observations are all equally reliable, but if they be not so, they must first be reduced to the same weight by the employment of a proper factor. In comparing the observed position of a planet with its calculated position, the difference depends not only on the E. of O., but also on the errors of the elements assumed in the calculation. Cases of this last kind are much more difficult; but for further information reference is made to the article LEAST SQUARES, METHOD OF. Airy's *E. of O.* is an excellent treatise on the subject.

Ersch, Johann Samuel, known as the founder of German bibliography, was born at Grossglogau, in Lower Silesia, 23rd June, 1766. He studied at Halle and Jena, and became Professor of Geography and Statistics at the former university in 1803. Among his works are a *Handbuch der Deutschen Literatur seit der Mitte des 18ten Jahrh, bis auf die neueste Zeit* (1812-14), the *Allgemeines Repertorium der Literatur* 1793-1809), and *La France Littéraire* (1797-98, with two supplementary vols. 1802 and 1806). Along with Gruber he began the *Allgemeine Encyclopädie der Wissenschaften und Künste* (1818, still unfinished). E. died at Halle, 16th January, 1828.

Erse, a corruption of *Irish*, formerly used by the Lowlanders of Scotland as a synonym for *Gaelic*, in allusion to the Irish origin of the Western Highlanders. Thus Burns, in his *Address to the Deil*, says—

> 'But a' your doings to rehearse,
> Your wily snares and fechtin' fierce,
> Sin' that day Michael did you pierce
> Down to this time,
> Wad ding a *Lallan* tongue or *Erse*,
> In prose or rhyme.'

Erskine, Ebenezer, Rev., an evangelical divine of the Church of Scotland, afterwards founder of the Secession Church, was a son of the Rev. Henry E., minister of Chirnside, a descendant of the Sheilfield branch of the Mar family. E. was born 22nd June, 1680, and entered Edinburgh University in 1693, taking his degree in 1697. He was licensed to preach in 1703, and soon after ordained minister of Portmoak. There he laboured for twenty-eight years with great assiduity, and laid the foundations of a wide popularity. He removed to the West Church of Stirling in 1731, and in the following year signalised himself by opposing an Act of the Assembly which he deemed favourable to error in doctrine and discipline. He preached against the prevalent 'defections,' in a sermon before the Synod of Perth and Stirling, and incurred the censure of the Church. He resented this, and while still holding the principle of a National Church, with a few other ministers set up the Secession Church in 1733. Fruitless efforts were made to restore unity, and in 1740 he was deposed. When the Secession was rent in twain in 1747, E. took the side of the Burghers, and was duly excommunicated by his late followers. He died 22nd June, 1754. E. was a preacher of great unction and a man of genuine piety.—**Rev. Ralph E.,** brother of Ebenezer E., was born in Northumberland, 18th March, 1685, studied at Edinburgh University and was ordained Minister of Dunfermline in 1711. He took the same side as his brother in the Church controversy, assisted in the formation of the Secession, and was deposed in 1740. He died 6th November, 1752. E. is the author of *Gospel Sonnets* and *Faith no Fancy*. The names of both brothers are still warmly cherished by the Scottish people.

Erskine, Harry, son of the tenth Earl of Buchan, and elder brother of Lord-Chancellor E., was born at Edinburgh 1st November, 1746, and called to the Scotch bar in 1768. Though not a great lawyer, his other gifts soon put him in the front rank of his profession, and made him one of the most popular men in Scotland. He was honourably distinguished for the attention he gave to the cases of poorer clients, and by the independence and consistency of his political principles. He acted as Lord Advocate under the short-lived Rockingham administration, and again under the Grenville ministry of 1806. In 1812 he retired from public life to Ammondell, in W. Lothian, where he died on 8th October, 1817.

Erskine, John, Baron of Dun, a Scottish theologian, born near Montrose in 1508 or 1509. He was educated at Aberdeen University, and was the first to encourage the study of Greek in Scotland. Buchanan called him 'a man of great learning.' He early embraced Protestantism, was both a preacher and soldier, and was one of the commission appointed in 1577 to arrange the scheme of Church government known as the *Second Book of Discipline*. E. died 21st March, 1591.

Erskine, John, of Carnock, afterwards of Cardross, son of a gentleman who had served under the Prince of Orange, was born in 1695, entered the Faculty of Advocates in 1719, acted as Professor of Scots Law at Edinburgh from 1737 to 1765, published his *Principles of the Law of Scotland* in 1754, and composed, but did not publish, his *Institutes* in retirement. He died 1st March, 1768, and the *Institutes* appeared in 1773. This work is a very accurate and comprehensive digest of the law of Scotland of the time. The learning in both the civil and the feudal law is adequate, and the arrangement of the whole subject is lucid. It has, accordingly, remained a standard institutional work for citation in the law courts, although on some important subjects, particularly on mercantile law, the book is very meagre, a fact perhaps explained by the dulness of Scotch trade during the 18th c., and the superior attractions which the Rebellion and its consequences gave to the subject of heritable title. On the other hand, E. has no philosophical insight into the most general principles of law. He too blindly follows the written and traditional authority and the reason which authority gives for itself. Deficient in analysis, he was also without conception of the historical method in the treatment of legal problems. These shortcomings do not lessen the great value of his work as a digest of positive law. The *Institutes* have passed through several editions. The *Principles* have been re-edited by Guthrie.

Erskine, Thomas, Lord, a younger brother of Harry E., was born 10th January, 1750, educated at the High School of Edinburgh, and at the grammar-school and University of St. Andrews. From 1764-68 he cruised about the W. Indies and S. America in H.M.S. *Tartar* under Sir David Lyndsay. He wished to enter the army, but could not find the money for a commission for some time. On his father's death E. became an ensign in the Royals or 1st Regiment of Foot, and married a good and beautiful wife, a daughter of Daniel Moore, Esq., M.P. for Marlow, in 1770. In 1772, his regiment having come to London, he made the acquaintance of Johnson, Burney, Reynolds, &c., at the house of Mrs. Montagu, and published *Observations on the Prevailing Abuses in the British Army arising from the Corruption of Civil Government*. On the suggestion of Lord Mansfield, he abandoned the army for the law in 1775, and after the usual course of study, was called at Lincoln's Inn, 3rd July, 1778. His first appearance was in defence of Captain Baillie, who was prosecuted for libel for having exposed the gross abuses in Greenwich Hospital. A striking speech led the way to immediate professional success. In 1779 he defended Admiral Keppel, who was tried by court-martial on a charge of incapacity in the battle off Ushant. In 1781 he appeared for Lord George Gordon, and startled the propriety of the court by swearing in the course of his speech. Returned to Parliament for Portsmouth in 1783, he and John Scott (afterwards Lord Eldon) both made their maiden speeches on Fox's India Bill. Next year occurred the famous case of the Dean of St. Asaph, who was tried for seditious libel, in republishing Sir W. Jones' little political tract, *A Dialogue between a Gentleman and a Farmer*. The case, as treated by Justice Buller, who nearly committed E. for contempt of court, rendered necessary Fox's Libel Bill, which made the jury judges of the law as well as the facts. From 1784 to 1790 E. was not in Parliament, but remained the private friend of Fox and Sheridan, and constantly rose in reputation at the bar. Perhaps the finest speech he ever delivered was in defence of Stockdale, who had published a pamphlet by Logan, a Scotch minister, upholding Warren Hastings against his impeachers. In 1790 Portsmouth again returned him to Parliament, which he did not leave till he was made a peer. The 'Reign of Terror' under Lord Loughborough's Chancellorship now began, and E. had a crowd of political clients, such as Paine, Frost, the *Morning Chronicle*, &c. The suspension of the Habeas Corpus Act in 1794, in consequence of the growth of societies formed to secure parliamentary reform, led to the great cases of Hardy and Tooke, which placed him at the summit of his popularity. About this time he published *A View of the Causes and Consequences of the Present War with France*, which ran through thirty-seven editions. Going to Paris with Fox in 1802, he was introduced to Napoleon and also to the French bar at the *Cour de Cassation*. On Pitt's death in 1806, E. was created Baron E., and appointed Lord Chancellor. He quitted public life at the close of his Chancellorship in 1807, after which he wrote a preface to Fox's speeches, several pamphlets on Greek questions, and a political romance called *Armata*. He died at his brother's house in Scotland, 17th November, 1823. E. was probably the most eloquent speaker which the English bar ever produced—a man of incomparable dexterity, firmness, and brilliant imagination. See Brougham's biography, prefixed to an edition of his speeches in 1847.

Erskine, Thomas, of Linlathen, born 13th October, 1788, was the grandson of John E. of Carnock, and nephew of the Evangelical leader the Rev. John E. He was called to the Scotch bar, but did not practise. His life, which was private but not retired, was spent chiefly at Linlathen and Edinburgh, with occasional visits to Paris and Geneva. He died in March, 1870. E.'s first literary effort was assisting in the Scotch editions of the works of Richard Baxter and John Gambold (1822). In his *Remarks on the Internal Evidence of Revealed Religion* he represents the incarnation as something contrived to produce a certain vivid effect, not otherwise producible, on the human mind, viz., a perception of God's infinite love. From this follows salvation, or the conscious habitual surrender of the human will to the divine. His *Unconditional Freeness of the Gospel*, a book warmly praised by Dr. Chalmers, is still much read. He insists on the universality of the offer of pardon through Christ, which on the stricter Calvinistic view is inconsistent with election. Hence in his *Doctrine of Sacrifice*, he represents that the quickening Spirit of God has passed into every corrupt soul of man, and that there is a real freedom, or power of choice, to follow or to resist its suggestions. E.'s latest meditations are contained in a posthumous volume, *The Spiritual Order*, and his life was written by the late Principal Shairp. What attracted men towards E. was his earnest simplicity of religious faith. He formed a link between Scotland and the finer minds in the English Church. See Hanna's *Letters of T. E.* (Edinb. 1877).

Eryn'go, or **Eryn'gium**, a genus of Exogenous plants belonging to the esculent or harmless section of the *Umbelliferæ* (q.v.). The field E., found in England and Ireland, furnishes 'E. root,' formerly used as a tonic. The sea-E. or holly is common on coast-lines, and its root is believed to possess tonic properties, alluded to by Falstaff. This root, as a sweetened preparation, is esteemed as an aperient and diuretic. Other species are the water E. and the fœtid E. of the New World. These plants have stiff spinous leaves, capitate sessile flowers, and a large prickly involucre, with an obovate scaly fruit.

Erys'imum, a genus of Cruciferous plants, represented by the 'worm-seed,' found in Europe and N. America. The popular name is derived from a former use of the seeds as a remedy for internal parasites. This plant has a four-sided 'pod' or fruit, is an annual, and attains a height of 16 or 18 inches. The leaves are small and lance-shaped, and the flowers yellow. The perfoliated E., grown in Japan, affords a fixed oil from its seeds.

Erysip'elas, a febrile and inflammatory disease, associated with an Exanthematous Eruption, which has a tendency to spread, and may involve the areolar tissue beneath. In England E. is sometimes called *St. Anthony's Fire*, and in Scotland *Rose*. E. is not a disease of the skin, but the pathological phenomena resulting from the action of the poison on the skin are that the skin is diffusely inflamed, being either of a bright scarlet or rose-coloured tint, disappearing on pressure, but reappearing when the pressure is removed. The areolar tissue is generally involved. The face, head, and neck are the parts most frequently affected, but a considerable portion of the trunk, or one or both lower or upper extremities, may be involved. E. may terminate by desquamation, vesication, suppuration, or gangrene. The symptoms of E. are fever, muscular pain, quick pulse, white tongue, nausea, sore throat, &c. On the third day the fever is continuous, the tongue brown and dry, and there is pain, swelling, and tenderness of lymphatic glands of the neck, and the cutaneous inflammation appears. From the fifth to the eighth day the bright colour begins to disappear, and desquamation takes place. E. has a tendency to spread, and sometimes it is erratic. The head, face, and limbs are sometimes enormously swollen, the inflammation extending deeply into the subcutaneous tissue, followed by suppuration (*E. phlegmonodes*) or by gangrene (*E. gangrenosum*). Cause—some specific poison. Propagation—E. is a communicable disease. It has been affirmed and denied that it is contagious and infectious, but it certainly spreads by *fomites*. An attack of E. does not secure immunity, but rather predisposes. E. in the surgical wards of a hospital is a most dangerous disease. Destructive epidemics of E. have occurred both in Europe and America. Treatment—in mild cases, rest, saline laxatives, cooling drinks and low diet, diaphoretics, and opiates occasionally. Tincture of the perchloride of iron in bitter infusions was at one time considered a specific. Sulphites of sodium or potassium have been recommended for both internal and external use. Dry flour, or starch flour, dusted over the inflamed part is a soothing application, but the advantage of attempting to limit the spread of E. by caustics or tincture of iodine is very doubtful.

Erythe'ma (Gr. *eruthēma*, 'redness') is a disease entirely distinct from erysipelas, the only symptom in common being that of redness of the skin. E. expresses inflammatory redness of the skin occurring in one or several patches of irregular form without pimples, vesicles, or pustules, and is produced by simple congestion of the cutaneous vessels. There is but slight swelling, except where there is serous effusion into the tissues of the skin. Acute E. terminates by subsidence of the redness and desquamation; chronic E. results in greater changes, and may terminate in psoriasis. E. is non-contagious, is occasionally produced by local irritation, but is generally symptomatic of constitutional or visceral disorder. The principles of treatment are to restore the functions of the system to healthy action, and to allay the local irritation by evaporating lotions, water dressings, warm fomentations, and ointments of various kinds.

Erythro'nium, a genus of Liliaceous (Endogenous) plants, represented by the 'dog-tooth violet,' so named from the appearance of its little white-coloured bulbs. This plant grows in our gardens, and has drooping flowers. It is a native of Central Europe, and also occurs in Siberia.

Erythrophlæ'um, a genus of Exogens belonging to the *Leguminosæ*, and to the *Mimoseæ*, a gum-arabic section of that natural order. Of this genus the E. of Guinea is a familiar species. It is a tree, attaining the height of 100 feet or more. Its red juice is used in ordeal by the native priests to test the innocence of an accused person.

Erythroxyla'ceæ, a natural order of Exogenous plants, distinguished by the flowers springing from overlapping scales. No calycine glands are developed, and plaited scales exist at the base of the petals. The ovules are anatropal, and possess no funiculi, or cords of attachment. *Erythroxylon coca* of Peru has long been famed for its supposed powers of sustaining the strength. It is the *ipadu* of the Indians; and Spruce remarks that with some ipadu-leaves in his mouth an Indian will walk for two or three days without food and without any desire to sleep. The leaves act by stimulating the nervous system. The corky E. of Brazil furnishes a brown dye from its bark.

Erzerum', **Erzeroum**, or **Erzrum** (*Arsen-er-Rum*, 'the land of the Romans,' from being founded under the Eastern Roman Empire; Armen. *Karin* or *Garin Khalakh*), a fortified city and the capital of the vilayet of the same name and of Turkish Armenia, on the river Kara-gu, a branch of the Euphrates, 125 miles S.E. of Trebizond, and 6000 feet above the level of the sea. It is the seat of an Armenian archbishop, and has a strong citadel, some forty mosques, several Armenian and Greek churches, and many bazaars and baths. The best buildings are of volcanic stone and sun-dried bricks, and the streets are narrow and filthy. E. is the entrepôt of a great caravan trade between Persia, Georgia, and the chief commercial cities of Asia Minor, chiefly in European manufactures, and in Eastern silks, shawls, cotton, tobacco, rice, and indigo. The principal manufactures of E. are morocco leather, sheepskin pelisses, and iron and copper wares. A fortress was founded here, near the Syro-Armenian town of Arsen, and named Theodosiopolis, after Theodosius II., in A.D. 415. On the destruction of Arsen the inhabitants removed hither, and transferred the present name to their new abode. E. was pillaged in 1201 by the Seljuks, who destroyed, it is said, some 100 churches. It was taken by the Mongols in 1242, by the Turks in 1517, and by the Russians in 1829, but was restored to the Porte on the peace of Adrianople. A great part of it was destroyed by an earthquake in 1859. In the last war between Turkey and Russia (1877-78) E. was besieged by the Russians and, as one of the conditions of the armistice at the end of the campaign, it was occupied by them for a time and then given back to the Turks. Pop. of town 59,050; of vilayet 645,702.

Erz'gebirge (*i.e.*, 'metal mountain'), a mountain chain of Germany forming the boundary between Saxony and Bohemia and stretching from the Elbe valley in the N.E. to the Thüringerwald in the S.W., a distance of 120 miles. It reaches a height of 3804 feet in the Keilberg, and has an abrupt declivity on the S.E. side, where several affluents of the Elbe have their rise. The E., which is of granite formation, is rich in silver, tin, iron, cobalt, &c. To the S. of this range, at an altitude of 3162 feet, is Gottesgabe ('the gift of God'), the highest town in Germany.

E'sau. The story of E.'s life is given in Gen. xxv.-xxxvi. Some modern critics, however, are of opinion that the patriarchal history has come down to us in a legendary form, and suggest that the name E. [of which two different explanations are given in Genesis (xxv. 25, and v. 30)] refers to the appearance of the country (Edom), in which red earth and rocks prevail, and of Mount Seir ('rough,' 'bristly,' *i.e.*, wooded). The higher antiquity of the Edomites (cf. Gen. xxxvi. 31), their friendship with the Israelites till the time of Saul, their conquest by David, the greater fruitfulness of Canaan as compared with Mount Seir, itself not unfruitful in parts, are thus supposed to be embodied in the story, in which E., the elder of two twin brothers, is supplanted by the younger, Jacob (Israel), who gets the blessing of the fatness of the earth, and himself gets an inferior blessing.

Escalade' (Ital. *scalata*, from Lat. *scala*, 'a ladder') is scaling a fortification by means of ladders. The ladders used consist of several pieces about twelve feet long, fitted together by sockets. The advance party of an E. is called the 'forlorn hope,' and though in their approach they are covered by the heavy firing of their comrades in the rear, the dangers to which they expose themselves are vastly greater than those to be met with in any other part of the field.

Escall'op, or **Escallop-Shell,** in heraldry, an indented shell; a badge belonging to noble pilgrims; the emblem of the apostle St. James the Greater.

Escape'ment, the mechanical arrangement in watches and timepieces by which the circular motion of the wheels is converted into the oscillatory motion of the balance-wheel or pendulum. See HOROLOGY.

Escarp' (from Ital. *scarpa*), in fortification, is the side of the ditch next the fort, while the side of the ditch next the country is the counterscarp. The E. is usually *revetted* (faced) with masonry or wood.

Escarp'ment, the geological name of a steep or abrupt cliff formed by the outcrop of inclined beds.

Escaut, the French name of the river Scheldt (q.v.).

Esch'ar (Gr. *eschara*), a slough of disorganized tissue occasioned by burns or the application of caustics.

Escheat' (*eschet* from Fr. *échoir*, 'to happen') is a term of feudal law denoting the incident by which lands or tenements revert to the sovereign or lord of the fee as the original grantor, on account of want of heir, or from forfeiture. Escheats are of two kinds—(1) Those forfeitures which belong to the sovereign from his prerogative when there is no heir to succeed to the inheritance; (2) those which belong to every lord of the manor, in virtue of his seigniory, under a royal grant. The law of E. presumes, upon the feudal system, that the blood of the person last seised in Fee Simple (q.v.) is extinct, either actually, or from the fact of the deceased tenant having been a bastard and died intestate, or (formerly) when the tenant was convicted of treason or felony, from which it follows that what the feudal writers call *feodum apertum* must revert to the lord of the fee. The Escheat Procedure Act of 1887 provides for inquiry as to the title of the Crown in any case where under the older statutes 'escheators' would have been employed.

In Scotch law single E. is the forfeiture to the Crown of one's moveable estate on conviction of certain crimes. Formerly it followed denunciation for non-payment or non-performance of a civil debt or obligation. Liferent E. is the forfeiture to the superior of the annual profits of the vassal's lands. A total forfeiture to the Crown of one's property is in Scotland a penalty attached to high treason only. Single E. is a penalty attached to a sentence of outlawry, fugitation, and other crimes. It ensues on sentence for a capital crime in Scotland.

Eschelles', Les, or **Échelles, Les** (Fr. 'the ladders'), a village in the S.E. of France, in the department of Savoie, about 11 miles S.W. of Chambéry. In the road between Chambéry and E. lies a huge limestone cliff 800 feet high, which travellers were formerly obliged to cross by means of ladders, but which was pierced by a tunnel 1000 feet long and 25 in height and width, a work begun by Napoleon and completed by the King of Sardinia in 1817. Pop. of commune 748.

Esch'enbach, Wolfram von, a celebrated Minnesinger, was born at Eschenbach, near Ansbach, in the latter part of the 12th c. He belonged to a noble family, and spent his life in knightly pursuits. He was conspicuous among the minstrels competing in the *Wartburg Krieg* ('war of the Wartburg'), held at the court of Hermann, Landgraf of Thuringia, in 1207. After Hermann's death E. retired to his paternal castle. He died about 1220. In his own time (says Schlegel) E. was as celebrated as Dante. His poems, which are on chivalrous and allegorical themes, display great imagination and elegance of diction, and combine the tenderness of the *Minne-lieder* with the brilliant fancies of the Provençal lyrists. His best works are *Parzival*, *Titurel*, *Lohengrin*, and *Willehalm*, a legendary Prince of Orange, who figures in the romance of Charlemagne.

Esch'er, Heinrich, merchant, was born at Zürich in 1626, and was sent to Louis XIV. in 1663 to renew the peace, and to ask for a renewal of Swiss trading privileges in France. He died 21st April, 1710.—**Johann Gaspard E.,** another Zürich man, was born 15th February, 1678, educated as a lawyer; supported in the Great Council the cause of public education and religious toleration, and was also successful diplomatically with Cardinal Fleury. He died 23rd December, 1762.—**Hans Konrad E.** was born at Zürich, 24th August, 1767. For his chief work, the embankment of the Linth and Glatz, he got the singular reward of adding *Von der Linth* to his name. Hans died 9th March, 1823. His son, **Arnold E., Von der Linth** (born 8th June, 1807, died at Zürich, 12th July, 1872), won a high reputation as a geologist.—**Johann Heinrich Alfred E.,** born at Zürich, 20th February, 1819, and educated for the law at Berlin, Bonn, and Paris. After lecturing at home on Swiss federal law, he was in 1841 elected to the Great Council, of which he rapidly became Secretary and President. He joined Furrer in expelling the Jesuits (1845), and devoted much thought to the reorganization of the cantonal schools. In 1848, as member of the Diet, E. intervened between Austria and Ticino, who were about to fight. He entirely approved of the federal constitution and the increased centralization. In the Bundesrath or Federal Council (see SWITZERLAND), which is an essential part of the Bundestaat Constitution (adopted by plebiscite in 1874), E. had much to do in forming the liberal and efficient system of education which Switzerland enjoys.

Eschscholt'zia, a genus of Exogenous plants belonging to the *Papaveraceæ*, or Poppy order. The Californian E., an annual common in our gardens, has large orange flowers. The floral receptacle grows up around the base of the ovary and carries up along with it the stamens, calyx, and corolla, the calyx ultimately separating from the other parts, and resembling a candle-extinguisher in shape.

Esch'wege ('Ash-tree road'), a town in the province of Hessen-Nassau, Prussia, 28 miles S.E. of Cassel, on the Werra. E. has an old castle, two churches, a *real*-school, and a pro-gymnasium. It is famous for its industries—cloth, oil, soap, and glue-making—and has tobacco manufactories and breweries. It is sometimes called the 'Hessian Elberfeld.' Pop. town 9016; district 42,260.

Esch'weiler ('Ash-tree dwelling'), an important manufacturing town in the province of Rheinland, Prussia, on the Inde, 9 miles E.N.E. of Aachen. The principal industries are the manufacture of iron and tin ware, machines, needles, iron-wire, silks, ribbons, leather, and wax-cloth. E. has besides breweries, rolling-mills, copper-forges, and lead and coal-mines. Some of the coal-mines are 200 fathoms deep. Tin and silver are also found. Pop. 16,780.

Esco'rial (Sp. *escoria*, 'dross,' in reference to the slag of exhausted mines found here) is a small town in the province, and 26 miles N.W. of the city, of Madrid, on the lower slope of the Sierra de Guadarrama. The town has sprung up beside the famous building—monastery and royal residence in one—of El E., which owes its origin to a vow made by Philip II. of Spain to commemorate St. Lawrence in gratitude for the victory he had won at St. Quentin on that saint's day (10th August), 1557. St. Lawrence is said to have been roasted alive on a gridiron, and Philip's votive memorial was built in the form of that utensil. It cost five million ducats, is built of bluish granite, and though grotesque and *bizarre* in style, is lavishly decorated, and contains several valuable collections of books and Arabic MSS., of coins, and of frescoes and pictures by Giordano, Carduchi, Pellegrini, and other Italian masters. The crucifix in the oratory is enriched with diamonds, &c. The mortuary chapel (called the Pantheon) contains the remains of the Spanish kings from Karl I. (V.) to Ferdinand VII., with the exception of Ferdinand VI., who was buried at Madrid.

Es′cuage (Old Fr. *escut*, 'a shield,' from Lat. *scutum*), in English feudal law, meant service of the shield, a kind of service by which the tenant was bound to follow his lord to war at his own charge. It also denoted money payments in place of military service.

Es′culin, an alkaloid obtained from the capsules of the fruit of the horse-chestnut. E. is slightly bitter, almost insoluble in cold water, soluble in 12 parts of boiling water, and more soluble in alcohol. E. has been introduced in Lyon for the cure of ague and periodic neuralgia, in place of quinine. Dose, 15 grains twice a day. The bark was used for the same purpose in 1720, and during the wars of the French Republic, when the importation of cinchona was interrupted.

Escutch′eon (Old Fr. *escusson*, Span. and Port. *escudo*, Ital. *scudo*, Lat. *scutum*, 'shield') is the shield upon which arms are depicted, but the word is also used to express the whole coat of arms. *E. of Pretence* is an inner shield bearing the arms of a wife who has brought lands as dowry.

Esdrae′lon is the Greek form of the Hebrew Jezreel, occurring only twice in the Apocryphal Book of Judith, iii. 9 and iv. 6. In Judith i. 8 the form is Esdrelom, and in chap. vii. 3, Esdraelom. The Plain of E. is triangular in shape, the mountains of Gilboa on the E. forming the base, the mountains of Galilee on the N. the one side, and Mount Carmel on the S.W. the other. Owing to its natural features it has been from time immemorial the battlefield of Syria, and from its position between Asia Minor and Egypt almost the battlefield of the East. It was the scene of the battle between Barak and Jabin (Judges iv.), Gideon and the Midianites and Amalekites (Judges vi., vii.), Saul and the Philistines (1 Sam. xxix. 1.), Ahad and Benhadad (1 Kings xx.), and between Josiah and the Egyptians (2 Kings xxiii., where it is called Megiddo, from the town of that name which stood on its southern border). Here the Assyrians and Persians, the Crusaders and Saracens, the Egyptians and Turks, the Arabs and Franks have fought, and here Bonaparte gained one of his victories.

Es′dras is the name of two Apocryphal books originally written in Greek, and attributed to Ezra (Gr. *Esdras*). In the Vulgate they are called 3rd and 4th E., 1st and 2nd E. being the canonical books of Ezra and Nehemiah. This arrangement was followed in all the earlier editions of the English Bible; that now existing, of calling the Apocryphal books 1st and 2nd E., was first adopted in the Geneva Bible. 1. E. consists of (1) the two last chapters of 2 Chron. nearly verbatim; (2) an original portion, written, probably in Egypt, in imitation of Esther and Daniel, and giving the history of three young men at the court of Darius; (3) the Book of Ezra differently arranged; and (4) a portion of Nehemiah. 2. E., or the Revelation of E., the date of which has been fixed variously from 28 B.C. to 69 A.D., and which was also probably written in Egypt, consists, as in English, of (1) two passages (cc. i., ii., and xv., xvi.) not found in the Ar. and Eth. versions, but interpolated in the Lat. text; (2) a passage after vii. 35, found in the Ar. and Eth. and omitted in the Lat. (probably from its denying the efficacy of human intercession after death); and (3) the original Apocalypse, consisting of a series of three revelations and three visions to Ezra, followed by the appearance to him of the Lord, from whom he receives the law.

Esenbeck′ia, a genus of plants belonging to the *Rutaceæ* or Rue order, and represented by the fever-curing E., which is employed in Brazil as a substitute for Peruvian bark.

Esk (Cymric, *wysk*, Gael. *uisk*, 'water'), the name of several streams in Scotland, of which five are worthy of note:—1. The Dumfriesshire E., rising on the borders of Selkirk, near Ettrick Pen, and flowing in its upper course through the wild pastoral solitudes of Eskdalemuir, and in its lower course through the richer scenery of Cumberland, falling into the Solway at the head of the estuary after a southerly course of 45 miles. This is the river of Young Lochinvar. 'He swam the E. river where ford there was none.' 2 and 3. The N. and S.E. in Midlothian, which rise in Peeblesshire and flow N.N.E., uniting in Dalkeith Park, and entering the Firth of Forth at Musselburgh after a course of 23 miles. The N. branch passes through the romantic ravines of Roslin and Hawthornden. 4 and 5. The Forfarshire Esks, both of which have their source in the eastern Grampians, the more northerly and lesser of the two reaching the sea 4 miles N. of Montrose after a course of 25 miles; the southerly and larger stream crossing the valley of Strathmore, passing Brechin, and falling into the Bay of Montrose after an easterly course of 40 miles. The southern English form of this Celtic word is *Exe* or *Axe* (q.v.).

Es′ki-Djuma ('Old commune'), a town in Bulgaria, 18 miles W. by S. of Shumla, near the Kamchik springs, has a culture of silk and large fairs. Pop. 9680.

Eskimo or **Esquimaux Dog,** a variety of Dog (q.v.), so named from its being found associated with the Eskimo or Esquimaux and other northern tribes in Europe, N. America, and Asia. It is extensively used in Arctic travelling for drawing sledges, and is very hardy and sagacious. The general colour is a dark grey, and the average size about that of a pointer. The outer hair is coarse and stiff, but a warm softer inner coat exists. The ears are short and pointed, and the bushy tail is generally curled over the back.

Eskimo Dog.

Es′kimos or **Esquimaux** (native name, *Inuit*, 'the people'), called by the Abenaki—an aboriginal people who at one time inhabited the country afterwards known as New England — *Eskimantsic*, or 'eaters of raw flesh.' The Abenaki applied this name to the tribes on the coasts of Labrador; the early French Canadians converted it into *Eskimaux* or *Esquimaux*. Latham and other ethnologists write it *Eskimos*, after the Danish orthography; while Rink, following the same orthography, uses the name *Eskimo* both in a singular and in a plural sense. The E. are a distinctive and singular people inhabiting Greenland and Labrador, the N. American shores, the inhabited islands of the N. American Archipelago, and part of the coast regions of the extreme N.E. of Siberia. They are spread over an insular region and a coast-line 5000 miles in extent, but they never penetrate inland. They are essentially a littoral people, able to obtain sustenance only from the sea. The E. closely resemble each other over the whole area occupied by them in appearance, language, habits, traditions, &c., and there is perhaps no other nation so unmixed in blood. Their faces are of a broad oval shape, the forehead and chin recede, the nose is usually broad and depressed, but in some instances prominent like that of Europeans. The eyes are small and oblique, and the complexion is nearly white after the removal of the permanent coating of oil, dirt, and smoke which covers the face. The usual height is from 5 feet to 5 feet 10 inches, and in rare instances to about 6 feet, and both men and women are remarkably muscular and agile. Latham ranks them among the American Mongolidæ, under which designation he includes all the native races of the New World. Rink, probably the most authoritative writer on the origin and history of the E., asserts that the independent existence of this people dates from a very remote period—many of their traditions being much more than one thousand years old—and inclines to the belief that the immediate cradle of the race was the American and not the Asiatic continent. His theory is that this people, originally located on the great rivers of polar N. America, were driven northward to the coast and to the islands beyond by Indians from the south, between whom and the E. a traditional enmity subsists to the present day. The E. depend for their existence on the seals and cetaceous animals which they capture at breathing-holes in the ice or at its edge. The blubber of these animals is their usual food, and enables them to resist the extreme cold of the regions they inhabit, while the skins of the seal, &c., are made into suitable and sufficient clothing. The imperative necessity of capturing these animals in order to preserve life has moulded the character of the social life, defined the nature of the inventions, and affected if not created, the religion, the superstitions, and the amusements of this people. Their *kayak* or shuttle-shaped boat, in which they hunt the walrus and whale, is a framework of wood joined together chiefly by strings, covered with skins, and impenetrable to water. Nothing could be more admirably adapted for its purpose, yet it would be difficult to find any sea-going boat anything at all like it in any other part of the globe. Their harpoons are fitted with an inflated bladder, which serves the double purpose of retarding the retreat of the wounded animal and floating the harpoon should it escape. The points of the harpoons and spears are so fitted into the shafts that after the blow has been delivered the point and the shaft come apart. The shafts of these weapons in most cases consist of small pieces of bone neatly tied together with thongs, and the points are supplied by the unicorn of the narwhal, by sharp-pointed bones, teeth, and occasionally metal, of the value of which the E. have the liveliest appreciation. The dog-sledges, marvels of construction, are also, for the most part, formed of pieces of bone tied together. Grouped together in small tribes of six to twelve or more families, the E. regard their wintering quarters as their home; in summer, however, they are constantly travelling, and choose their route usually with the view of hunting reindeer, though seal-hunting, fishing, and trade are objects always kept in mind. When the cold weather comes round, the party returns to the wintering-place, and recommences sealing and whaling for the season. They often eat flesh and fish raw, but the usual custom is to boil it in a stone pot suspended over a lamp fed with blubber, and with moss for wicks. The costume is nearly the same for both sexes, consisting of fur or sealskin jacket, with hood, trousers of the same material, and boots reaching well up the thigh. In summer they reside in tents formed of hides sewn together, but in winter they retire into houses variously constructed, as the capabilities of the locality permit—of stones and turf, stones and bones, drift-wood, or blocks of frozen snow so cut and arranged the one above the other as to form a vault or dome. Owing to the uncleanly habits of the people, and to the circumstance that their food is often in a putrid condition, the stench of these houses is unsupportable to white men, though some of our early explorers passed whole nights in them. The religion of the E. is a form of paganism, the system embracing a supreme being named *Tornarsuk*, a series of guardian spirits named *tornat*, and a class of human beings (*angakut*) endowed with supernatural wisdom or power. Existence the E. accept as a fact without speculating on the origin of man. Their invisible world embraces the *upper world*, the unlucky souls in which suffer from constant cold and famine; and the *under world*, in which the temperature is warm, and the food abundant. The E. are firm believers in witchcraft of a most complicated description. The tales and traditions of this singular people are divided into two classes, the ancient and the modern, the former of which—recounting extraordinary adventures, under conditions, however, precisely the same as those under which the E. of the present day live—are believed to be much more than a thousand years old. These tales form a body of unwritten literature, handed down orally, but with scrupulous exactness, from generation to generation. Story-telling is cultivated as a science, and the art of the *raconteur* is subjected to such a severe standard in the matter of accuracy, that the tales are supposed to have been preserved in an unaltered shape for ages. They concern themselves chiefly with deeds of violence terribly avenged, and the usual moral enforced is to be kind to orphans and to the defenceless, if we would avoid the surely coming day of reckoning. Of the entire race, the number of which is not ascertained, those that have come directly under European influence are chiefly the inhabitants of the Danish districts in Greenland. During the last century these were rapidly decreasing; but after the Moravian mission established here by Hans Egede in 1721 had taken firm root, the decrease was arrested, and in time the numbers began to increase. For some time subsequent to 1855 the numbers of E. in the Danish districts remained almost stationary between 9400 and 9700; but the pop. of Greenland is now estimated to amount to 10,516, which number includes a few Europeans. The Danish officials have never introduced intoxicating liquors into Greenland, and scarcely another instance can be adduced in which Europeans have shown equal consideration for an aboriginal race. See Richardson's *Polar Regions*, and Henry Rink's *Tales and Traditions of the Eskimo.*

Eskimo Hunter.

Es'ki-Zaghra, a town in Eastern Roumelia, about 30 miles S. of the Balkan Mountains, and 67 miles N.W. of Adrianople, with manufactures of carpets, &c., has several mosques and Christian churches, and a huge bazaar. Its baths are much frequented. Pop. 15,027.

Es'la, a tributary of the Douro, rises in the Cantabrian mountains, province of Leon, Spain, and after a S.W. course of 130 miles, falls into the Douro, 15 miles below Zamora. In the angle at the confluence of the Douro and E. is found the finest clay in the Peninsula for the manufacture of earthenware.

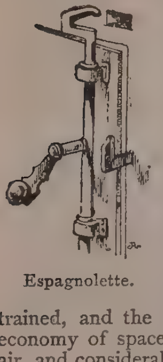
Esmerel′da (Span. 'emerald'), a river of Ecuador, S. America, rises near Quito, passes the town Esmerelda (pop. 1560), and enters the Pacific after a course of 110 miles.—E. is also the name of a mountain range of Brazil, province of Minas Geraes, about 170 miles long, and of a county in Nevada bordering on California, and rich in minerals.

Es′neh, or **Es′ne,** a town in Upper Egypt, on the left bank of the Nile, about 80 miles N. of Assouan. It has some manufactures of cotton and earthenware, and a pop. of 3250, of whom half are Copts. At E. are the ruins of a sandstone temple, founded by Thothmes III., and dedicated to Chnumis Satis and Har-Hek.

Part of the Temple at Esneh.

Eso′cidæ, a family of Teleostean fishes, represented by the Pikes. It belongs to the *Malacopteri* ('soft-finned') section of the Teleostei, and to the Abdominalian section of the *Malacopteri*. The dorsal fin is placed far back on the body, and the intermaxillary bones partly contribute to the formation of the upper jaw.

Esoter′ic (Gr. *esōterikos*, 'inner'), in the ancient mysteries and schools of philosophy, was applied to the doctrines taught in private, and designed for the initiated alone. Those taught to the public were termed *exoteric*. In general the former denotes the secret or abstruse, the latter the public or popular.


Espagnolette.

Espagnolette, in architecture, a French term signifying an arrangement by which a window is closed. It consists of an iron rod, with a hook at each end, which is moved by a handle inside the room. The hooks are held fast in staples when the window is closed. By turning the handle, the hooks are released from the staples, and the window opens.

Espal′ier (Fr. from Ital. *spalliere*), a supporting lattice-work of wood or wire-fencing on which fruit-trees, &c., are trained, and the objects gained by the use of which are economy of space, favourable exposure to heat, light, and air, and considerable protection against the effects of high winds. The British fruit-trees most suitable for training by means of the E. are the apple and pear.

Esparte′ro, Don Jo′aquin Baldome′ro, a Spanish general and politician, the son of a cartwright, was born at Granotula, La Mancha, 27th February, 1792. He was intended for the Church, but, on the French invading Spain, in 1808, joined the *Batallon Sagrado* ('the sacred battalion') formed wholly of students, and, on the expulsion of the French, fought in S. America against the insurgent colonies. On his return to Spain he espoused the cause of Isabella II., drove Don Carlos from the country in 1839, for which he was made a grandee and duke, and from 1841 to 1843 governed as regent with considerable success, though often foiled by intrigues. In 1843 the party of progress and the party of Queen Christina united against him. General Narvaez entered Madrid, and E., deserted by his troops, betook himself to England, where he remained until 1848. He lived in retirement in Spain from 1848 to 1854, when Queen Isabella unwillingly summoned him to form a ministry along with General O'Donnell. Soon two parties arose—the Liberals, followers of E., and the opponents of progress, headed by O'Donnell—the antagonism between which became so bitter as to completely cramp the government. In 1856 E. was dismissed, and immediately rebellions in his favour broke out at Madrid, Barcelona, and Zaragoza, but from these he held aloof, resigning the senatorial rank in 1857. In 1868 he showed warm sympathy for the provisional government, and in 1869 it was proposed by one of the deputies that he should be made king, a scheme which the Cortes did not favour. In 1875 he avowed his adherence to Alfonso XII. He died at Logroño, 9th January, 1879. E. proved himself a good soldier, and one of the most honest, patriotic, and disinterested of Spanish politicians, but wanted the decision, wariness, and dexterity indispensable to successful Spanish statesmen.

Espar′to (*Macrochloa*, or *Stipa*, *tenacissima*), a well-known genus of Grasses, grown in large quantities in Spain and Northern Africa, whence it is exported for the manufacture of mats, baskets, ropes, paper, &c.

Es′pinasse, or **Lespinasse, Claire Françoise,** famous for her powers of fascination, intellectual brilliance, and shifting fervours of sentiment, was born at Lyon in 1731 or 1733. She was the child of Madame d'Albon, and after acting as governess in a noble's household, went to Paris as a companion to Madame du Deffand, to whom she was at first strongly attached, but whom she soon eclipsed by her youthful beauty and wit. A quarrel ensued, and Mademoiselle E. separated from Madame du Deffand, most of whose admirers, D'Alembert among others, forsook her for her more captivating rival. Her friends then obtained Mademoiselle E. a pension from the king, and she continued until her death, at Paris, 23rd May, 1776, to charm the most cultivated circles of her time. D'Alembert was deeply enamoured of her. Her letters show her to have possessed a warm heart, as well as dazzling wit and exquisite accomplishments. See her *Lettres* (Par. 1806).

Es′pinel, Vicente, a Spanish poet, born at Ronda, in Grenada, 28th December, 1551. He studied at Salamanca, entered the army, fought in Flanders, and travelled through France, Italy, and Spain. He afterwards took holy orders, obtained some preferment, and ended his life in a monastery at Madrid in 1634. E. was a musician of considerable fame, and added the fifth string to the guitar. He probably invented the stanza of ten octosyllabic verses called *Espinelas*. His works are *Life and Adventures of Marcos of Obregon*, which somewhat resembles *Gil Blas*; *Casa de las Memorias*, a poem; a translation of Horace's *Ars Poetica*, and various lyrics and biographies.

Espinha′ço, Serra do, a mountain chain in Brazil, running parallel to the coast, generally about 150 miles from it, though its offsets in places approach within 20 miles of it. It rises N. of Ouro Preto, and extends northward to the banks of the San Francisco. Its southern portion is the highest, but no summit rises above 6000 feet.

Espir'ito San'to (Port. 'Holy Spirit').—1. A maritime province of Brazil to the N. of Rio Janeiro, has an area of 17,315 sq. miles, and a pop. of 124,361. It consists of the land which lies between the mountains, Serra dos Aimores, and the sea, and between the river Mucury on the N. and the river Itabapuana on the S. It is watered by the Rio Doce, and is in great part covered with forests, in which are found valuable woods and drugs. The coast flats yield sugar, cotton, manioc, and rice. The capital is Victoria. 2. A town (called by the Spaniards *Sancti Spiritu*) of Cuba, near the centre of the island, 240 miles E.S.E. of Habana. Pop. 32,608. 3. The largest island of the New Hebrides, 65 miles by 20, and rising some 2000 feet above the sea.

Es'planade (Fr. from Lat. *ex* 'out,' and *planus*, 'flat'), in fortification, is an open space of ground extending in front of the glacis of a fortified work, such as intervenes between the citadel and the houses of every fortified town, and the object of which is to make certain that in the event of siege no cover shall be afforded to the enemy. The term is also applied to open spaces for walks and drives, into which the fortified works of former days are now so frequently converted.

Es'py, James P., an American meteorologist, was born in Pennsylvania about 1785. In his early life he was a successful teacher in Philadelphia, but becoming devoted to the study of meteorology, he left the profession of teaching and supported himself by lecturing, for which the United States present peculiar facilities. He delivered a series of lectures to the Franklin Institute of Pennsylvania, and rendered himself famous by his theory of storms. He received the Magellanic premium of the American Philosophical Society of Philadelphia in 1836 for a treatise on storms. His numerous lectures on this subject gained him the name of the Storm-king. In 1841 he published his book upon the *Philosophy of Storms*, a work which received the highest commendation. In the Smithsonian Institution at Washington he made his important experiments upon the cooling of gases, and the cooling effects of expansion on dry and moist air. E. made several able reports on meteorology to the United States Government, the last being printed in 1857. His ardour and enthusiasm did much to advance this science to the prominent place it holds in America. E. died in Cincinnati, 24th January, 1860.

Esquire', or Écuyer (Old F. *escuyer*, 'a shield-bearer,' from *escut*, Lat. *scutum*, 'a shield'), literally a man who carries a knight's shield. The E. in chivalry was the stage into which the page, *damoiseau* or varlet, passed at the age of fourteen. The next seven years were spent in athletics, running at the ring, tilting, and mock combats, and in attendance on a particular knight. On entering the temple of honour the E. became a knight or chevalier. E. was the first degree of 'grand chivalry,' to which, as a general rule, only persons of noble birth were admitted; but sometimes chevaliers were created without passing through the stage of E. The squire was responsible for the state of the knight's armour, a most important matter in close fighting with pointed weapons. The dress of an E. was properly a modest brown; but the garment of Chaucer's E. was 'embroidered like a meadow.' Many gentlemen of good birth did not become knights on account of poverty. (See CHIVALRY.) In English law E. is apparently a title not of dignity, but merely of *worship*, colonels, serjeants-at-law, and doctors of the learned professions being placed before esquires. There are five sorts of esquires, namely those by birth—the younger sons of peers and their eldest sons, the eldest sons of knights and their eldest sons; by prescription—heads or chiefs of ancient families; by creation or office—serjeants-at-arms, heralds, judges, officers of state, the higher naval and military commissioned officers, barristers-at-law, doctors of various faculties, justices of the peace; by appointment—a Knight of the Bath appoints three to wait upon him when he is installed or attends a coronation.

Esquirol, Jean Étienne Dominique, a French physician, famous for his treatment of the insane, was born at Toulouse, 4th January, 1772. He studied medicine in Paris, giving special attention to insanity, and in 1799 founded an institution for the mentally deranged. In 1811 he was elected successor to Pinel at the Salpêtrière, where he introduced an entirely novel treatment of maniacs, substituting kindness for constraint. He was made inspector-general of the university in 1823, and in 1826 chief physician to the Private Lunatic Asylum at Charenton. He died 12th December, 1840. Through his philanthropic labours and scientific attainments the old coercive and cruel treatment of the insane was abolished, and the present humane system introduced. E.'s chief work, *Des Maladies Mentales considérées sous les Rapports Médical, Hygiénique et Médico-légal* (Par. 1838), is of great value.

Esquiros, Henri Alphonse, a French author, was born at Paris in 1814. His first work, *Les Hirondelles*, appeared in 1834, and won the praise of Victor Hugo. He published *Les Magiciens*, a phantasy, three years later, and the romance of *Charlotte Corday* in 1840. In that year also he produced three works of great power—*Les Vierges Martyres*, *Les Vierges Folles*, and *Les Vierges Sages*. In 1841 E. was imprisoned in the Pélagie for supporting the views of Lamennais, when he wrote *Les Chants d'un Prisonnier*. In 1847 he published *L'Histoire des Montagnards*, and *Paris*, being papers on 19th c. life, reprinted from the *Revue des Deux Mondes*. E. became member of the Legislative Assembly in 1848; but after the *coup d'état* was exiled for his opposition to the Empire. In 1855 he came to England, and his *English at Home* was published at London in 1862 and 1863. His *Dutch at Home* was published by Chapman & Hall in 1861. In 1869 E. was returned to the *Corps Législatif*, and became prefect of a department. In 1870, however, he retired, and assumed the editorship of the *Égalité* at Marseille. He died at Paris, 13th May, 1876.

Ess'bouquet, an abbreviation of essence of bouquet, is a compound perfume of English origin and well established reputation. Like most bouquets, it is of complex composition, containing orange, citron, petit-grain, lavender, clove, and cassia oil, tincture of musk, and a minute quantity of attar of rose, besides other essences.

Ess'en, an ancient town of the province of Rheinland, Prussia, on the Börne, 20 miles N.E. of Düsseldorf by railway, in a district rich in coal and iron. It has a cathedral, the west choir of which dates from the 9th c., and which was renewed in 1855. The mines in the circle of E. produce about 20,000,000 tons of coal and 500,000 tons of iron ore annually. E. is the seat of the famous cast-steel works of Herr Krupp, which employ several thousand hands, and cover 1800 English acres, of which one-fifth is roofed over. The establishment is very complete, having 23 miles of rails for locomotives, and 9 miles for horse-waggons, a telegraph system, with stations, fire-brigade, hotel, beer-shops, bakery, printing-presses, &c. Pop. 78,706.

Essen, Hans, Henrik, Count, a celebrated general and statesman of Sweden, born in Kaflas, in Ostergotland, in 1755, and educated at the Sweden universities, he early attracted the notice of Gustavus III., whom he accompanied on his foreign travels. E. rendered valuable service during the campaign in Finland. On the assassination of the King, whom he had warned in vain of the impending danger, E. was appointed Governor of Stockholm by Gustavus IV., and later, in 1807, commander-in-chief in Pomerania, whence he was recalled. E. lived in retirement till 1814, when Charles XIII. sent him with an army against Norway, and on the union of the two countries he was made Governor of Norway. E. died 28th July, 1824.

Essences are solutions of volatile essential oils in alcohol, and are prepared—(1) by adding a rectified spirit to the odoriferous parts of the plant and distilling; (2) by adding the spirit to the previously-extracted oil and distilling; or (3) by adding the oil to the spirit and agitating till a uniform mixture is obtained. Innumerable simple and compound E. may thus be prepared. Alcoholic solutions, as of camphor, are sometimes called E. In the pharmacopœia E. and spirits are identical in preparation, but the former contain 1 part of the oil to 4 of the spirit, and the latter 1 to 49.

Essenes'. Countless derivations of the name have been given, making them 'the healers,' 'the holy,' 'the faithful to God,' 'the mysteriously silent,' 'the watchers,' 'the seers,' 'the agents,' 'the baptists,' 'the pious.' The greatest English authority, Ginsburg, who enumerates nineteen, prefers the last (Heb. *Chassiya*, 'pious'), which connects the name with *Chassidim*. The E. were a Jewish sect, or rather a branch of the sect of the Pharisees. They represented the direct and legitimate development of Judaism in a strict application of the demands of the law as understood from the time of Ezra. Being, like the Pharisees, the descendants of the Chassidim (q.v.) or Puritans, the E. were the ultra-Puritans, while the Pharisees were the moderate party; or the E. were to the Pharisees what the latter were to the general community. Thus in the Mishna, Talmud, and Midrashim, they are called the original Assideans, *i.e.*, Chassidim. If this be the correct theory of their origin, it is impossible to say at what date they could have been regarded as distinct from the general body of the Jews. They are first mentioned as a distinct sect in the time of Jonathan the Maccabæan, about 160 B.C. (Josephus, *Antiquities*, xiii. 5, 9). At first they lived in the general community, especially in Jerusalem, which had a gate named after them. From Jerusalem they retired to the smaller towns and villages, and from these to the deserts, in order to avoid the habitual wickedness of citizens, but also and chiefly because, according to their observance of the Levitical laws of purity, they considered themselves defiled by coming in contact with those who did not live according to the same rules. The majority settled on the N.W. shore of the Dead Sea, and the rest lived in scattered communities throughout Palestine and Syria. According to Josephus they numbered 4000. After A.D. 40 little is heard of them. Probably most of them became Christians. The most marked points of difference between them and the Pharisees were that they (1) formed an isolated brotherhood; (2) held celibacy to be a higher life; (3) did not go to the temple, nor offer sacrifices; and (4) did not believe in a resurrection of the body, though holding the immortality of the soul. Many of the precepts and practices of Essenism reappear in Christianity; but that the former led the way to the latter by expecting a Messiah and proclaiming the kingdom of heaven is incorrect, because the E. regarded these as enclosed within their own limits.

The principal doctrines and practices of the E. which appear in the Christian system are the following:—To seek first the kingdom of God and his righteousness (cf. Matt. vi. 33, Luke xii. 31); to seek to have no treasure upon earth, the supply of one's wants with contentment being enough, and the greatest riches, Matt. vi. 11, 19-21, 25-34; community of goods, the rich selling their property, and a steward keeping a common bag for the benefit of all, Matt. xix. 21, Luke xii. 33, John xii. 6, xiii. 29, Acts ii. 44, 45, iv. 32-55; all were on a perfect equality, Matt. xx. 25-28, xxiii. 8-12, Mark ix. 35-37, x. 42-45; to be meek and lowly in heart, poor in spirit, merciful, pure in heart, peace-makers, to hunger and thirst after righteousness, Matt. v. 1-9, xi. 29; the healing of the body to be combined with that of the soul, as by Christ the power to exorcise demons, to perform miraculous cures, &c., was given to the faithful, Matt. x. 8, Mark xvi. 17, Luke ix. 1, 2, x. 9; that oaths should never be used, Matt. v. 33-37; to take nothing with them on a journey, Matt. x. 9, 10, Mark vi. 8-10; to make no weapons of war, Matt. xxvi. 52, only weapons might be carried on a journey for defence against robbers, Luke xxii. 36; that celibacy was a higher kind of life than matrimony, although some among them had wives, Matt. xix. 10-12, 1 Cor. vii. 32-35; not to offer animal sacrifices, but their own bodies, Rom. xii. 1; to live such a life of purity as to be temples of the Holy Ghost and be able to prophesy, 1 Cor. vi. 19, xiv. 1, 39; a threefold rule for the conduct of their life—love of God, of virtue, of mankind, Matt. xxii. 36-40; to despise philosophy except in so far as it treated of the existence of God, Col. ii. 8; a supreme love for the members of the brotherhood, Rom. xiii. 8, 1 Tim. iv. 9, 1 Peter i. 22, ii. 17, 1 John iii. 14, iv. 7, 11, v. 2.

As the majority lived in celibacy, the brotherhood had to be kept up by proselytes. The best material for these of course was children, whom they preferred. Grown-up candidates had to pass through a noviciate of two stages extending over three years, attaining in succession seven different degrees of purity or holiness: (1) outward or bodily purity by baptisms; (2) celibacy; (3) inward or spiritual purity; (4) the possession of a meek and lowly spirit; (5) being a temple of the Holy Spirit and able to prophesy; (6) being able to perform miraculous cures and raise the dead; (7) being like Elias, the forerunner of the Messiah. Our Saviour described John Baptist as having attained the highest degree of Essene purity (Matt. xi. 14); and as much of the Sermon on the Mount is expressed in Essene phraseology, and still more is in accordance with its spirit, it has been thought probable that Christ himself may have in his youth been instructed by members of the sect. The original authorities on the subject are Josephus, Philo, and Pliny. The first to show the true relations of the E. to allied sects was Frankel.

Essen'tial Oils, or **Ethe'real Oils,** are substances which in their chemical constitution and properties differ entirely from common or fixed oils; but they are closely allied to resins, into which, through oleo-resins, they insensibly merge. At ordinary temperatures they are for the most part fluid, and such as are solid melt readily without decomposition, and they also undergo distillation without change. They possess a burning taste and a powerful odour, which in some is very pleasant, while in others it is equally repulsive. Their smell is due to the fact that the gaseous particles they evolve are very energetically acted on by oxygen. Some are pure hydro-carbons (*i.e.*, compounds of carbon and hydrogen), others contain oxygen in addition, and in the malodorous series sulphur is also present. Under the influence of cold many of them separate into two distinct bodies, a solid crystalline stearoptene and a fluid elaoptene. E. O. are very sparingly soluble in water, but dissolve freely in alcohol, ether, bisulphide of carbon, chloroform, and the fixed oils. Such of them as possess a pleasant odour are extensively employed in perfumery, others are largely used for flavouring articles of food, others are valued in medicine, and a few are employed in the arts as solvents, &c. The following is a list of the principal E. O.:—Orange, neroli, bergamot, lemon, lime, petit-grain, bitter almond, lavender, peppermint, mint, rosemary, marjoram, thyme, carraway, anise, sweet fennel, cajuput, sassafras, cinnamon, cassia, clove, pimento, nutmeg, sandalwood, rosewood (*Convolvulus scoparius*), geranium, winter-green, patchouli, vetiver, citronelle (species of *andropogon*), cedarwood or juniper, and Calamus aromaticus.

Essequi'bo, a river of British Guiana, S. America, rises in the Serra-Acaray, to the E. of the Moon Mountains, between British territory and Brazil, flows in a direction almost always due N. through impenetrable forests, and enters the Atlantic after a course of upwards of 550 miles, broken by numerous cataracts. Its mouth forms an estuary 20 miles wide, in which are several islands, such as Hog, Leguan, Tiger, and Wakenaam. Small schooners can proceed nearly 50 miles up the river.

Ess'ex, a county in the S.E. of England, bounded N. by Suffolk and Cambridge, W. by Hertford and Middlesex, S. by the estuary of the Thames, and E. by the German Ocean. E. is well watered by tributaries of the Thames, as well as by the Crouch, Chelmer, and Colne. The surface, which in the N. and in the centre is richly wooded, and on the coast partly sandy and partly marshy, nowhere reaches a great elevation. The highest point is Langdon Hill, 620 feet above the sea-level. Of the 985,545 acres which constitute the area of land and water in E. (not including tidal water) 344,133 are under corn crops (wheat 124,592), 100,494 under green crops (potatoes 10,929, and turnips and swedes 28,116), 83,405 under clover, sainfoin and grasses in rotation, and 253,998 under permanent pasture and grass (hay 114,790). Flax is cultivated on 195 acres, and small fruit on 1527, while 43,722 are bare fallow or uncropped arable land. Mountain and heath land cover 1248 acres, nursery grounds are laid out over 374, and woods and plantations cover 28,784. In the neighbourhood of London, chemicals, tar, &c., are manufactured. There are silk-mills at Colchester, Braintree, Halstead, &c. Straw-plaiting employs numerous hands in the villages, and there are cement and whiting manufactories, iron-foundries, and brick-works. Oyster-fishing has been long a profitable industry. Calves and lambs are raised in large numbers for London, and the county is famous for its breed of pigs. See articles CATTLE, HORSE, PIG, SHEEP. In the time of the Romans this part of the island was occupied by the Trinobantes, and was included in the Roman province *Flavia Cæsariensis*. It was the nucleus of one of the kingdoms founded by the Low German invaders of Britain, from whom it received its present name of an E. or 'East-Saxon' land. Pop. of E., ancient county 785,445; reg. county 761,191; and adm. county 579,355. E. contains eight parliamentary divisions, each of which returns one member: E. or Maldon, 54,572; Mid or Chelmsford, 58,304; N.E. or Harwich, 55,623; N. or Saffron Walden, 47,449; S.E., 69,837; S. or Romford, 103,546; S.W. or Walthamstow, 101,236; and W. or Epping, 55,416.

Essex, Earl of. See CROMWELL, THOMAS.

Essex, Robert Devereux, Second Earl of, son of Walter Devereux, first Earl, was born at Netherwood in Herefordshire, 10th November, 1567, studied at Cambridge, was introduced at court by Burleigh in 1584, and gained the favour of Elizabeth. In 1585 he accompanied the Earl of Leicester in his expedition to Holland, and showed great bravery in the battle of Zutphen. On the death of Leicester, E. succeeded to his place in the Queen's affections, and honours were showered upon him. He commanded two expeditions against Spain, in the latter of which Cadiz was captured, and was made Earl Marshal of England and Chancellor of Cambridge University. At the same time he acquired a high reputation beyond the limits of the court by his generous patronage of men of letters and science, such as Shakespeare and Bacon. But popularity turned his head. He offended the Queen by rudeness. In spite of this he was appointed (1599) Lord Lieutenant of Ireland when the larger portion of that island was in rebellion. He failed, however, to allay the disorders, and was recalled. Returning to London, E. madly put himself at the head of an insurrection, was imprisoned, and after a trial, for his share in which Bacon (q.v.) has incurred deserved obloquy, was condemned to death. His execution took place, 25th February, 1601.—**Robert Devereux, Third Earl of E.,** son of the preceding, was born at Essex House in 1592, studied at Eton and Oxford, and in his earlier years took service under the Elector Palatine and the United Provinces. He was not a favourite with King James or with his son Charles, and soon after the outbreak of the Civil War was appointed general of the Parliamentary forces. He commanded at Edgehill (1642), took Reading (1643), compelled the King to raise the siege of Gloucester (1643), but was unfortunate in a campaign in Cornwall, and escaped with difficulty to London. He was received with honour by the Parliament, but ill-health and the growing power of the Independents (E. was a moderate Presbyterian) induced him to withdraw from public affairs. He died 14th September, 1646. See Green's *Short History of the English People*.

Ess'ling, a village of Austria, 5 miles E. of Vienna, together with Aspern (q.v.) the site of a fierce but indecisive battle between Napoleon and the Austrians, 21st-22nd May, 1809. From it Massena got his title of 'Prince of E.'

Ess'lingen, a walled town of Würtemburg, on the Neckar, 9 miles E.S.E. of Stuttgart by railway. It has a fine Gothic *Frauenkirche* (14th c.), with a spire 230 feet high, an old castle, a rare old townhouse (1430), a well-endowed hospital, and extensive manufactures of machinery, cottons, woollens, paper, silver ware, and wines. E. is specially celebrated for its locomotive engines and its 'champagne,' a sparkling Neckar wine. E., founded in the 8th c., was made a free city of the German Empire under Otto IV. in 1209. The Swabian Bund was formed here in 1488. A school for knights existed till 1733 at E., which was the scene of many tournaments. The town suffered severely in the Thirty Years' War. It came to Würtemburg by the peace of Lunéville in 1802. Pop. 22,234.

Essoign' (Fr. *ensoigne*, *essoin*, from *soin*, 'care,' 'labour'), in English law, an excuse on oath on ground of sickness or other sufficient cause for non-appearance by one called in an action. *E. day of term* was the first day of the term on which the courts were open, essoigns or excuses being then, according to ancient custom, heard for those who had not appeared according to the summons. Statute 11 Geo. IV. and 1 Will. IV. c. 70 abolished E. day of term as part of the term. In Scotch law the form is *Essonium* or *Essonzie*.

Ess'ouan, or **Es'wan.** See ASSOUAN.

Estab'lished Church is a Church recognised and supported by the state. The relation in which the Church may be said to stand to the state depends on the definition of the nature of the Church. The form of the Christian Church was—(1) The little community at Jerusalem. (2) As soon, however, as another such community was formed elsewhere, and one member of the Church was dead, a new idea was formed of the Church as a spiritual body, bounded by no limits of space or time, but composed of those (and none else) of whom it is written, 'As many as are led by the Spirit of God, they are the sons of God.' In process of time the theory came to be developed (3) that the Church is essentially an externally organized society, all those born within its pale being its members and entitled to all its privileges—its sacraments and ordinances—in virtue not of their character but of their birthright. It is in this sense only—in which baptized persons are everywhere claimed as Christians—that there can properly be a *national* E. C. Before the Reformation nations were held by the Church to be Christian as nations, and with the development of the Popedom the Church became not only national but Catholic. After the Reformation Protestant Churches which kept the doctrine of baptismal regeneration could properly enough maintain their national character, the headship being vested in the sovereign instead of the Pope. It thus appears that it is an impropriety to speak of an alliance between a national Church and the state, because they are identical. Owing, however, to the growth of dissent in modern times, it is customary to speak of the relation existing between the Church and the state as an alliance; and the arguments for and against such a relation existing may be here briefly stated. The controversy is carried on both on the ground of *divine authority* and on that of *utility*. 1. *Divine authority*.—It is contended that the teaching of Scripture is in favour of a national E. C. both as to the principle and as to its application. (1) As to the principle, Scripture teaches that Jesus Christ is the supreme king over all kings and rulers, and head not only of his Church but of all nations: Ps. ii. 12 (applied to Christ, Acts xiii. 33); lxxii.; cx.; Eph. i. 21, 22; Rev. *passim*. (2) As to the application—(*a*) in Melchizedec the offices of priest and king were united (the closest conceivable union of Church and state), in respect of which he was a type of Christ (Heb. vii. 1, 2); and further, Abraham's paying tithes to Melchizedec was a type of the rights of the priesthood of Christ (Heb. vii.). (*b*) The Mosaic ordinances for the payment of tithes to the priests amounted to a national establishment and endowment of the Church. It is held on this side to be no valid objection that the Jewish system was a pure theocracy, because it was founded on principles of moral obligation which are applicable in all time. (*c*) In reference to the Gospel dispensation, it is contended that 'when the ordinance of God in behalf of kings and other rulers (as in Rom. xiii. 1, 2; 1 Tim. ii. 1, 2; 1 Pet. ii. 13-15) was so explicitly renewed, if it had been intended to impose any new and peculiar restriction upon their authority, it is impossible to suppose that it would not have been made known.' The objections and arguments on the other side under this head are in brief as follow:—(1) 'That there is no precept of the gospel under which an E. C. is required and enjoined, and that there was no such institution during the first three centuries.' (2) 'That Christ himself declared that his kingdom is not of this world: John xviii. 36.' (3) 'That a civil government is not competent to specify what ought to be the nation's creed, and cannot therefore be supposed to have divine authority to do so.' (4) 'That the maintenance of any particular system of religion at the public expense, and consequently more or less at the expense of dissenters, is anti-scriptural, unjust, and a violation of the rights of conscience.' 2. On the ground of *utility* it is argued, on the one hand—(1) That an E. C. is necessary for keeping up a supply of ministers and religious ordinances proportioned to the spiritual wants of the people; and asserted that the voluntary system, when it has been tried, has signally failed in giving such a supply in poor and thinly-inhabited parts. (2) That there are great advantages in the ministers of religion being independent of those to whom they minister, because when dependent on them they are under a temptation to accommodate their ministrations to the wishes rather than to the wants of men. (3) That an E. C. not only promotes religion generally, and thus strikes at the root of all crime, but tends to consecrate the state itself and the rulers of the state. On the other hand it is argued—(1) That ministers being independent of their flocks tends to make them indolent and indifferent in the discharge of their duty, and that the organization of an E. C. leaves little room for burning zeal and intense vitality. (2) That 'civil legislation ought not to extend beyond the outward secular affairs of communities,' and that the best thing the state can do for religion is 'to let it alone,' because all the good done by an E. C. can be done better on the voluntary principle. (3) That although it was impossible for the state to let religion alone at the time when National Churches were established (because it was then the universal conviction that it was the duty of rulers to care for the religious condition of their subjects, because religion was then too formidable a power to be let alone, and because such a course would then have entailed great spiritual destitution), Established Churches are now an anachronism.

Estate', in English and Scotch law, has the same signification as property. In England, property is either real or personal. Real property consists of lands, tenements, and things immoveable. Personal property, or personalty, consists of money, goods, leases, and other moveables which either are or easily may become transferable. Nearly all the real property of England is supposed to have been granted by a superior, from whom it is held in consideration of certain services to be rendered to him by the possessor. By the 12 Car. II. c. 24, which abolished the military tenures, commuting them for a grant of excise and customs, only the honorary services of grand sergeanty are reserved, such as carrying the king's sword or banner, or officiating as butler or carver at the coronation. Real property, by the law of England, can only be acquired in two ways, by Descent (q.v.) and by purchase. See PURCHASE OF ESTATES, ENTAIL; see also HEREDITAMENT, MANOR. In personalty, see CHATTELS. Regarding tenures of real E., see BOROUGH ENGLISH, BURGAGE, COPYHOLD, COMMON TENANCY, FREEHOLD E., GAVELKIND, SOCAGE. See also, applicable to real and personal E., JOINT-TENANCY. Respecting transfer of land, see REGISTRATION OF TITLE TO LAND. In Scotch law, see HERITABLE AND MOVEABLE, MOVEABLES.

Estates of the Kingdom are three in number, the Lords Spiritual, the Lords Temporal, and the Commons. In the ancient Parliament of Scotland the three estates of the realm were, according to Erskine, 1st, the archbishops, bishops, abbots, and mitred priors; 2nd, the barons, including commissioners of shires and stewartries; and 3rd, the commissioners from royal burghs.

Es'te (anc. *Ateste*), a town in the province of Padova, N. Italy, at the foot of the Euganean Hills, 18 miles S.W. of Padua. It was a Roman colony, was a place of importance under the Empire, and still contains numerous ancient inscriptions. The *Rocca* or Castle of E. overshadows the town, and the church of San Martino has a leaning campanile. There are manufactures of silks, hats, and pottery. The town gives name to the House of E. Pop. 10,653.

Este Family, one of the most princely houses of Italy, famous for the splendid patronage which it accorded to the arts and sciences, traces its origin to some of the Tuscan feudatories of the Karolings. Alberto Azzo II., the founder of the house of E., was invested by the Emperor Heinrich III. with Rovigo, Casal-Maggiore, and other Italian states. His sons, Welf or Guelfo IV. and Fulco I., are the heads of the two great branches of the family—the Welf-Este or Guelf-Este (German branch), and the Fulco-Este (Italian branch). Welf IV. was invested with the dukedom of Bavaria by the Emperor Heinrich IV. From him the houses of Brunswick and Hanover, and consequently the later sovereigns of England, draw descent. Fulco I., who died in 1135, is the progenitor of the dukes of Modena and Ferrara. The E. F. headed the Welfic or Guelfic party—the minor principalities and free cities of Northern Italy—in their conflicts with the emperors. It first acquired Ferrara, and later Modena and Reggio; at the same time its successive representatives began to distinguish themselves as lordly patrons of literature and the arts. The Marchese Obizzo (who died 1190) entered into the Lombardic league against Friedrich Barbarossa, but was afterwards confirmed in all his fiefs by the emperor, and raised to the *marchesato* ('marquisate') of Milan and Genoa. By his marriage with Marchesello, daughter of Torello, the head of the Guibellini, the E. F. acquired extensive possessions in Romagna and the March of Ancona. Azzo VII. (died 1264), after a long struggle, inflicted a severe defeat on the Guibellini in 1259, and completely re-established the tottering fortunes of the house of E. Obizzo II., born about 1240, received from the Emperor Rudolf I. the investiture of all the Italian states under imperial suzerainty, and was freely elected to the seignories of Modena and Reggio. Nicolo III. (born 1384, died 1441) re-established at Ferrara the university founded there by his father. Borso, first Duke of Ferrara and Modena, one of the most distinguished princes of his age, encouraged letters and established printing in the Italian states. He died in 1471. Alfonso I. (died 1534) was distinguished as a general and a statesman, and was celebrated in the verses of Ariosto and all contemporary Italian poets. His second wife was the notorious Lucrezia Borgia. Ercole II. (died 1559) and his brother, the Cardinal Hippolito, were liberal patrons of the arts. The latter built the magnificent Villa d'Este at Tivoli. Alfonso II. (died 1597), the most magnificent of contemporary Italian princes, is chiefly remembered for his harsh treatment of Tasso, whom he imprisoned as a madman for seven years. After him the E. F. was represented by a long series of undistinguished princes. Rinaldo, Duke of Modena (died 1737), married Charlotte Felicitas of Brunswick, daughter of the Duke of Hanover, and thus united the two great branches of the E. F., which had remained separate since 1071. Ercole Rinaldo III., who acquired by marriage the principalities of Massa and Carrara, fled to Venice on the approach of the French troops in 1797. He lost Modena and Reggio through the peace of Campo Formio, and died in 1798—the last male representative of the E. F. His daughter, Maria Beatrice Ricarda, was married to Ferdinand, the third son of the German emperor, Franz I., who obtained the duchy of Breisgau as indemnity for the lost provinces, and died in 1806. Of their two sons, Francisco IV. acquired the possession of the duchy of Modena. He was succeeded in 1846 by his son Francisco V. (died 20th November, 1875), who, as a consequence of the revolution of 1859, lost his territories, and at the consummation of Italian unity in 1860 disappeared from the land in which his ancestors had held the state of kings.

Estell'a (from a Basque root, *ast*, 'a rock'), a city of Spain, province of Navarra, on the Ega, 27 miles S.W. of Pamplona. It has always been a stronghold of the Carlist party, and on the 27th May, 1874, was the scene of a fierce and bloody struggle in which the Republicans were defeated. Another battle took place near it, 13th April, 1875, in which the Carlists in turn were beaten. There are some woollen and linen manufactures, and a trade in grain and fruit. Pop. 5974.

Este'pa (Basque, 'rocky ground'), a town of Spain, province of Sevilla, 60 miles E.S.E. of the city of Seville, with manufactures of oil and cloth; a trade in grain, cattle, wool, and fruits, and a pop. of 9059. The church of Santa Maria is an imposing and well-preserved Gothic structure.

Estepo′na (Basque, 'rocky ground'), a town of Spain, province of Malaga, 23 miles N.N.E. of Gibraltar, supplies the fortress with fruit and vegetables, and has some manufactures of linen and leather. Pop. 9771.

Ester, a term in chemistry signifying an acid, or salt of hydrogen, in which the hydrogen has given place to an alkyl or alcoholic radicle. An E. may, therefore, be defined as alkyl salt of oxygenated acid.

Es′terhazy (originally **Estoras,** then until 1584 **Zerhazy), of Galantha,** the name of an Hungarian family. Of the Frakno branch, **Nikolaus I.** in the latter half of the 17th c. worked hard to spread the Lutheran reformation in Hungary.—**Paul IV.,** born 8th September, 1635, showed great military skill against the Turks at Essek, Kanisa, &c., in 1664; took several forts, *e.g.*, Segedin and Bartz; and became during the peace governor of the frontier. In the Diet he supported Austrian influence, especially in the declaration of male succession of 1687. He raised the siege of Vienna in 1683, and after many public services became a Prince of the Empire, and received from Charles VI. the right to coin money and to grant patents of nobility. He had refined tastes, and introduced to Hungary the *Atlas Marianus*, or collection of portraits of the Virgin with a history. He died 20th March, 1713.—**Nikolaus II.,** born 17th December, 1765, was at the head of the Hungarian army of defence raised against the French invasion of the Austrian duchies. Napoleon tried to bribe him by an offer of the Hungarian crown. He was the patron of Haydn, and the founder of a famous picture gallery at Vienna. He died at Como, 28th November, 1833.—**Paul Anton,** born 10th March, 1786, had a long diplomatic career. He negotiated the marriage of Napoleon and Maria Louisa, was minister at London from 1815-18, and from 1830-38. Returning home, he joined the party of Nationalists, and in 1848 was for a time in the Batthyanyi ministry. He died at Regensburg, 21st May, 1866.—The present head of the family is Paul Anton Nikolaus, who was born on 21st March, 1843, and succeeded his father as prince on 28th January, 1894. His mother was Lady Sarah Villiers, of the family of the Earl of Jersey.

Est′her, Book of, one of the books of the Old Testament, which gives an account of a remarkable deliverance of the Jews in Persia, in the time of a king Ahasuerus (*i.e.*, Xerxes I., B.C. 485-464), accomplished by his queen, Esther, a Jewess. It has been debated whether the book contains an authentic historical narrative or is a fiction. As opposed to the authenticity, it is held to be improbable (1) that the royal edict for the massacre of the Jews should have been issued and made public, as is necessarily implied, twelve months before the time appointed for its execution; (2) that it should have commanded the massacre of all Jews in Judæa, which it must have done, since Judæa was at the time a province of the Persian empire, and again inhabited almost entirely by Jews; (3) that the Jews should be able, although permitted by the second edict, in every case to overcome their enemies, and kill 75,000 of them; (4) that the king should send to every province the edict of ch. i. 22; and (5) that Esther should be able so long to conceal her Jewish connection. The strong point relied on as a proof of the authenticity of the book is the existence of the Feast of Purim (q.v.), the name of which is interpreted in the book as the Persian word for *lot* (iii. 7, ix. 24), and which is assumed to imply the events of the book. But this appears to others the strongest proof of its unhistorical nature, since it is the manifest intention of the writer, according to either view, to give the *raison d'être* of the feast. The repeated explanation of *Pur* (iii. 7, ix. 26, 28, 31) is thought to point to this, whereas no Persian word *pur*, 'lot,' is known. In the circumstances the explanation offered is that Pur was a Persian feast, in the celebration of which the Jews had begun to take part here and there (ix. 19), and that the author's aim in writing the work was to bring the feast into general popularity with his countrymen (ix. 20, 27). The language also points to a late period for its composition. See Kuenen's *Religion of Israel* (Eng. trans. 1875).

Estho′nia, or **Rev′al** (native *Viroma*, 'border-land,' Ger. *Esthland*), a government of Russia, and one of the Baltic provinces, is bounded N. by the Gulf of Finnland, E. by St. Petersburg, S. by Livonia, and W. by the Baltic. It is for the most part flat, and one-fourth of the surface is covered with birch and pine forests. The soil is partly sandy, partly marshy, and yields much grain, hemp, flax, and tobacco. Reval (pop. 52,644) is the capital, and the government includes the island of Dagöe. The upper classes and inhabitants of the towns are chiefly a mixed German, Swedish, and Russian people called *Esthländer*, while the country folk are mainly the aboriginal *Esths* of Finnish race. Ninety-six per cent. of the inhabitants are Lutherans. The language of the Esths, which is mild and melodious, is rich in ballads and folklore. The chief poem in the language is the epic *Kalexa Poig*. Ahrens published an Esthonian grammar in 1853. In the 10th and 12th centuries E. belonged to Denmark, but it was sold to the Knights of Livonia in 1347. It was annexed by the Swedish Erik XIV. in 1561, and was finally seized by Peter the Great in 1710. Area 7818 sq. miles; pop. 401,000.

Es′toile, in heraldry. See STAR.

Estopp′el (Old. Fr. *estouper*, 'to stop'), in English law, is a bar to a right of action arising by matter of record, by deed, or in pais (where a tenant cannot dispute his landlord's title). The same is known in the law of Scotland under the term *Personal Objection* or *Exception*.

Esto′ver (Fr. *estoffer*, 'to furnish'), in English law is the right of taking necessary wood from another's estate for household use, to make and repair implements of industry, and to repair hedges and fences. See COMMON.

Estray′. In English law the term is applied to any beast found within a manor or lordship and not owned. If intimation be proclaimed in church, and be given by the crier in the two next market-towns, on two market-days, and the E. is not claimed by the owner within a year and a day, it belongs to the sovereign, or his substitute, who is generally the lord of the manor. If duly claimed, the owner is entitled to restitution on payment of the expense of maintaining the animal. If legal intimation is not made, the owner is entitled to restitution at any time. If anyone not owning the manor on which the beast is E., find and take care of it, the owner may recover it without paying the expenses of maintaining it.

Estreat′ (Fr. from Lat. *extractum*), in English law, is a true copy, extract, or note of an original writing, especially applied to a record of a fine, recognizance, &c., entered in the rolls of court. If the condition of a recognizance be broken, the recognizance becomes forfeited; and being *estreated* or extracted from the record and sent to the Queen's Bench Division, the fine must be levied by Queen's Bench process.

Estremadu′ra (Lat. *Extrema Durii*, 'the extreme limits of the Douro'), a province of Portugal, is bounded N. by Beira, E. and S. by Alemtejo, and W. by the Atlantic, contains the districts of Leiria, Santarem, and Lisboa, and has an area of 6876 sq. miles, and a pop. of 1,083,290. It is watered by the Tagus and its tributaries, and is intersected from N.E. to S.W. by the granite range of the Serra da Cintra. These mountains reach to a height of 1800 feet, and terminate, near the mouth of the Tagus, in the Cabo de Roca. To the S.E. the surface is marshy and sterile, but the hill slopes and valleys yield abundance of grain, wine, oil, cork, and fruits, while everywhere there is a profusion of the finest flowers. E. is subject to frequent earthquakes. The chief minerals are coal, granite, and marble.—**E.** is also the name of a former province of Spain, now divided into Badajos and Caceres. Area, 16,700 sq. miles; pop. 821,301. It lies between the Portuguese frontier and New Castile, and is intersected from E. to W. by the Tagus and the Guadiana, the basins of which are separated by a sinuous mountain range. The N. and S. portions are also mountainous. The rich botanical and mineral resources of E. are almost entirely neglected, and the only extensive occupation is sheep-rearing.

An old right of pasture (*mesta*) has long since put an end to the cultivation of the soil.

Estremoz′, a town of Portugal, in the district of Evora, province of Alemtejo, 25 miles N. by E. of the town of Evora. It is defended by a strong citadel. E. is famous throughout the peninsula for its earthenware, especially of vessels for cooling liquids, which are still cast in purely classical forms. Pop. 13,691.

Esz′ek, or **Ess′ek** (Slav. 'high place'), a free town and capital of Slavonia, Hungary, on the right bank of the Drave, 12 miles above its confluence with the Danube. It is fortified, and has an important transit trade in grain, wood, iron, wine, and flax, especially since steamers have been placed on the Drave. Pop, 20,240, mostly Catholics, and of Servian stock. On 14th February, 1849, Count Batthyanyi, who for several weeks had held E. for the Hungarian revolutionists, capitulated to Baron Trebersberg, the imperial general.

Étampes, formerly **Estampes**, a town in the department of Seine-et-Oise, France, on a river of the same name, 31 miles S.S.W. of Paris by railway. It is four miles long, and has several famous churches which rank among the historical monuments of France, the *Notre Dame* (13th c.), *Saint Basile*, built by King Robert, and a specimen of pure Romanesque, *Saint Martin* (12th c.), &c. There are also remains of an old castle and fortifications. E. has forty flour-mills, besides tanneries, linen, thread, and soap factories, &c. The town existed under the Merwings. It was dismantled by Henri IV. in 1590. Pop. of commune 8573; of arrond. 41,551.

Etang′ de Berre, a salt lake in the S. of the department of Bouches-du-Rhône, France; greatest length 12½ miles, breadth very irregular. Rich salt works have been erected on its bank, and numerous coasters from the Mediterranean trade to the port of Berre on its S.E. shore.

Etawah, the capital of a district of the same name in the N.W. Provinces, British India, a mile E. of the left bank of the Jumna, and on the East Indian Railway, 710 miles N.W. of Calcutta, and 1835 E. of Delhi. It is an ancient town, with numerous *ghâts* or bathing-steps leading down to the river. Its modern prosperity is due to its position on the Jumna and on the road from Agra to Cawnpore. One of the main branches of the Ganges Canal here opens into the Jumna. There is a great mosque on the Gwalior road, which presents many interesting relics of ancient art. The Asthala temple, surrounded by a grove, is one of the most sacred places in the Hindu religion. It was built in honour of one of the incarnations of Vishnu, only about 100 years ago, and this was, of course, before the Mohammedan invasion. Under the Mogul empire it flourished considerably, but when it was left unprotected to the rapacity of Rohilla and Mahratta freebooters, it speedily declined until the British took possession. Pop. 38,793.—The *district*, which lies in the Doab, between the Ganges and Jumna, has an area of 1691 sq. miles, and a pop. of 727,629. Of these 682,863 are Hindus, 42,325 are Mohammedans, 2117 are Jains, 134 are Christians, and 2 are Parsees. E. is well watered both artificially and naturally, and the Cawnpore Branch Canal is sufficiently near to be useful. A large portion of E. is covered by jungle. Wild beasts are numerous, and game is plentiful. It yields wheat, barley, and grain in spring, and opium, sugar-cane, cotton, indigo, rice, and millet in autumn. E. was formerly a great haunt of Thugs, or secret and systematic murderers. In a single year (1808) as many as sixty-seven dead bodies were taken out of the wells in the district.

Etch′ing. See ENGRAVING and GLASS.

Ethel′bert, properly **Æthelberht**, a descendant of Hengist, and son of Ermenric, King of Kent, began to reign in 565. He was defeated in 568 at Wibbandun, Surrey, by Ceawlin of Wessex, but by valour and prudence increased his dominions, and about 590 was acknowledged as *Bretwalda*, his supremacy extending over Middlesex, Essex, and E. Anglia. His wife, Bercta, daughter of Chariberht, King of Paris, being a Christian, Gregory the Great resolved to attempt to convert him and his subjects, and sent Augustine with a band of priests to England. They landed on the Isle of Thanet in 597, and were listened to in the open air by E., who in the next year embraced Christianity. His people followed his example, the language and arts of Rome began to return with the new religion, and England was again brought into contact with the other nations of Europe. In this reign codes of law were published, and the bishopric of Rochester was established. E. died in 616. See Bede's *Hist. Eccl. Gentis Angl.* (lib. i.), and Freeman's *Hist. of the Norm. Conq.* (vol. i.).

Ethelre′da, properly **Æthelreda**, an East Anglian princess of the 7th c., who was canonised, and whose name was shortened to St. Audrey, of which our word *tawdry* is perhaps a corruption, from the gaudy toys and laces sold at a fair held in her honour in the Isle of Ely.

E′ther, also called **Sulphu′ric Ether** and **Ox′ide of E′thyl**, is obtained from spirits of wine by the action of dehydrating agents. To prepare it a capacious retort, either of glass or sheet-iron coated with lead, is connected with a good condensing apparatus. Through the tubulure of the retort a tube passes which is connected with a vessel containing spirits of wine of 0·83 specific gravity. This tube is provided with a stopcock to regulate the flow of spirit into the retort. The retort is charged with a mixture of 5 parts of spirit and 9 parts of oil of vitriol, and heat is applied until E. begins to distil over. The stopcock of the spirit reservoir is then opened, and the spirit allowed to flow into the retort at the same rate as the E. distils over. The level of liquid in the retort is thus kept constant. The process is continuous and only ceases when the oil of vitriol becomes too much diluted to remove more water. Formerly it was believed that in this process the sulphuric acid simply acted as a dehydrating agent, removing one molecule of water from two of alcohol to give E.

The experiments of Williamson have, however, shown that the dehydration is not effected directly, but in two stages. In the first of these, sulphuric acid acts upon alcohol, forming sulphovinic acid and water.

The sulphovinic acid then acts on alcohol to form E. and sulphuric acid.

The crude E. which distils over is purified by washing with milk of lime and water, and subsequent rectification. E. is a colourless mobile liquid, having a pleasant odour and burning taste. It is very volatile, and boils at 34·5° C. It is much lighter than water (sp. gr. 0·723), and therefore when agitated with that liquid separates after a short time in a layer which swims on the surface. It is employed in medicine as a stimulant and antispasmodic, and is also largely used as an anæsthetic, being considered by many surgeons safer than chloroform. It is an excellent solvent of fats, resins, alkaloids, &c., and is used for that purpose in the arts. Owing to its volatility and the cold produced by its evaporation, it is employed in several freezing machines.

Ethers are compounds of hydrocarbons, or of hydrocarbon radicals with elements or acids. Compounds of hydrocarbons and their radicals with elements are called *simple* E., while their compounds with acids are called *compound* E. Many of the latter occur in nature, and of these the Fats (q.v.) and many fruit essences are important examples. Thus oil of pears is the acetate of amyl; oil of pine-apple, butyrate of amyl, &c.

Ether, Luminif′erous, the medium which is supposed to fill all space, and in which the phenomena of light, radiant heat, and probably electricity and magnetism, take place. The necessity of such a medium for the transmission of light is admitted, but there is still an evident reluctance on the part of some to extend its properties so as to embrace electric and magnetic phenomena. The gradual diminution of about two hours per revolution in the periodic time of Encke's comet, and the direct experiments of Professors Stewart and Tait on the rotation of a disk *in vacuo*, hint at the existence of a resisting medium; and if such exist, it is to it that we naturally look as the vehicle for the transmission of energy. This E. then, to satisfy all the necessary conditions, must act both as a mobile fluid to permit the easy motion of matter through it, and as an elastic solid to admit of the transmission of light vibrations. Lord Kelvin fixed a superior limit to the density of the medium from calculations founded upon the known velocity of light; and Clerk Maxwell, by making further assumptions regarding its power of *resilience*, has shown that such a medium can account for the more hidden actions of magnetic and electric induction, as well as for the phenomena of light and heat.

Eth'erege, Sir George, one of the Restoration dramatists, was born about 1636 in Oxfordshire. He was educated at Cambridge, travelled on the Continent, and on his return became the associate of Sedley, Rochester, Villiers, and other courtiers of Charles II. He was knighted about 1683, and sent as English minister to Hamburg and Ratisbon, where he died about 1694, from falling downstairs after a carouse. E. has left three comedies—*The Comical Revenge, or Love in a Tub* (1664); *She would if she could* (1668); *The Man of Mode, or Sir Fopling Flutter* (1676). Dryden (*Epistle to E.*) speaks of his terse comic wit, but his characters are flimsy, his dialogue generally trifling, and his plays only interesting from the swift succession of incidents. E. was imitated by Cibber. See Ward's *English Dramatic Literature*, vol. ii.

Eth'ics, or the science of morals, as generally taught, deal with several distinct matters. *First*, the question arises, which has perhaps excited as much metaphysical discussion as any, What is the ultimate standard of right and wrong? The replies are as numerous as the systems of E.: (*a*) The arbitrary will of God, expressed in the Bible as interpreted by the ruler or teacher who desires a sanction for any particular command; (*b*) the arbitrary will of human government regarded as absolutely irresponsible, a conception of Hobbes plausible enough in certain early stages of civilisation—*e.g.*, caste, but not applicable to states having representative institutions, or a diffused political intelligence; (*c*) a certain harmony of fitness, or intellectually perceived rightness of actions, which, as Cudworth says, is eternal and immutable, and which Price apparently classifies with mathematical intuitions, and deliverances of the intellect upon questions of beauty in colour or form; (*d*) the moral sense, which, as explained by Hutcheson, its author, means a susceptibility to certain specific and unique sensations or emotions, the causes of which being actions done or contemplated, we classify as virtuous and vicious, good or bad. (*e*) Self-interest, which was humorously but coarsely expounded by Mandeville in his *Fable of the Bees* as including and explaining all the sublimest virtues —a psychological blunder which has often unjustly been attributed to the Utilitarians. (*f*) The utility or probable consequences of conduct upon the human race directly, and also indirectly through the subsequent conduct of all. It will be seen that fundamentally there are here two views—1st, that the judgment, arrived at by any particular mind on any particular question involving moral relations, shall be held to be sacred and final, whether intellect or emotion predominate in the judgment, and whether the judgment be a simple or a complex operation; (2nd) that, admitting the existence of a faculty of conscience, whether original or derived, its judgments are liable to error, and may be corrected by reference to the true standard, which is an intelligible objective one, deduced from family, social, and political relations. E. is concerned, *second*, with the psychological questions of the Freedom of the Will (q.v.), whether there are, strictly speaking, any benevolent or purely disinterested emotions in the human mind; and, lastly, what is a conscience, a primitive faculty of feeling or knowing, or a derivative growth and combination of the mind, the product, therefore, in part, at least, of the external circumstances under which the human race have lived. The question of primitive benevolence is very interesting and largely misunderstood. It may be said, as by Paley, that virtuous people obey God 'for the sake of everlasting happiness,' for a definite consideration or reward, or to escape some obvious inconvenience or threatened punishment. The reward, for instance, might be the calculated gratitude of the person benefited, or simply a love of admiration, as frequently in the case of pious and charitable bequests. Then if we are painfully affected by compassion, it is said we 'do good,' in the ecclesiastical sense of giving to the poor, in order to get rid of the pain. Again, if benevolence be pleasant to a benevolent person, that may be an ultimate fact of the mental constitution, but it would still only be a mode of self-regarding action to extend our own pleasure, others' pleasure being incidental. Lastly, the ordinary laws of association must, it is said, make many of our habits disinterested, even if they originally sprang from selfish motives. A large and powerful school of ethical writers, including Butler, Bain, Hume, and Adam Smith, maintain, though in very different senses, that, allowing for the influences above mentioned, there is a residual fact of primitive sympathy which urges men to relieve distress and to confer benefits. Perhaps the controversy has to some extent lost sight of the enormous differences which exist between classes and individuals even of the same nation. In some cases no sympathy is discoverable; in other cases it is the principle of life. *Third*, an important ethical question, wholly insoluble, is what is the *summum bonum*. *Summa bona* are as numerous as individual characters; in each case it is to be found in the direction which promises the greatest amount of healthy and vigorous life. The ascetic and the epicurean schools represent duty and happiness as *summa bona;* the first is certainly too contracted, the second is misleading, unless happiness be defined so as to include all the activities of the organism. Modern E. do not deal much with the formal classification of duties. It is a science, not an art. It is the business of moralists and preachers, and especially of private individuals, to elaborate a code of duty. The relations of E. to law, politics, and religion, have of course varied much from time. Many ethical duties are recognised and enforced by law, and the opposite failures in duty, crimes, delicts, and quasi-delicts, are prohibited. Other 'natural obligations,' as they are called in the language of the Roman law, are recognised, not as separately enforceable, but as pleadable in equity by the creditor in them against the performance of counter-duties towards the debtor. Of course the morality of this partial recognition may itself be questioned, and is indeed emphatically condemned by the Christian Scriptures. The political question, how far the state should instruct the intelligence and control the will of the subject, is a fundamental one, and cannot be intelligibly stated, much less thoroughly discussed, except by men familiar with the ascertained laws of psychology.

Ethio'pia. *Name and Geography.*—The Greek *aithiops*, from which the name is derived, is probably a corruption of the native Egyptian name *Ethaush*, although the Greeks regarded it as meaning sunburnt, from *aithō*, 'I light up,' and *ōps*, 'face.' They applied the term—(1) To all dark races of men; (2) to the inhabitants of all southern regions with which they were not acquainted; (3) to all the inhabitants of Africa S. of Mauritania, the Great Desert, and Egypt; and (4) more specifically to the inhabitants of E. That country lay immediately to the S. of Egypt in the Nile valley, extending from Syene (Assouan), or the First Cataract, to the confluence of the Blue Nile and the White Nile. This territory, which nearly corresponds to Nubia, was E. proper, or the kingdom of Meroë; and it is to this that the references in the Bible are generally, if not always, made. But, in truth, the northern was the only boundary that was definitely fixed; and in a more extended sense E. included Nubia, Sennaar, Kordofan, and Abyssinia, while the part with which it is identified in modern times is Abyssinia. The principal feature in the physical geography of the country, as in that of Egypt, was the river Nile. The White or True Nile, from the Nyanza lakes in tropical Africa, and flowing through great marshes, is joined at Khartum by the Bahr el Azrek, or Blue Nile, from the highlands of Abyssinia, and farther down, near Berber, by the Tacazze or Atbara (anciently Astaboras). Between Khartum and Berber was the so-called island of Meroë, which was the favourite capital of the kings in the later period; although, like that of E., this was an ill-defined name, for, belonging first to Upper Egypt, it was gradually shifted southward. The other capital, Napata, was situated on the southern reach of the great bend to the W. made by the Nile. Near it is the sacred rock of Barkal. Just beyond the S.W.

angle of this bend is the island of Argo, which was the limit of the ancient Egyptian conquests of the country.

Race and Language.—At the present day E. is inhabited by a great variety of tribes of a race intermediate between the Negro and the Aryan and Semitic races. Nearest to Egypt is a very dark tribe, the Kunuz, said to be of Arab origin; next, the Nubeh, much fairer; next come tribes of Arab blood, but fair; the distinctly-marked Semitic Abyssinians; and, lastly, tribes as dark as negroes, though not of the pure negro type. When the race of Kîsh (Cush) is represented on the Egyptian monuments by a single individual, he is of the negro type; and in one passage at least of the Bible (Jer. xiii. 23) Ethiopian appears to be equivalent to negro. There are strong reasons for thinking that in primitive times there was a stream of migration from E. through Arabia, Babylonia, Persia, to Western India (*Genesis of the Earth and of Man;* Rawlinson's *Herodotus*). But, on the other hand, there must have been later a stream of Semitic migration in the opposite direction. The predominant races in Abyssinia at the present day are Semitic, and must have crossed the Red Sea from the W. of Arabia. The settlements of the descendants of Kîsh (Gen. x.) may be traced from Meroë to Babylonia; and by the E. 'compassed' by the river Gihon (Gen. ii. 10) is probably meant the S. of Arabia. The Ethiopic or Gîz, which is the ancient and only written language of Abyssinia, and in which there is a complete translation of the Bible and other religious and historical works, has a strong affinity both in the forms of the alphabet and the grammatical structure with the old Arabic. Gîz ceased, however, to be the vernacular of the country in the 14th c., and was superseded by the Tigre and the Amharic, which are regarded by the best authorities as dialects of the former.

The ancient history of E. is part of the history of Egypt (q.v.). For the modern history of E. see ABYSSINIA. See R. S. Poole, in Kitto's *Cyclopædia of Biblical Literature;* and Birch's *Egypt from the Monuments.*

Eth'moid, one of the bones of the cranium, placed between the orbital plates of the frontal bone, immediately behind the root of the nose, and entering also into the formation of the orbits and of the nasal fossæ. It is so termed (from *ethmos*, 'a sieve,' and *eidos*, 'form'), as it is perforated by numerous minute openings for the passage of the olfactory nerves to the nose.

Ethnol'ogy (Gr. *ethnos*, 'nation' or 'race,' and *logos*, 'a discourse') is the science of the fundamental resemblances and differences of human species or races. The procedure is to divide the human family into classes, sub-classes, varieties, sub-varieties, sections, and sub-sections, according to some well-marked types of physical organization, and then to accumulate evidence on each of these divisions from languages, religions, folklore, laws, customs, institutions, works of art and industry, &c. This evidence, which is being always collected by able specialists, tends in the first place to test the accuracy of the original classification, and in the next place to suggest the permanent conditions under which the great modifications of both physical and spiritual organization have taken place. It is hardly necessary to add that E. or anthropology accepts analogies from the comparative biology of the lower animals, and that the larger facts of written history are also made use of. The special name of Zoological Anthropology is given to that part of the science which deals with the relations of man and the brutes—relations which are seen in geographical distribution as well as in general biology. This conception has been extended by Agassiz to the vegetable kingdom. Let us take the more recent, and perhaps the more trustworthy, classification, that of Huxley:—(1) The Australioid type. The males are of fair stature, with well-developed torso and arms, but very slender legs. The colour of the skin is some shade of chocolate brown, and the eyes very dark brown or black. The hair is fine and silky, usually raven black, never woolly, but wavy and tolerably long. The Australians are dolichocephalic (long-skulled), the cranial index often not amounting to more than seventy-one or seventy-two; the nose is broad rather than flat, the jaws heavy, the lips very coarse and flexible, and the *Norma occipitalis* is sharply pentagonal. The brow-ridges are strong and prominent, the teeth large, and the fangs strong. These marks are seen in the Dasyu hill tribes inhabiting the interior of the Deccan. The ordinary Coolie is nearly Australian. The Egyptian, too, though changed by civilisation and probably admixture, has also the dark skin, black silky wavy hair, long skull, fleshy lips, and broad *alæ* of the nose. (2) The Negroid type is best represented by the negro of S. Africa (including Madagascar), between the Sahara and the region of the Cape. He is of fair stature; his body and limbs are well made; his skin is black, with shades of brown; his eyes, brown or black; his hair is black, short, and crisp; his beard and body-hair scanty. He is dolichocephalic, the cranial index being often only seventy-three. His forehead is childlike and feminine. The *norma occipitalis* is often pentagonal. Like the Australioid, there is generally prognathism (protruding jaws). The nasal bones are depressed, giving a characteristic flat nose. The lips are coarse and projecting. The Bushmen of the Cape area are a special type, marked by low stature, the males not much exceeding 4 feet in height; both sexes, however, are well made. The skin is yellowish brown, the eyes and hair black, the latter woolly. The antero-posterior diameter of female pelvis is of great relative length. Hottentots are said to be a cross between Bushmen and Negroes. Another modification, the Negritos, occurs in the Andamans, Malacca, Philippines, Tasmania, and the islands parallel to the Australian coast, from Wallace's Line to New Caledonia. The Andamans have a cranial index of eighty; all the rest are dolichocephalic, though some in the S. and E. approach the Australioid in large brow-ridges and otherwise (*e.g.*, Tasmania, New Caledonia, New Guinea, and Torres Straits). There is perhaps a cross with Malays in New Guinea; more probably a cross with Polynesians in the Fijians. (3) Xanthochroic, or fair whites, found in the greater part of the population of Central Europe. They are of tall stature, have a colourless skin (through which the blood shows), blue eyes or grey, hair ranging from straw-colour to red or chestnut, and beard and body-hair abundant. They are both dolichocephalic and brachycephalic (short-skulled). On the S. and W. this type meets the Melanochroi, or dark whites; on the N. and E. it meets the Mongoloid. (4) The great area E. of a line drawn from Lapland to Siam is peopled chiefly by the Mongoloid, who are short, squat, with yellow-brown skin; eyes and hair black, the latter coarse, straight, long on the scalp, but scanty on the body and face. They are sometimes very brachycephalic, without prominent brow-ridges, nose flat and small, eyes oblique. The Malays proper and the indigenes of the Philippines, who are not Negritos, probably belong to this group. The Chinese and Japanese, on the other hand, are distinguished chiefly by being dolichocephalic; this characteristic occurs also in the ancient Ainos (found, for example, in Yesso), who are further remarkable for the development of hair on face and body, and the dull-red earthy skin. The Dyaks of Borneo, the Batâks of Sumatra, the Alfures of Celebes, are all dolichocephalic, and seem to pass through the people of the Pelew Islands and of the Caroline and Ladrone Archipelagos into the Polynesians, in whom the straight hair and oblique eye have disappeared, the skull being long and coming back to the Australioid type. The Polynesian type is best seen in the Maoris of New Zealand; brachycephaly occurs in the Sandwich and Samoan Islands. Language shows that Polynesia was peopled from the west, and it is thought that the Polynesian type may be a cross between the Dyak-Malay and the Negrito elements in Indo-nesia. In N.E. Asia the Tchuktchi are said to be the same as the Eskimos and Greenlanders of N. America; with Mongoloid hair and skin they have very long skulls. Dolichocephaly also distinguishes the aborigines of both Americas from the Asiatic Mongoloid; only the Patagonians and the ancient mound-builders are brachycephalic. There is the same sort of contrast and resemblance between a Mongol proper and an Iroquois as between a Malay and a Maori. The Melanochroi, mixed occasionally with Xanthochroi and Mongoloids, are to be found in W. and S. Europe, cis-Saharal Africa, Asia Minor, Syria, Arabia, Persia, and Hindustan. The type is seen in Irishmen, Welshmen, Bretons, Spaniards, S. Italians, Greeks, Armenians, Arabs, and high-caste Brahmins. In physical beauty and intellectual development they often excel the Xanthochroi, but the skin, though transparent, is brown, deepening to olive; the eyes and hair are black, the latter fine and wavy. This type shades off into the Xanthochroic and the Deccan variety of Australioid. The contrast between the uniformity of race through the various climatic zones of America and the variety of race in one zone of the Asiatic Archipelago indicates that modification by physical conditions can play only one part in the present distribution of races. It will be observed that this classification discards the old division into Aryan and Semitic—the Indo-Germanic and Syro-Arabian of Prichard—which was suggested chiefly by language, but of which even the philological boundaries are becoming indistinct. In criticism of Huxley's grouping it has been suggested that the fundamental division of the white races is not according to colour, but by a general type of physical development, which, it is alleged, would put the tall, handsome, hook-nosed Persians, the Afghans and other N.W. tribes of India, the Jews, Syrians, and N. Arabians together as the primitive and perfect white stock, degenerating by crossing into the Hindus, the short, swarthy, small-featured Arabs of Central and S. Arabia, and the mixed varieties of Europe. It has been pointed out in support of the radical difference of Mongoloid and Negroid that the former is distinguished by grave demeanour and concealment of the feelings, deliberate speech without violent gesticulation, rarity of laughter, and plaintive and melancholy songs. This is specially true of American Indians and Malays. The Negroid, on the other hand, is strongly marked by vivacity and excitability, strong exhibitions of feelings, loud and rapid speech, boisterous laughter, violent gesticulation, rude noisy music. These are certainly very fundamental mental differences, and they are seen in the Papuan of New Guinea as well as the African negro. With regard to the brown Polynesians (*e.g.*, in Tahiti), Wallace thinks that, putting mental characteristics and general physical features (except colour) together, they must be held to be fundamentally Negroid, modified towards the Mongoloid type. Since Linnæus divided the human race into *Europæus albescens*, *Americanus rubescens*, *Asiaticus fuscus*, *Africanus niger*, there have been various tests of scientific division proposed, such as Camper's *facial angle* (the angle formed by a line between the centre of the ear and the base of the nose, and a line from the most prominent part of the forehead to the most prominent part of the upper jaw-bone), which was said to increase with intellectual development; Blumenbach's *norma verticalis*, which expressed the result of several measurements of skull, frontal bones, cheekbones, jaws, and nose, and which gave the classification of Mongolian, Caucasian, Ethiopian, Malay, and American. Cuvier included Malay and American under Mongolian. Latham, the philologist, gives Mongolidæ, Atlantidæ, and Japetidæ, and maintains the European origin of the Aryan family. The *Mongolidæ* include several Indian nationalities, as the Sinhalese, Kashmiri, Tamil, and their language is stated to be for the most part in the agglutinative stage. The *Atlantidæ* include—besides the African Negroids—Syrians, Arabs, Jews, and the ancient Assyrians and Babylonians. Their language is said to be agglutinative, and very rarely inflectional. The *Japetidæ* are subdivided into Celts and Indo-Germanic, the latter into European and Iranian and some unclassed varieties; the language is described as mainly with amalgamate inflections. The question whether there was a one primitive stock of mankind, of which all existing nations and tribes are the modifications, is one which will probably never be settled. Prichard and Latham support the unity of man, the latter arguing from an assumed universal identity of language. But language might be borrowed by a distinct stock, or identities of language might be produced by different stocks exposed to similar conditions. On the other hand, language may be lost or thrown aside, and differences apparently fundamental in language (and there seem to be such) would not conflict with the supposed unity of men, were it established on appropriate evidence. But such questions are premature when existing kinds have not been accurately classified. The American school, founded by the diligent craniologist Morton, and supported by the speculation of Agassiz (that men along with animals may be arranged in certain combinations of faunæ, eight in number, and defined by geographical limits), maintain the primitive diversity of types as a doctrine. When extended observation of both physical and mental features has disclosed the facts to be explained, it will then be time to apply to these facts the hypothesis of unity or diversity.

E′thyl, a hydrocarbon radical which cannot be isolated as such, but which occurs in many compounds, of which the most important are alcohol (hydrate of E.); ether (oxide of E.); nitric ether (nitrate of E.); acetic ether (acetate of E.). When attempts are made to isolate E., it becomes doubled, forming diethyl or butane.

Eth′ylene. See OLEFIANT OIL.

Étienne, St., the capital of the department of Loire, France, on both banks of the Furens, a branch of the Loire, 35 miles S.S.W. of Lyon by railway. It has a Gothic church of St. Étienne of the 12th c., and an Hôtel de Ville, with a museum of the industrial products of the town. E. is one of the most important manufacturing places in France. The production of ribbons alone employs 40,000 workmen, and the annual value of the industry amounts to about £3,000,000. Among the other large manufactures are iron-wares (to the annual value of 4,000,000 francs), arms, steel, machinery, edge-tools, hats, and pottery. There are also large coal-pits in the vicinity, employing 5000 miners, and yielding 1,575,000 tons yearly. St. É., the *Furanum* of the Romans, was the residence of the Counts of Forez in the 10th c. As early as the 11th c. it became a centre for ironwork and ribbon-making. Pop. of municipality 128,136; of arrond. 312,826.

Etiol′ogy (Gr. *aitia*, 'a cause,' and *logos*, 'a discourse'), a term used to indicate that branch of medical science which has for its object the discovery of the causes of disease.

Etiquette′ (Fr. 'a ticket'; origin uncertain), the unwritten laws of polite society in reference to social intercourse and matters of precedency and ceremony, so called from the circumstance that formerly tickets were distributed among persons invited to processions, &c., with instructions as to the place they were to take, &c. The fallacy that E. becomes more rigorous in each ascending stratum of society is probably due to the E. of the courts of Europe having till recently choked all free and natural life. In the court of Louis XIV. of France, E. drove out sense and virtue, and spread from Versailles to the courts of Germany, where its influence was tyrannical and exacting down to our own time.

Of all European courts, that of Spain is said to be the most observant of E. In many Asiatic countries, including Turkey, court E. is very strictly enforced, while in the great African negro states no such thing as E. has ever existed.

Et′ive, Loch, an arm of the sea extending inland from the Firth of Lorn into the district of Lorn, Argyllshire, about 9 miles E., after which it stretches about 11 miles N.E., with a breadth varying from a ¼ of a mile to 2 or 3 miles. It is navigable for vessels of 100 tons. The scenery, especially in its upper part, is wildly picturesque. The ruins of Dunstaffnage Castle, originally the capital of the Dalriad kings and afterwards the stronghold of the Macdougals of Lorn, lie on the S. side, about 3 miles N. of Oban.

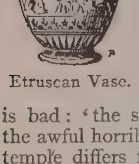
Et′na, or **Ætna** (Gr. *Aitnē*, Lat. *Ætna*, not from Gr. *aithō*, 'I burn,' but from the Phœnician *attuna*, 'a furnace,' now called in Sicily *Monte Gibello*, a term compounded of the Italian *Monte* and the Arabic *Jibel*, both signifying 'mountain'), a celebrated volcano in the E. of Sicily. It is an isolated cone, 10,840 feet above the sea-level, with a base of 90 miles in circumference, and cut off from the mountains to the N. by the valley of the Alcantara, and from the range to the S. and W. by the basin of the Semeto or Giarretta. Eastward its base reaches to the sea. Its eruptions are recorded from an early period. Thucydides mentions three which had happened since the establishment of the Greeks in the island; the second, which seems to have been of unusual violence, being referred to 475 B.C. Shortly before the Christian era successive eruptions had made the district on the E. side of E. uninhabitable and almost impassable from want of water. There were important outbursts in 1169, when lava destroyed Catania with 15,000 of its inhabitants, in 1329, 1408, 1444, 1447, 1536, and in 1669, when the lava again reached Catania. Among the last violent eruptions were those of 1852, 1865, 1868, 1874, and 1879. On the side facing the sea is a capacious amphitheatre, named the *Val del Bone*. It is 5 miles in diameter, and hemmed in by 'dykes,' of from 500 to 3000 or 4000 feet high, displaying several hundred regular strata of dark lava, alternating with beds of tufa of an average thickness of 6 feet. The surface of E. is divided into three regions—(1) The *Desert*, including the crater-bearing cone, the highest part of which is covered with snow during eight months of the year; (2) the *Woody*, richly clad with beech, pine, oak; and (3) the *Cultivated*, around the base, producing in abundance corn and wine, oil and fruits.

E'ton ('town on the water,' or 'meadow-land'), a town in Buckinghamshire, on the left bank of the Thames, opposite Windsor on the right bank, and connected with it by a fine bridge. It is 22 miles W.S.W. of London, and is near Slough. The town owes its prosperity mainly to the well-known College. Pop. reg. sub-dist. 13,820; and civ. par. (including Eton College), and ecc. par. (each) 2955.

Eton College ('the College of the Blessed Mary of Eton'), one of the first public schools of England, was founded by Henry VI. in 1440, for a provost, 10 priests, 25 poor scholars, &c. The College foundation (by recent statutes) consists of a provost, head master, lower master, 2 chaplains ('conducts'), and not less than 70 scholars—the provost of Eton and ten governors forming the 'governing body.' There are besides one vice-provost, ten fellows, one precentor, one steward of the courts, one auditor, forty-nine assistant masters, three French masters, one Italian master, and one drawing master. The buildings were commenced in 1441, and were, in part, finished and thrown open in 1443. The whole original structure was not completed till 1523. The chapel has been richly decorated, and the college hall was almost entirely rebuilt in 1858, the new features being chiefly the open timber roof with Louvre lantern, the Gothic windows filled with stained glass, and the floor of encaustic tiles. A large block of school buildings was erected (1862) at a cost of £10,000, and new mathematical schools (1876) at a cost of £15,000. The principal buildings are arranged in two quadrangles, on the N. side of which are the boys' library and apartments, called the New Buildings. The pupils, numbering 1022, consist of the 'collegers,' or scholars on the foundation, and the 'oppidans,' or students, who lodge outside the college or with the masters and fellows. There are two schools—an upper and a lower. Connected with the college are several valuable scholarships at King's College, Cambridge, obtainable by competitive examination. There are also the Newcastle scholarship, £50 for three years; two Chamberlayne (£60), one Reynolds (£59), two Davies (£60), one Berriman (£43), and one Bryant (£47), each tenable for four years; four Goodall exhibitions; two Postmasterships at Merton College, Oxford; one Rouse scholarship, one Tomline scholarship, and one Oppidan exhibition.

Eton College.

Etru'ria. The Etruscans, Ras, or Rasenas, were among the primitive inhabitants of Italy distinguished from the Iapygians in the S. of the Peninsula, and the Italians—Latins and Sabellians—who occupied the middle. It is conjectured that they originally inhabited a large district N. of the Po, between the Ligurians and the Veneti. Niebuhr supposes, from an examination of the Groeden dialect in the Tyrol, that they came from beyond the Rhætian Alps. Mantua was an Etruscan town; so were Felsina (Bologna) and Ravenna. On this side they met the Umbrians, who built Hatria and Spina ('black town' and 'thorn-town'). Their chief settlement was, however, in the district now called Tuscany. The names Umbro, Camars (Clusium), the language and religion of the Falerii in Southern E., suggest that the Etruscans pushed the Umbrians from the N., and perhaps the district of Falerii, Veii and Cære, Sutrium and Nepete, between the Ciminian forest and the Tiber, was not entered till the 2nd c. after the foundation of Rome. The boundaries of E. proper were from the Arnus on the N., by Tarquinii and Pisæ, to the Tiber; the Apennines and the sea forming the other boundaries. To the N. was a debatable land called *E. Circumpadana*, sometimes held by the Ligurians. The northern origin of the Etruscans is favoured by the fact that only one town (Populonia, not among the oldest) is on the coast. The Lydian origin suggested by Herodotus arose from the accidental resemblance of the Lydian name *Torrheboi* to the native *Tursennæ* (Gr. *Tursenoi*, Umb. *Tursci*, Roman *Tusci* or *Etrusci*). The maritime fame of E. was confused with the piratical habits of Lydia. Besides, the short sturdy figures, large heads, and thick arms on the vases and bass-reliefs of Volterra and Clusium exclude the Greek origin. Egyptian inscriptions of Menephtah and Rameses III. introduce the Turska, distinguished by their pointed helmets, along with another race, who are said to be the Pelasgi. This, however, is too vague a ground even for conjecture. The Etruscans called themselves *autochthones*, and, as Dionysius reports, 'claimed alliance with no people in the world.' As is always the case, the bass-reliefs, &c., disclose many symbolical ideas suggestive of other nations. The Persian eagle-horse, the Egyptian man-wolf, the grotesque and horrible figures resembling the Egyptian and Phœnician Kabiri, or gods of punishment, the senator's *laticlavium*, the *prætexta* and sacerdotal *apex*, the curule chairs and lictors of Rome, are all found there. In the silence of recorded history, reference (often mistaken) is made to language. But the Etruscan language, while deciphered, is not translated. By the help of a bilingual inscription at Chiusi, however, the meaning of the terminations *al* (descent from the mother) and *sa* (referring to marriage into a clan) has been reached. In the earliest inscriptions (those on clay at Cære) the collision of two consonants is avoided; later (as at Perusia) vowels were rejected, terminals were thrown off, and the language became harsh. Tarquinius becomes Tarchnaf, Minerva Menrva, Hermes Thurms, and Bacchus Fufluns. The accent was thrown on the first syllable, and the distinctions *b p*, *c g*, *d t* were lost sight of. Except *φ*, which was too soft, all the aspirate consonants were used—Thethis for Tethis. Some of the names of divinities resemble the Italian; *e.g.*, Usil (Sol) is the Sun. The gentile terminations *enas* and *ena* resemble the Sabellian clan-names. Müller thought the language was Lydian, Humboldt suggested a connection with the Basque population. No trace of it has been found in the architecture of the sepulchre-builders (*Nuraghe*) of the Tuscan Islands. Mommsen goes no further than to say that there are Aryan elements in the language. As regards the Etruscan religion, it was pervaded by a gloomy mysticism, in which soothsaying and the manipulation of numbers played a prominent part. The worship was cruel, and included the slaughter of prisoners or slaves. The interpretation of entrails, of the flight of birds, of *lightning*, and other prodigies was learned from the dwarf Tages. According to Müller, the eagle was of good omen, the owl evil; though at Athens the owl was of good omen. The system was subtle and complex. The sacred square or oblong was imitated in the shape of towns, with temples, the *vorsus* of agrarian measure, and tombs. The world was finite, its 'great year' being 6000 years; and the gods were subject to the *Dii Involuti*, the veiled deities. Among the former are Voltumna, goddess of change or fortune, and the double Janus, opening the gates of heaven and the year, turning with the sun, passing with time, flowing with rivers. His wife is sometimes Camasene, a fish; sometimes Venilia, the wave touching the shore; or Suturna, the daughter of winds and waters. An old man with wings and a hammer conducted the souls of the dead to hell to be tortured by mallets and serpents. There was a mode of redemption by sacrifice to the gods. The position of the *Dii Consentes* or *Complices* (Tina, Thurms, Sethlans or Vulcan) is not clearly defined. Nor do we know much of the patrician Lucumones, the Larths and Aruns, the eldest and second sons of the Cilnii, the Cæcinas, the Musonii, &c. As regards the early relations of E. and Rome, there is a tradition that Mezentius of Cære imposed a wine tax on Latium, and two bands of Tuscans led by Cælius Vivenna and Mastarne are said to have settled on the Cælian Hill. There was a Tuscan quarter at the foot of the Palatine. The Veientes seem often to have disputed the possession of Fidenæ. The name of the last regal family in Rome, Tarquin, is Tuscan, and so is the woman's name Tanaquil or Tancluil. But this does not imply any blending of the two races, or even a subjection of the one to the other. It was on the sea that the real power of the Tuscans lay. They were pirates, and traded as far as Miletus and Sybaris, where it is said that silver formed the medium of exchange between the *æs rude* (copper) of E. and the gold of Miletus and Carthage. Through this trade, no doubt, came many ideas which have been used to prove an Ionian origin. While the 'wild Tyrrhenian' was a pirate, peaceful trade relations seem to have existed between Southern E., or at least the town of Cære, and both Greeks and Phœnicians. The Tuscan king Arimnus presented gifts to the Olympian Zeus, and Cære had a special treasury in the temple of the Delphic Apollo. But the Etruscans dislodged the Greeks from Æthalia and Populonia, and held sway in Antium and Sunactum, making the cliff of Capri a centre for their freebooting expeditions. It is even said they founded a league of twelve towns in Campania. In 550 B.C. gold and silver coins were struck by the Etruscans after a model and standard distinctly Attic or Ionian. They had great commercial advantages; the free ports on the Adriatic, the land route from Pisæ to Spina, and the productive fields of Capua and Nola. They had the iron of Æthalia, the copper of Volaterræ and Campania, the silver of Populonia, and the amber trade from the Baltic, which came overland to the mouth of the Po. There are many Attic earthenware vases in the Etruscan tombs, and many Etruscan gold cups and bronze candlesticks at Athens. They also excelled in *terra-cotta* work, which was generally spoken of at Rome as 'Tuscanic.' Their lapidaries adhered to the form of the *scarabæus* or bettle. Tomb-painting, mirror-designing, and graving on stone were their chief forms of art. Contour-drawing in metal and monochromatic fresco-painting are both excellent. But the taste is bad: 'the severe becomes harsh, the graceful effeminate, the awful horrible, and the voluptuous obscene.' The Tuscan temple differs from the Greek types in the course of columns carried round the *cella*, or enclosed quadrangular space, and in placing a separate pedestal under each column; the outline is nearer a square; the gable is higher; the intervals between the columns, the inclination of roof, and projection of corbels are all greater. It is, in fact, more like the modern private house. About the time of the expulsion of the Tarquins, the power of the Etruscans (then in alliance with Carthage) was at its height. They had already got Corsica, and Lars Porsena, King of Clusium, by a successful war (B.C. 507) would have obtained Latium but for the intervention of the Cumæans. Rome undoubtedly fell for some time under Etrurian authority, and was forced 'to cede all her possessions on the right bank of the Tiber to the adjacent Tuscan communities, thus abandoning her exclusive command of the river; and she also delivered to the conqueror all her weapons of war, promising to make use of iron thenceforth only for the ploughshare. It seemed as if a union of Italy under Tuscan supremacy was not far distant' (Mommsen's *Römische Geschichte*, book ii. chap. iv.). The fall of Xerxes and Hamilcar was followed (B.C. 474) by Hiero's victory over the Etruscans, which is the subject of the first Pythian Ode of Pindar. The Massiliots and Syracusans then became powerful competitors in the Mediterranean. Dionysius attacked both Hatria and Pyrgi, and at last the Etruscans, abandoning Carthage, sent eighteen war-ships to the help of Agathocles. While the Romans took Fidenæ, the Samnites took Capua, thus destroying Etruscan influence in Campania. Then came the war against Veii (B.C. 396), in which Camillus inaugurated the splendid career of victory which awaited his nation. The ravages of the Celts from Gaul still further weakened the Tuscans, disconnecting their settlements on the Adriatic, and Southern E. began to enter into *civitas sine suffragio* with Rome. The reign of the Lucumones had now passed into a form of patrician government supported by priestly monopoly. The hegemony of Volsinii was merely nominal, and indeed in 301 and 260 B.C. Roman help was got to suppress popular risings. The reign of luxury and sensuality had begun. 'The Greek authors of this age are full of descriptions of the unbounded luxury of Etruscan life; poets of Lower Italy in the 5th c. of the city celebrate the Tyrrhenian wine; Timæus and Theopompus delineate pictures of Etruscan banquets, such as fall nothing short of the worst Byzantine or French demoralisation. Unattested as may be the details in these accounts, the statement at least appears to be well founded that the detestable amusement of gladiatorial combats—the gangrene of the later Rome and of the last epoch of antiquity generally—first came into vogue among the Etruscans. At any rate there is no room on the whole to doubt the deep degeneracy of the nation. It pervaded even its political condition' (Mommsen's *Römische Geschichte*, book ii.). Yet in spite of their moral decline, and in spite of the disaster at the Vadimonian Lake (B.C. 310), they were able to give succour to the Samnites in their long struggle against Rome, and they joined the Lucanians in their combination with Pyrrhus, fighting however, by Senonian Celtic mercenaries, and not by native soldiery, for the energies of the nation had been virtually broken; and one may safely say that they had lost the possibility of becoming a great nation from the day of Veii and Melpum. During the revolt of the Italian subjects the Etruscans supported Rome, as they had before supported the equites against Drusus, whose plans of reform threatened the domains of the large proprietors. They also made a struggle against Sulla. He gave much of the district to his successful legions, and this example was followed by Julius Cæsar and Augustus. E. is then lost in the Roman Empire. The question how far there was continuity of life in the Italian towns until the *Motta* was formed and the struggle against imperial power began, is one of the most difficult in history.


Etruscan Vase.

Etschmiad'sin, a fortified monastery in the Russian government of Erivan, on a tableland 20 miles N. of the town of E., ceded to Russia by Persia in 1828. Famous as the seat of the Armenian Katholikos or patriarch since 1441, and the meeting-place of the synod of the Armenian Church, it has been called the 'Rome of Armenia.' It has splendid buildings and gardens, several churches, a library (once much richer in Armenian literature than it is now), and some notable relics; among others, a bit of Noah's ark, the point of the spear which pierced the Saviour on the cross, the hands of Jacobus of Nisibis and of St. Gregory himself.

Ett'rick, a district and river in the S. of Scotland famous in Border song and story. The river, which rises in the extreme S. of Selkirkshire and flows N.E. to its junction with the Tweed, is, like its affluent the Yarrow, a 'river bare, that glides the dark hills under;' yet the pastoral solitudes through which it runs are inexpressibly beautiful. E. Forest formerly embraced the whole of Selkirkshire, and was a famous hunting-ground in the days of the Stuarts. At Tushielaw, midway up E. Vale, Adam Scot, the famous freebooter, was hanged by James V. Boston, of the *Fourfold State*, was minister of E. parish; and the poet Hogg is familiarly known as 'the E. Shepherd,' because he was born in the Forest, and spent his youth there as a shepherd.

Ett'y, William, R.A., a famous painter, was born at York, 10th March, 1787, and after seven years' apprenticeship with a printer, became in 1805 a student at the Royal Academy, London, where he had as fellow pupils Haydon, Wilkie, and Eastlake. The Academy, after repeatedly rejecting his pictures, in 1820 accepted his 'Coral Finders,' which received marked applause. In 1822 he set out for Italy, where he studied Titian, Veronese, and the other great Venetians. He was elected an Associate of the Academy in 1824, and an Academician in 1828, in which year the Royal Scottish Academy purchased his three large pictures on the history of Judith. His fame was now wide, and his works commanded high prices. Between 1811 and 1849 he produced above 200 pictures, of which the chief were 'Pandora Crowned by the Seasons,' 'The Combat,' held to be his masterpiece, 'Benaiah,' 'Ulysses and the Syrens,' 'Joan of Arc,' 'Cleopatra,' 'The Storm,' 'Lute-player,' 'Youth at the Prow and Pleasure at the Helm,' 'Amoret Chained.' He died at York, 30th November, 1849. After being unduly ignored, E. has been grossly overrated. His works are often shallow and vulgar, and his glowing nudities the result of a false ideal. 'No one,' says Ruskin, 'told E. what to paint, and he studied antique, and painted dances of nymphs in yellow shawls to the end of his days. His is gone to the grave a lost mind.' See E.'s Autobiography, and Gilchrist's *Life of E.*

Etymol'ogy (Gr. *etumos*, 'true, real,' thence *etumon*, 'the true literal sense of' and *logos*, 'a discourse') treats of the structure and history of words, and of the connections between various languages. In its widest sense it is usually termed Philology (q.v.). In a narrower but more familiar sense it denotes that branch of grammar which deals with the different parts of speech and the various modes of inflection.

Eu (Lat. *Auga* or *Aguim*), a town of France, department of Seine-Inférieure, on the Bresle, 2½ miles from its mouth and 20 E.N.E. of Dieppe. It has a fine Gothic church of the 12th c., an old church of the Jesuits containing the tombs of Catharine of Kleve and Henri of Guise, and a famous château which was begun by François of Guise in the 14th c., and which belonged to the Orleans family till 1852. The château is surrounded by a beautiful park, and contains perhaps the finest collection of historical portraits in France. E. was in the possession of the Comtes d'E., a branch of the Norman royal family, till the 12th c. The title Comte d'E. was conferred on the eldest son of the Duc de Nemours (born 1824) by his grandsire Louis Philippe. The town has some manufactures of lace, waxcloth, sailcloth, tow, hemp, linens, &c. Pop. of commune 4693.

Eubœ'a (*Egripos, Negropont*), by far the largest island of insular Greece, is situated in the Ægean Sea, and lies parallel to the mainland. The channel on the N. is called Trikeri, and on the W. Talanta and Egripos. It is only 40 yards wide at Chalcis, where it is bridged over. E. is about 90 miles long from N. to S., and its extreme breadth is 30 miles, though at one point it is not more than 4 miles across. Throughout the island runs a range of mountains, of which Mount Delphi on the eastern coast is 7266 feet high; and the south is particularly mountainous. The soil in the plains is fertile, and there are excellent pastures on the mountain slopes. Vines, corn, and olives are chiefly cultivated. Copper and iron are found in the mountains. The chief towns are Egripos or Chalcis and Karysto. In ancient times E. was divided among six or seven independent cities, of which Chalcis and Eretria were the most important. They were mostly inhabited by Ionic Greeks. For a long period the island acknowledged the supremacy of Athens, though it frequently asserted its independence. It passed successively under the sway of the Macedonians, Romans, Venetians, and Turks. It is now part of the modern kingdom of Greece. The area of E. and of the adjacent islands, the Sporades, is estimated at 2216 sq. miles; and the pop. at 103,442.

Eucalyp'tus, in botany, a genus of plants of the natural order *Myrtaceæ*, and indigenous to Australia, Tasmania, New Guinea, and some of the neighbouring islands. Of the 150 species known, most are trees, some of which attain an immense size. They are evergreen, and the leaves, which are thick and leathery, present their edges instead of their surfaces to the sun. A gum exudes from the bark after rain, whence they are known as gum-trees. They have been popularly divided into two classes, of which the one has a smooth bark, periodically shed in long strips; the other, a rough and fixed bark. The principal species are blue gum, stringy bark, red gum, and peppermint. Specimens of the two first from 300 to 400 feet high are not uncommon, while a fallen peppermint has been measured which was 480 feet long, and of proportionate girth. Their timber is hard and very durable, but heavy. The blue gum yields products which are beginning to be esteemed for their medicinal properties. A preparation made from its leaves has been pronounced by French and Italian physicians, after experiment, to be an excellent substitute for quinine. Extensive plantations of this tree exist in Algeria, Southern France, the Roman Campagna, and India, and it is also being cultivated in Brazil and California, its great rapidity of growth and the beneficial influence it exerts upon malarious places being its chief passports to favour. The health of the lepers on the 'leper island' near to Penang has much benefited since blue gums were planted beside the hospitals, and the medical officers have reported a distinct diminution in the number of fever cases among their patients. The sap from the trunk of *E. Gunnii* is brewed into a kind of beer by the colonists. Many species of E. yield an essential oil which will doubtless become commercially important. That of *E. ericifolia* resembles Cajeput. The large-fruited E. has a beautiful flower of which the stamens are brilliant with the colour of carmine. Most E. have, however, only small flowers, but those of the large-fruited E. are both large and showy.

Large-fruited Eucalyptus.

Eu'charist (Gr. from *eucharisteō*, 'I give thanks') is another name for the Lord's Supper (q.v.). The Jewish Passover, on which the E. is founded, was originally a feast of thanksgiving to the Almighty Creator for the fruits of the ground, but afterwards came to be specially associated with the deliverance from Egypt. Every master of a household who distributed bread and wine to his guests praised God who had given these fruits of the earth to man, and for the favour He had shown to his own people. For this reason the cup of wine over which he pronounced the thanksgiving was called the cup of blessing or thanksgiving. It was in allusion to this practice that St. Paul (1 Cor. x. 16) called the sacramental cup 'the cup of blessing' (Gr. *to potērion tēs eulogias*). As the Greek words *eulogia* and *eucharistia* are synonymous, the latter came to be used by metonymy for the Lord's Supper, in which 'the cup of blessing' plays such an important part.

Euc'lid of Alexandria, the world-famous geometer, lived, according to Proclus, in the time of the first Ptolemy (B.C. 323-283), and seems to have been the founder of the Alexandrian school of mathematics. His best known work is his *Elements*, a book which, in spite of its antiquity, and the rapid progress which mathematical science has undergone within the last few centuries, still retains its place, at least in Britain, as the standard authority from which the student first obtains the principles of geometry. The first Latin edition which could be called the *Elements of E.* was translated from the Arabic by Adelard in 1130. Since then there have been numerous editions. E.'s other extant works are his *Data*, his *Appearances* (of the heavens), his *Optics* and *Catoptrics*. The treatises on *Music* and the *Division of the Scale* are not certainly by him. Pappus, Proclus, Eutocius, and others also ascribe to E. works on *Conic Sections*, *Porisms*, and *Fallacies*, of which there is now no trace.

Euclid of Megara, a Greek philosopher, was one of the chief disciples of Socrates, on whose death (B.C. 399) he returned to his native city, where he became the founder of the Megaric or Dialectic school, which derives its doctrines from the Eleatics as well as from Socrates. The Megaric philosophers held that 'the good' is the leading universal in all things. Everything, they said, is good in so far as it *is*. Evil is only negation. The good is the element of agreement in all existing things. The Megaric school was also famous for its dialectical subtlety and logical puzzles.

Eudiom'eter (Gr. *eudios*, 'fine,' and *metron*, 'a measure') is an instrument employed in the analysis of gases. Many different forms of the E. are employed, but the simplest consists of a syphon tube closed at one end and graduated at the lower limb. Wires are sealed into the closed end in such a manner that they nearly touch, and an electric spark can be passed through the gases. The tube is partially filled with water to keep the gases enclosed, and the thumb is placed on the open limb to prevent their escaping when exploded.

Eudo'cia, or **Athenais,** born at Athens A.D. 394, was the daughter of Leontius, a sophist, who gave her a good education in Latin, Greek, rhetoric, astronomy, geometry, and arithmetic. She was very beautiful. Her father having left her only 100 pieces of gold, she went to Byzantium to see if the will could be reduced. Pulcheria, the sister of Theodosius II., struck by E.'s grace and culture, told the Emperor to marry the fair stranger, which he did, 7th June, 421. On the retirement of Pulcheria from public affairs, E., from 443 to 450, practically governed the empire. Before this she had suffered from her husband's unfounded jealousy of Paulinus, the *magister officiorum*. She was further suspected of having plotted with the Grand Chamberlain, Chrysaphius, the deposition of the patriarch Flavian by the second Council of Ephesus ('Council of Thieves,' 449). Having become attached to the teaching of the heretic Eutyches, she quarrelled with Pulcheria, and the result was that she withdrew to Jerusalem, where she spent her life in restoring the sacred places, and where she was finally converted by Simeon Stylites to an orthodox view of the double nature of Christ. She died in 461. E. left several poems, but the only piece extant is a poem on St. Cyprian, found in the Laurentian Library, Florence. See Gibbon's *Decl. and Fall of the Rom. Empire.*

Eudox'us of Cnidus, the astronomer, flourished in the first half of the 4th c. B.C. According to Laërtius he was for a time a pupil of Plato, but having suffered dismissal he repaired to Egypt, where he remained thirteen years. On his return he is said to have introduced the sphere into Greece. Notices of him are numerous in the poems of Aratus and the works of Hipparchus, Strabo, Seneca, Aristotle, Archimedes, Vitruvius, Proclus, Cicero, Ptolemy, &c., but all his reputed writings are lost. He is said to have corrected the length of the year, to have introduced a theory of planetary motions, and to have determined the sun's diameter as nine times that of the moon's. Delambre considers him to have been ignorant of geometry.

Eugane'an Hills, also **Monti Isolo'te** or **Padova'ni,** a volcanic range in the province of Padova, N. Italy, which rises abruptly from the 'waveless plain of Lombardy' to a height in Monte-Venda of 1884 feet, and which extends from N. to S. for a distance of 19 miles. The E. give a title to one of the most musical of Shelley's poems.

Eugène, Prince François, de Savoie-Carignan, born at Paris 18th October, 1663, entered the service of the Emperor Leopold I. in 1683. He fought with Victor Amadeus of Savoy in his campaigns in Dauphiné and elsewhere against the French. In 1697 we find him with the rank of a field-marshal inflicting the decisive defeat of Zentha (near the Theiss river in Hungary) on the Sultan Mustapha II. This was followed by the peace of Karlowitz (1699), by which Turkey ceded Transylvania to Austria, and Podolia and the Ukraine to Poland. E. was the hero of the opening scenes of the Spanish Succession War, driving back the French marshals Catinat and Villeroy in the N. of Italy. The brilliant assault on Cremona was, however, soon neutralised by Vendôme's victory of Luzzara (1702). E. now became president of the Aulic Council, and formed the league with Marlborough and Heinsius, the Grand Pensionary of Holland. The first fruit of this league was Blenheim (1704), where the army of Marsin and the Elector of Bavaria was destroyed. E. next measured strength with Vendôme at Cassano (Piedmont) without definite result. By the relief of Turin, however (where Marsin was again outgeneralled), he became master of N. Italy. After a fruitless invasion of Provence in 1707, he triumphed over Vendôme at Oudenarde (1708). Lille now fell. This victory, as well as that over Villars at Malplaquet (1709), was due to the perfect understanding between E. and Marlborough. When the latter was deprived of the command of the English army, and Anne made peace with France, E.'s glory seemed to leave him. The clever strategy of Villars disarmed Van Keppel (Lord Albemarle) and drove E. back on Brussels. Next year further reverses led to the peace of Rastadt. But fresh laurels were gained in 1716, when the Grand Vizier Ali with 150,000 Turks was routed at Petervaradein, and in 1717, when a second Turkish army was driven from the very walls of Belgrade. Only the peace of Passarowicz prevented E. from going to Constantinople. The Polish Succession War (1733) saw the veteran general once more on the Rhine, but he did not join battle with the unfortunate Berwick, whose rapid advance secured the peace of 1735. E. died at Vienna, 21st April, 1736. He was an able diplomatist and administrator. Both Napoleon and Friedrich the Great placed him in the front rank of generals. 'The bright-eyed snuffy little man' had also gentler tastes: his palace became a museum of rare books, pictures, and specimens of natural history. His soldiers loved him, as the French guard did *Le Petit Caporal*; and his figure as the 'Saviour of Christendom at the siege of Belgrade' has become classical in song.

Euge'nia, a genus of Exogenous plants belonging to the *Myrtaceæ* or myrtle order. Of this genus *E. pimenta* is the most familiar species. Its fruit is aromatic, and when dried is known as allspice, pimento, or Jamaica pepper. The flavour resembles that of cinnamon, cloves, and nutmeg. Other species are the bitter E.—which also yields pimento—the Malay apple, and *E. Jambos*; the latter affords 'clove-apples.' Other species are found in Brazil, Guiana, and the W. Indies; all of these bear edible fruit. The species of E. possess a calyx exhibiting a fourfold division, four petals, and a baccate or berry fruit consisting of one or two cells, with a seed in each cell. These plants grow in the Malay Archipelago, in the South Sea Islands, the W. Indies, Brazil, &c. A Chilian species has been acclimatized in the S. of Britain.

Eu'génie Marie de Guzman, Condesa de Téba, ex-Empress of the French, born at Granada, in Spain, 5th May, 1826, is the second daughter of the Count de Montijos and Donna Maria Manuela Kirkpatrick, whose father—connected with the old Scotch family of the Kirkpatricks of Closeburn—was for a time British consul at Malaga. She was married to the Emperor Napoleon III., 30th January, 1853. While the Second Empire lasted, E. was distinguished as the dictatress of female fashions of dress, as the graceful head of the most brilliant court in Europe, and as the chief supporter of Ultramontanism in France. A son, born 16th March, 1856, was the sole issue of this union. On the news of the surrender of Sedan, near the close of the Franco-German war (1870), E. left France for England. The Emperor joined her at Camden House, Chislehurst, where they resided till his death, 9th January, 1873. Her life here was saddened by the death of her son in South Africa, who was surprised and killed while engaged in following the war against the Zulus. Both father and son were buried at Chislehurst.

Euge'nius, the name of a Gallic teacher of rhetoric who in 392 conspired with Arbogastes to murder Valentinian and seize the imperial authority. He favoured the heathen element in the empire, and was destroyed in 394 by Theodosius. —**St. E.,** Bishop of Carthage, in the latter part of the 5th c. bravely defended the orthodox Nicean faith against Hunneric, Thrasimund, and other Arian Vandals. E. is also the name of four popes, of whom the last only, **E. IV.** (originally Gabriele Gondolmieri), is of much importance. Born at Venice in the latter part of the 14th c., he rapidly rose to be Cardinal of Bologna, and on the death of Martin V. in 1431 was chosen pope. With the help of Florence and Venice he compelled the Colonnas to restore the papal treasures they had abstracted, and then turned his attention to the refractory fathers of the council sitting at Basel (q.v.). Pressed by a democratic outbreak at Rome, E. yielded to the summons of the council to appear before it and to confirm its decrees, but in 1438 he dissolved it a second time and called a new council at Ferrara, chiefly for the Greek fathers, who proposed to unite with the Latin Church. After discussions on the simple and double procession of the Holy Ghost, purgatory, papal supremacy, the articles of union were agreed to. In the meantime the fathers at Basel had deposed him as guilty of simony, heresy, perjury, and schism. E. replied by excommunicating them all, and thus provoked the great schism, the council proceeding to elect Amadeus of Savoy as Pope Felix V. The project of Greek union was really a political measure of security against the Turks. With the same object E. urged the Hungarians into the war which ended with the disaster of Varna (1444) and the death of the brave Hunyadi. E. himself after a troubled career died at Rome 23rd February, 1447. He had distinguished men as secretaries—viz., the brothers Aretini, Poggio, and George of Trebizond. See Gibbon's *Decl. and Fall of the Rom. Emp.*, vol. xii., and authorities there cited.

Eugle'na, a microscopic organism occurring in infusions of decayed organic matter, and generally believed by naturalists to be an infusorian animalcule. Some authorities consider it to be a lower plant-form. The body is provided with a single lash-like filament or *flagellum* used for locomotion, and a pigment spot is also developed in the body. The E. may be coloured green with the same substance (*chlorophyll*) which imparts the green colour to plants. The Green E. is a familiar species.

Eu'gubine Tables (*Tabulæ Eugubinæ*), the name given to the famous bronze tablets found in 1444 in a subterranean vault near the site of the ancient Eugubium or Iguvium (*Gubbio*). They were originally nine in number, but in 1540 two were conveyed to Venice and never recovered. The remaining seven are preserved in Gubbio. On four the *characters* are Umbrian (which do not greatly differ from the Etruscan), on two Latin, on one partly Latin partly Umbrian. The *language*, however, which is undoubtedly the ancient Umbrian, is the same in all, and is quite distinct from both Etruscan and Latin, though exhibiting an affinity to the Latin in its older forms, and also to the Oscan. The four in Umbrian characters are earlier than the others, and are supposed to belong to the 4th c. B.C. All contain directions for sacrificial and other rites.

Eu'lenspiegel ('Owlglass') **Tyll,** the hero of a great number of German popular stories, who, as a wandering journeyman, travels over the country, indulging, under the guise of a simpleton, in knavish tricks and wild frolics. E. is most probably an imaginary character, but some assert that he was born at Kneitingen, Brunswick, that he roved through the N. of Germany, visited Rome and Poland, finally settled at Mölln, near Lübeck, and died there in 1350. A tombstone is shown at Mölln, with a looking-glass (*spiegel*) and an owl (*eule*) on it; but Damme, in Belgium, also claims to be the place where E. was buried. It is not known when or in what dialect the jocose tales in which E. figures were first written. Most probably they were composed in Low German, and from this were translated into High German by the Franciscan Thomas Murner, who collected and edited them in 1519. There is a later edition by Lappenberg in 1859. The stories have been popular not only in Germany but in other parts of Europe, and have been translated into French, English, Latin, Dutch, Danish, and Polish.

Eu'ler, Leonhard, one of the greatest mathematicians of last century, was born at Basel, 15th April, 1707. In 1727 he accompanied the Bernoullis to St. Petersburg, where on the retirement of Daniel Bernoulli he became professor of mathematics in the Academy of Sciences, then rapidly rising to a high position under the rule of Peter I. Here he published his *Mechanica Analytice Exposita* (1736), his *Tentamen Novæ Theoriæ Musicæ* (1739), besides numerous papers in the *Petersburg Memoirs;* among others those on isoperimetrical problems, which may be looked upon as anticipating the calculus of variations developed by Lagrange fifteen years later. In 1741 he went to Berlin, on the invitation of Friedrich the Great, to assist in forming an academy there. Between 1744 and 1773 he published several scientific works and tables. In 1766 he returned to St. Petersburg. Latterly he lost his eyesight, but his labours were still continued by the aid of an amanuensis. E. died 7th September, 1783, while playing with his grandchild. Of his numerous works and memoirs many remain unpublished.

Eumen'ides (Gr. the 'well-disposed' or 'gracious' goddesses), a euphemism by which the Greeks designated certain dreadful powers whose real name they feared to utter. By a similar euphemism the Athenians called them *semnai thei*, the 'venerable goddesses.' They were called also by the Greeks *Erinnues* (Gr. *ereunaō*, 'I search after, track, persecute,' or *erinuō*, 'I am angry'), and by the Romans *Furiæ* or *Diræ*. They were more ancient than the Olympian gods, and dwelt in the thick darkness of the nether world. Homer, Hesiod, and the tragedians do not specify their number, but later writers restrict it to three. Their names are Alecto, Megæra, and Tisiphone. Their genealogy is variously given. Hesiod calls them the daughters of Ge by the blood of Uranus, Æschylus of Night, Sophocles of Darkness, others of Chaos and Terra. Stern and inexorable, they executed the vengeance of the gods, and punished the guilty here and hereafter. They are described by Æschylus as of grim and frightful aspect, with dark and gory garments, serpent-twined locks, and blood-dripping eyes. Later poets represent them with wings, holding in one hand a burning torch, in the other a whip of scorpions, and attended by Terror, Rage, Pallor, and Death. In works of art they appear as grave and serious maidens, richly attired, but still retaining the serpents and the torches. They were propitiated by offerings of black victims and libations composed of water, milk, and honey (*nēphalia meiligmata*). The white turtle-dove and the narcissus were sacred to them. In their festival (*Eume-*

nideia) only freeborn citizens of virtuous life were allowed to take part.

Eumol'pus (Gr. 'sweetly singing'), a mythic bard and priest of Demeter, concerning whom there were numerous traditions. He is represented as the son of Poseidon and Chione. He was educated in Ethiopia, fled to Thracia, and subsequently aided the Eleusinians in a war with Athens, when he was slain by Erechtheus. E. introduced into Attica the Eleusinian mysteries and the cultivation of the vine. The Eumolpidæ, a sacerdotal family at Athens, derived their name from him.

Eu'nice, a large genus of Errantia (q.v.) or marine worms, the species of which live in the sand of our own and other coasts. One of the largest is the giant E., measuring 4 feet or more. These worms possess prominent side bristles or *setæ*, and the mouth is provided with a protrusible proboscis, armed with several pairs of horny jaws. The gills or branchiæ are large.

Euno'mius, the son of a peasant of Cappadocia, was ordained Bishop of Cyzicum in 360. On account of his intense zeal for Arianism he was soon after deposed and banished. After many vicissitudes he was allowed to return to his birthplace, where he died about 394. In the great doctrinal controversy in the 4th c. the orthodox Church party held the Son to be of the same substance with the Father (Gr. *homo-ousios*), in opposition to the Arians, who regarded him as only the highest of the *creatures*. The great majority of the heterodox, however, belonged to a middle or semi-Arian party, who adopted the phrase *homoiousios* ('of a similar substance') to express their idea of the relation of the Son to the Father. E. took up his position at the farthest extremity of the heterodox and became the leader of the ultra-Arians, so that these were known as the Eunomian party. The Son, according to him, was the first of created beings, and the Spirit the first among the created natures, formed according to the command of the Father by the agency of the Son.

Euom'phalos, a fossil genus of Gasteropodous mollusca, found in early Palæozoic strata, and dying out in the Trias. The shell is of discoidal form, the whorls being angular, the aperture five-sided, and the umbilicus or opening of the central spine or columella of large size. A large number of species are known.

Eupato'ria (formerly *Koslov*), a town and port in the government of Taurida, Russia, on W. coast of the Crimea. It has a fine mosque, several manufactories, and important fisheries. It exports about £45,000 worth of hides, barley, wheat, &c., yearly. During the Crimean war the Allies selected E. as a landing-place for their troops. It was the headquarters of the Turks in 1854-55. Here, under Omar Pacha, they repulsed an attack of the Russians, 17th February, 1855. Pop. 8960, mostly Tartars. About 12 miles distant is the large salt lake of Ssak.

Eupato'rium, a genus of Exogenous plants included in the order *Compositæ*. They have small flower-heads or *capitula* arranged in corymbs. The florets or separate flowers of the heads are tubular, each containing stamens and pistil. The receptacle is naked, and the stigmas or heads of the carpels (pistil) are club-shaped. These plants mostly inhabit the New World. The British species is the hemp agrimony, which is found in marshy districts. Its root and leaves were held in repute medicinally. A common American species is the thorough-wort, which is highly valued as an antiperiodic in intermittent fevers, such as ague, &c. It has a diaphoretic and purgative action. A species of N. America obtains the name of *gravel-root*, as being used as a preventive of 'gravel.' Another species, esteemed as a remedy for snake-bite, is found in N. Brazil and the E. Indies.

Eu'pen (called by the French *Neau*), a town in the province of Rheinland, Prussia, on the railway to Aachen, and 9 miles S. of that city. It has several churches, a Franciscan monastery, and an orphanage. E. is the seat of the most important cloth manufactures in Prussia. It has also manufactures of waxcloths, waxlights, and leather. There are, besides, machine and dye works. At the peace of 1814 E., with the other portions of the duchy of Limburg, was assigned to Prussia. Pop. town 29,328; district 42,431.

Eu'phemism (Gr. *eu*, 'well,' and *phēmi*, 'I speak'), is the substitution of an indirect or delicate form of expression in order to avoid one that is unpleasant or offensive. Thus for 'he died,' we say 'he fell asleep,' 'he paid the debt of nature,' 'he was gathered to his fathers.' The ancients always had recourse to the E. to avoid expressions of evil omen—*e.g.*, they called the Furies *Eumenides*—a name of blessing for one of cursing.

Eu'phon, a musical instrument, similar in tone to a glass harmonicon, invented by Chladni.

Eupho'nium, a bass instrument of the Bugle (q.v.) class, used in brass bands.

Euphorbia'ceæ, a natural order of Exogenous plants, popularly named the 'spurge order,' from its including the *Euphorbiæ* or spurges and allied plants. It is a very large natural group, the species of which occur in both hemispheres. They are most numerous in tropical and sub-tropical regions. In Britain there are three genera (including at least fifteen species) of this order. The E. exist as trees, shrubs, and herbs, with opposite or alternate stipulate leaves. They have unisexual flowers, which occasionally possess one floral envelope only. The stamens are sometimes numerous, and united into one or more bundles. The ovary has one, two, three, or more cells, and the seeds are albuminous. The spurges yield a milky juice, used by African savages as a poison for arrows. The *latex* or juice of *Siphonia Braziliensis* of Brazil affords a superior Caoutchouc (q.v.), which escapes from incisions made in the bark, and is allowed to dry on clay moulds. So many as 140,762 cwts. (valued at £2,020,799) were imported into Britain in 1894. Cassava is obtained from a species of the genus *Manihot*. In this order are also included the *Ricinus communis*, the castor-oil plant, and *Croton tiglium*, which furnishes croton oil. The boxwood of engravers is obtained from the evergreen Box, another genus of E.; and *Oldfieldia Africana* yields African oak or teak.

African Euphorbium.

Euphor'bium, the type-genus of the spurge order of plants, *Euphorbiaceæ* (q.v.). It has achlamydeous ('single-enveloped') monœcious flowers, and the various species yield a milky juice often of poisonous nature. One species, the caper-spurge, affords an oil which has a powerfully purgative action; *E. officinarum*, *E. antiquorum*, and *E. Canariensis*, yield a purgative resin named *E.*; and *E. ipecacuanha* furnishes an emetic which is not to be confounded with the true Ipecacuanha (q.v.). Many of the euphorbia closely resemble the cactuses (see CACTACEÆ) in appearance. Some have scarlet and showy involucres surrounding their flowers, and some form spiny and dense hedges in Africa.

Euphra'sia. See EYE-BRIGHT.

Euphra'tes (Arab. *Frat*, the 'fruitful'), the largest river of Western Asia, rises in the Armenian highlands (*Anti-Taurus*) by two branches, the Murad and Kara Su, which unite 10 miles N. of Keban' Ma'den, about lat. 39° N. and long. 39° E. The stream thus formed flows W., dividing Armenia from Cappadocia, forces its way through the Taurus, and on reaching the plain country winds S. and S.E., passes the N. of Syria and N.E. of Arabia Deserta, and eventually, after many deviations, joins the Tigris, to terminate in the Persian Gulf. Its total length is 1750 miles, of which 1195 are navigable, while the area of its drainage is 255,000 sq. miles. The tributaries are few and of no great size, the largest being the Chabur or Khabur. Among the towns washed by the E. are Bir, Deir, Anah, Hit, the ruined Babylon, Hillah, Lamlun, and Kurna. The last of these is at the confluence of the E. and Tigris. Below this point the stream is called the Shat-el-Arab, and is 900 yards wide, from three to five fathoms deep, and 92 long. Bassorah is on the Shat-el-Arab, which enters the sea by three channels, after receiving the Kerchu or Kerkhah and Kuren or Karan from Persia. Above Hit the river is singularly picturesque; along the banks are many ancient aqueducts for irrigation. From Hit to Babylon the country is flat, and is partly cultivated by Arabs, whose villages, shaded by the date-tree, are dotted along the banks. Irrigating canals and cuts are frequent above the Lamlun marshes, which are flooded yearly, and which yield rich crops of grain and rice. Here the mud villages are annually swept away. The river is fringed with a continuous belt of fine date-trees from Lamlun to the sea. The water of the E. is turbid, but when purified is sweet and wholesome. The river is at flood-tide in May, and at full ebb in November. In its latter state it is tranquil and sluggish, but when swollen it flows swiftly. It abounds in fish. From the earliest times it was used for navigation, and in the 15th c. it was the highway for European merchants to India.

Euphros′yne (Gr. 'mirth') was one of the three Graces, who presided at festive meetings.

Eu′phuism, the name of a literary style made fashionable in England by the *Euphues* (1580) of John Lyly. It was partly a growth of the Renaissance, being prevalent in France and Italy, and was marked by far-fetched illustrations, an abundance of classic allusions, flowery antithetic language, and extravagant hyperboles. It was ridiculed in Shakespeare's *Love's Labour's Lost*, and by Ben Jonson in *Asotus* in *Cynthia's Revels*. See articles LYLY and ENGLISH and FRENCH LITERATURE.

Euplectell′a, the name given to an elegant and beautiful genus of siliceous or flinty sponges abundant at the Philippine Islands. The species of E. are known as 'Venus' flower-baskets,' the outward appearance of these organisms suggesting the form and shape of an elegant vase of from 8 to 10 inches in length, the sides of the vase being formed of a delicate network of siliceous or flinty fibres, whilst the lower part of the organism is provided with longer fibres serving to attach it to the sea-bed, and which resemble spun glass in appearance. *E. aspergillus* is the familiar species, whilst another species, *E. suberea*, was obtained in the dredge by the *Challenger* expedition. See also SPONGE.

Eu′poda, a family of *Coleoptera* (q.v.) or Beetles, belonging to the section *Tetramera*, including those with four joints in the tarsus. The segment of the limb named the 'thigh' by entomologists is usually very long in this group, which is represented by a few British and many exotic species.

Eure, a department of France, and part of the old province of Normandy, is bounded N. by Seine-Inférieure and the estuary of the Seine, E. by Oise and Seine-et-Oise, S. by Eure-et-Loir, and W. by Calvados and Orne. Area, 2300 sq. miles; pop. 349,471, showing a decrease of 9358 since 1886. It is very flat and woody, and is watered by the Seine, Eure, Iton, Risle, and Charentonne. The soil is a fertile alluvium, except along the Seine, where it is in part sterile and sandy. Besides grain, hemp, and flax, E. yields large quantities of apples and pears, of which are made excellent cider and perry. The breeding of horses, cattle, and sheep is largely carried on, and there are important manufactures of woollens, paper, glass, copper-ware, &c. E. is traversed by several lines of railway. Évreux is the capital, and among the other towns are Pont-Audemer, Louviers, Les Andelys, and Bernay. The *river* E. rises in the W. of Orne, flows S.E. into the heart of Eure-et-Loir, winds abruptly N. through Eure, and enters the Seine near Pont-de-l'Arche after a course of 100 miles.

Eure-et-Loir, a department in the N.W. of France, bounded N. by Eure, E. by Seine-et-Oise and Loiret, S. by Loir-et-Cher, and W. by Sarthe and Orne. Area, 2268 sq. miles; pop. 284,683. It is traversed from E. to W. by the Plateau de la Beauce, separating the basins of the Seine and the Loire, and is watered by the Eure in the N., and the Loir and its affluent the Huisne in the S. The low country (La Beauce) is level, and produces excellent wheat, hops, &c., while the elevated region *du Perche* is intersected by rich valleys and covered with oak and birch forests. E.-et-L. produces good cavalry horses (*chevaux du Perche*). The value of the annual yield of grain, fruit and vegetables amounts to 18,500,000 francs. The chief railway in E.-et-L. is the Paris à Brest. The capital is Chartres, and other important towns are Châteaudun, Dreux, and Nogent-le-Rotrou.

Eurip′ides, the latest in order and the least in fame of the three great tragic poets of Greece, was born at Salamis, B.C. 480. His parents were persons of rank and wealth. In early life he was a painter, and received a complete philosophical education, Prodicus having been his instructor in rhetoric, and Anaxagoras in physics; and he was the friend, if not the pupil, of Socrates. At an early age he devoted himself to tragic poetry, having exhibited the *Peliades* in his own name when twenty-five years old, but did not succeed in gaining a prize till 441 B.C. His attachment to the new philosophy and to the sophistical education of the time drew upon him the splendid slanders of Aristophanes, and the populace of Athens only granted him the prize five times out of seventy-five. In 408 B.C., E. sought refuge from the party violence of the Athenians at the court of Archelaus, king of Macedonia. It is said that he was there torn in pieces by hounds let loose upon him by two poets, Archidæus and Cratinus, whose enmity he had excited. He died at the age of seventy-four (406), and was buried at Pella. The dramas of E. are said by some to have been seventy-five, and by others ninety-two, in number. Of these, eighteen have come down to us, of which the following is a list, with the dates of their representations:—*Alcestis*, B.C. 438; *Medea*, 431; *Hippolytus*, 428; *Hecuba*, 424; *Heracleidæ*, 421; *Supplices*, *Ion*, *Hercules Furens*, *Andromache*, *Iphigeneia in Tauri* (dates uncertain); *Troades*, 415; *Electra* (about) 415; *Helena*, *Iphigeneia in Aulide*, *Bacchæ*, *Phœnissæ*, *Cyclops* (dates uncertain); *Orestes*, 408. In tragic power the *Medea* excels all the other dramas. The *Cyclops* is the only example of the ancient satiric drama now extant. In regard to the structure of his plays, E. has been severely criticized for his use of the prologue, so thoroughly undramatic in its character; and for the frequency with which the difficulties of his plots are solved by the intervention of a deity. Mrs. Browning has applied to E. the epithet 'human,' in recognition of 'his touches of things common, till they rise to touch the spheres.' Sophocles, it was said, represented men as they ought to be, E. as they really are. From the supernatural in Æschylus and the heroic in Sophocles the Greek drama passes in E. to 'the romance of everyday life, the unexaggerated picture of manners in which the human heart, and the affections which influence it in its domestic relations, constitute the leading subject.' He delights in the 'nice disdinctions of a sophistical philosophy, in brilliant antitheses, startling paradoxes, a dexterous use of language, and an affectation of pedantic ornament.' The ancient authorities regarding E. are the biographies in Suidas; in Musgrave's edition, by Thomas Magister; in Elmsley's edition of the *Bacchæ*, first published in 1821; and Aulus Gellius, xv. 20. The chief modern editions of the whole works are those of Barnes (1694), Musgrave (1778), Matthiæ (1813), Paley (1858), Kirchhoff (Berl. 1855), and Nauck (Leipz. 1857-69). There is an English translation in verse by Potter (Oxford, 1814).

Euro′pa is the ancient name of the continent of Europe. It is commonly supposed to have been derived from E., the daughter of Agenor, king of Phœnicia, but Hermann has plausibly suggested its derivation from two Greek words, meaning the 'broad land.' The E. of the ancients at no time equalled in extent the modern continent. The primitive E. of Homer was comprised within very narrow dimensions, and at its greatest size the E. of the Greeks was bounded by the chain of mountains N. of Thrace, Italy, and Iberia, and did not comprehend more than a third of modern Europe. The geographical knowledge of Southern E. was obtained by the successive victories of the Roman arms, especially by the Gallic campaigns of Cæsar. The traders who followed the advancing legions of the Empire penetrated beyond the Elbe, the Weser, and the Vistula, but the conquerors possessed little, if any, knowledge of the races who roamed through the remoter regions of the N. Subsequent additions to the geography of E. are chiefly due to the Scandinavian pirates, to the Christian missionaries who explored Scythia and Sarmatia, and to Karl the Great, Ælfred the Great, and the Teutonic knights, by whom, in the annexation of Prussia, the long series of geographical discoveries was completed.

Eu'rope is the smallest of the three great divisions of the Old World, and is strictly a western prolongation of the continent of Asia. In proportion to its size it is by far the most populous of the great land divisions, while it is also the centre of culture, industry, and commerce. It is bounded N. by the Arctic Ocean, W. by the Atlantic, S. by the Mediterranean Sea, the Sea of Marmora, the Black Sea, and the Caucasus, and E. by the Caspian Sea, the river Ural, and the Ural mountains. The extreme length, from Cape Roca (Portugal), in long. 9° 30′ W., to the Ural Mountains, 60° 20′ E., is 3400 miles; the breadth, from Cape Tarifa (Spain), in lat. 36° N., to Cape Nordkyn (Norway), 71° 5′ N., is 2760. But if we include insular E. the area is considerably wider. The chief projections of the coast are Scandinavia, Jutland, Brittany, the Iberian peninsula (Spain and Portugal), Italy, the Hellenic peninsula, and the Crimea in the Black Sea. Owing to the numerous indentations, of which the principal are the White Sea, the Baltic, the Bay of Biscay, and the Adriatic, the coast-line is comparatively longer than that of any other great division of the globe, having an estimated length of 19,500 miles, or 1 linear mile to every 194 sq. miles of surface. The political divisions, with areas and populations, are as follow:—

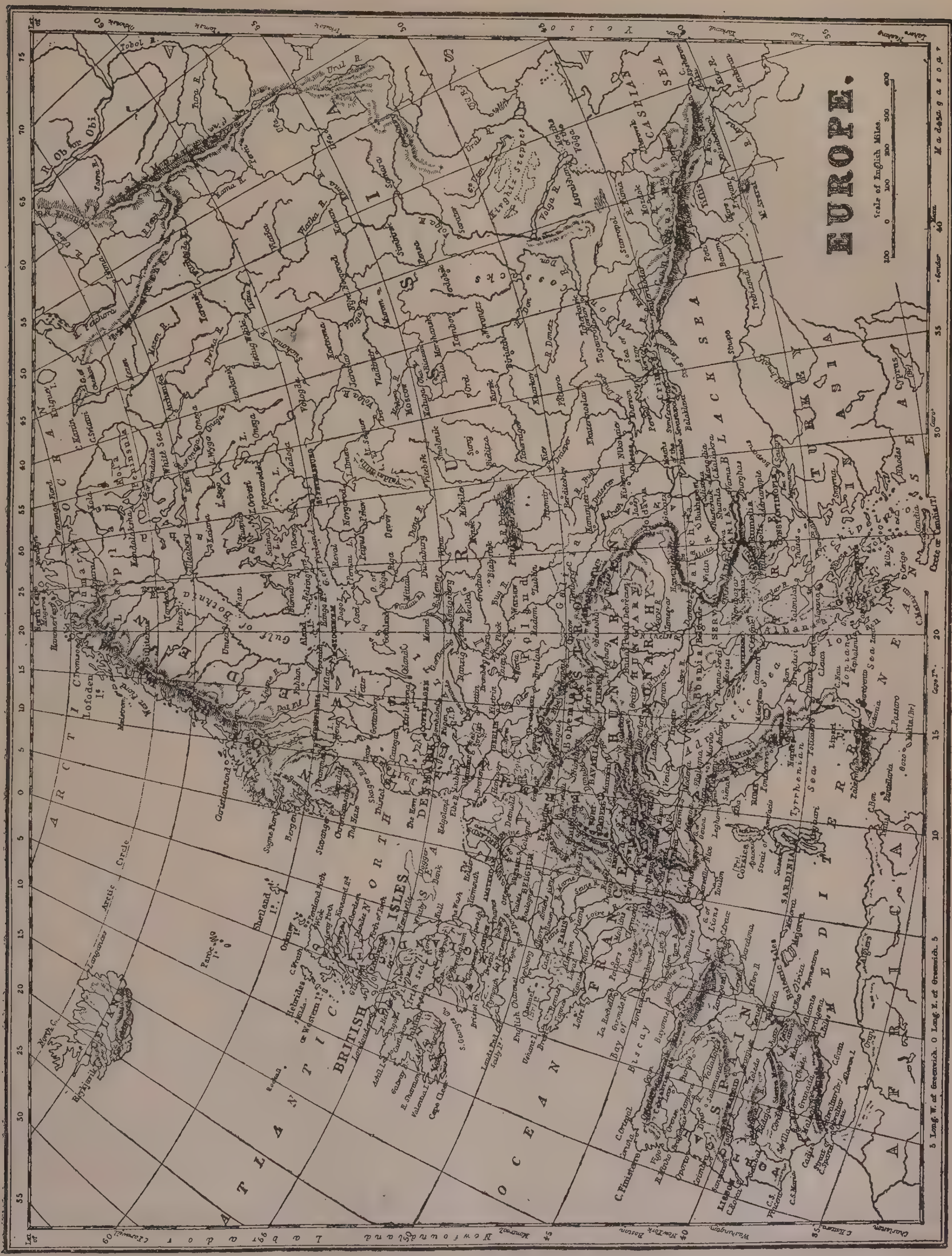
States.	Area in sq. miles.	Population.
Russia (with Poland)	2,095,504	99,553,024
Germany	208,670	49,428,470
Austria-Hungary (including Bosnia and Herzegovina)	261,119	42,813,251
France	204,092	38,343,192
Great Britain and Ireland	120,979	38,104,975
Italy	110,623	28,459,628
Spain	197,670	17,673,838
Sweden and Norway	297,321	6,785,898
Belgium	11,373	6,262,272
Roumania	48,307	5,800,000
Portugal	34,038	5,062,719
Turkey	61,200	4,781,545
Netherlands	12,648	4,732,911
Bulgaria and E. Roumelia	37,860	3,309,816
Switzerland	15,976	2,917,754
Servia	19,050	2,256,084
Greece	25,041	2,187,208
Denmark	15,288·7	2,185,162
Luxemburg	998	211,088
Montenegro	3,630	199,040
Samos	180	48,666
Monaco	8	13,304
Liechtenstein	68	9,124
San Marino	32	8,260
Andorra	175	6,180
Total	3,781,850·7	361,153,409

Belgium is by far the most densely-peopled country, having in 1893 550·6 inhabitants to the sq. mile; Russia is among the least populous, with an average of some 47. Great Britain, Germany, France, Austria, Russia, and Italy are known politically as 'the six great powers.' Eleven of the European states have possessions in other divisions of the world, the aggregate area of which amounts to nearly five times as much as that of all E.

Physical Aspect.—The surface of E. consists of two large unequal portions of distinctly marked character. North-eastern E. is a plain 2,500,000 sq. miles in extent, and of great uniformity, while South-western E. is a tableland traversed by high mountains, and intersected by considerable plains and valleys. The great north-eastern plain extends from the Black Sea and the Caucasus N. to the Arctic Ocean, and from the Ural Mountains W. to the low shores of Holland and Hanover. Of plateaux the chief are those of Bavaria in Germany, Bohemia in Austria, Castile in Spain, and Auvergne in France. The *mountains* of Southern Europe, forming a great girdle, may be said to centre in the system of the Alps (q.v.), which reaches a height of 15,783 feet in Mont Blanc. Hence radiate the German Mittelgebirge, with their highest point of 5000 feet in the Riesengebirge; to the E. the Carpathians, enclosing in a vast crescent the entire W. plain of Hungary; to the S. and S.E. the ranges of Italy, Turkey, and Greece. The mountains of Spain, including the Pyrenees, are also linked to the Alpine system by the Cevennes and other chains of France. The Ural Mountains, the Caucasus, the table-topped mountains of Norway, and those of Britain, are isolated masses. Mount Elbruz, in the Caucasus (18,493 feet), is the loftiest peak on the borders of E. The higher European ranges are covered with perennial snow, and send down enormous glaciers. Volcanoes are comparatively numerous, the most notable being Vesuvius in Naples, Ætna in Sicily, Hecla in Iceland, and those in the Lipari Isles. There are also many extinct volcanoes in Catalonia, the mountains of Auvergne, and in S. Germany. The *rivers* of E. are smaller than those of America and Asia, but are admirably distributed for purposes of fertilisation and commerce. They may be grouped into two systems, one flowing in a direction generally N. or W., the other S. or E. The latter includes the largest rivers, as the Volga (2400 miles), Danube, Dnieper, Dniester, Don, Po, Rhône, Ebro, &c.; the former has the Tagus, Garonne, Loire, Seine, Rhine, Weser, Elbe; the Oder, Vistula, Düna, Tornea, &c., entering the Baltic; the Onega, Dwina, Mezen, and Petchora flowing into the Arctic Sea. Most of these are navigable, and conduce greatly to the development of commerce in the inland countries. The *lakes* of E. are only inferior in extent and number to those of N. America. They are chiefly grouped round the E. coast of the Baltic and among the Alps. In Finland are lakes Ladoga and Onega, by far the largest sheets of fresh water in E.: those of Switzerland and Italy are famous for their beauty.

Islands.—The aggregate area of the islands is about 191,000 sq. miles, or one-twentieth of all Europe. Proceeding from the N., the principal are Novaia Zemlia, Spitzbergen, the Lofodens, Iceland, the Faröe Isles, the British Isles, Heligoland in the N. Sea; the Danish Isles, Bornholm, Rügen, Gotland, Oeland, Dago, Osel, and Aland Islands in the Baltic; the Balearic Islands, Sardinia, Corsica, Sicily, Pantellaria, Gozo, Malta, Crete, the Ionian Isles, Strivali Isles, Cerigo, and the Grecian Archipelago in the Mediterranean. E. is generally regarded as including the Azores and Madeira.

Climate.—E. is the only great division of the globe which nowhere touches the torrid zone, and is almost wholly within the temperate. The climate is partly continental and partly oceanic, and is throughout greatly more temperate than other countries of equal latitude. Britain and France are on the parallel of Labrador, and the line of 41° F. annua lmean temperature, which leaves America from the State of Maine in lat. 45°, is carried N. to beyond lat. 60° on the coasts of Norway. The extremes of mean temperature are 58° and 106° F. In the N.E. the air is dry, and the sky clear; in the S. and S.W., where the climate is milder and more oceanic, the air is humid and the rains heavier. The Scandinavian


EUROPE.
Scale of English Miles.
100 0 100 200 300 400
5 Long. W. of Greenwich. 0 Long. E. of Greenwich.
ARCTIC OCEAN
ATLANTIC OCEAN
NORTH SEA
BRITISH ISLES
BLACK SEA
CASPIAN SEA
MEDITERRANEAN
AFRICA
ASIA
FRANCE
SPAIN
RUSSIA
TURKEY
AUSTRO-HUNGARIAN MONARCHY

mountains shelter the countries of the Baltic from the cold winds of the N., while the Alps and Apennines arrest the Sirocco from the S. The heaviest rains fall on the western shores, where the S.W. rain-clouds of the Atlantic deposit their loads of moisture. On the coast of Portugal the yearly rainfall, the heaviest in E., amounts to 118 inches; at the foot of the Alps it is 100; on the W. shores of Britain 35-100; and on those of Norway 32. Ireland has no fewer than 208 days in the year during which rain falls. On the other hand, the fall in the Russian plains is only some 15 inches, and there are not more than half the average of rainy days that occur in the W. The fall of snow depends on temperature, and increases from S. to N. There are on an average 1½ day annually at Rome, 10 days at Milan, 12 at Paris, 21 at Karlsruhe, 30 at Copenhagen, and 171 at St. Petersburg.

Geology and Mineralogy.—The geological formations of E. indicate that the S. and central part of the continent remained submerged under the ocean for ages after the northern portion existed as dry land, and that the Caspian, the Black Sea, and the Arctic Ocean were united in comparatively recent times. The great mountain ranges and Scandinavia, Bohemia, Auvergne, Normandy, and parts of Britain, consist of gneiss, granite, syenite, &c., and the highly-contorted strata of the older Palæozoic formations. The Old Red Sandstone or Devonian occupies vast tracts in Russia, the Rhine basin, and Britain, and crops up continually, like the other primary groups, on the flanks of the southern mountains. The secondary formations occur in England, Denmark, France, W. Germany, Turkey, Greece, the S.E. and N.E. of Russia, and in patches in Spain and Italy. Tertiary strata stretch, with few interruptions, in a broad zone from the S. of the Baltic to the Black Sea, extending in breadth from the Niemen to the Carpathians. To the W. and S. of this belt they cover the basins of all the great rivers, including those of the Danube, Seine, and Thames. The minerals of E. are mainly useful, and are distributed in great abundance. Gold is produced in greatest quantity in the Carpathians and Urals; silver in the Erzgebirge, Harz, Carpathians, and in Scandinavia. The richest iron-mines are those of Britain, France, the Eastern Alps, the Riesengebirge, and the Scandinavian Alps. Lead is plentifully found in the Sierra Nevada, Cornwall, Saxony, and Bohemia; tin in Cornwall; zinc in the Riesengebirge; mercury at Almaden in Spain, and at Idria in Carniola; copper in the Carpathians, Urals, Pyrenees, and in Cornwall and Norway; cobalt, bismuth, and antimony in various parts of Germany. In the Russian government of Perm are found diamonds; the opal in Hungary, and rubies in France. Coal is generally most abundant where iron is found, but especially in Britain, Belgium, and France. Salt-mines are numerous in the Carpathians and Alps, and sea-salt is obtained extensively on the coasts of the Black Sea, &c. In the volcanic regions, as the Solfataras of Naples, Sicily and Iceland, there is much sulphur, and petroleum occurs in Russia, Wallachia, Italy, and Wales. Amber is procured chiefly on the Prussian shores of the Baltic. Mineral and brine springs are of frequent occurrence, and large naphtha springs are in Russia.

Botany.—The flora of E. does not probably contain a single indigenous plant unknown in Western Asia or Northern Africa. It is naturally divided into four great zones:—(1) To the N. of lat. 64°, including Iceland and part of Russia and Scandinavia, is the region of mosses and saxifrages, which has only stunted birches and firs, and along its southern limit some oats, rye, and barley. (2) The N. middle zone, extending from Scandinavia to the N. of France, also known as the region of the *Umbelliferæ*, the predominant trees of which belong to the *Coniferæ* and *Amentaceæ*, as the beech, oak, birch, plane, alder, poplar, willow, and cypress. The pastures are singularly fine, and the forest trees shed their foliage in winter. Besides the species of grain found in the northern zone, there are here wheat, hemp, flax, leguminous plants, apples, pears, cherries, and other northern fruits. (3) The S. middle zone, or region of the central mountain system, where the plains are clad with oaks, beeches, and chestnuts, and the elevations with pines. Here are produced much wheat and wine. (4) The southern or evergreen zone, the region of the *Labiatæ* and *Caryophyllæ*, embracing the three southern peninsulas and the S. coast of France. The vegetation of this zone is famous—its olives and date-palms, its winter flora and its fiery wines. In the extreme S. the orange flourishes, and rice is cultivated in E. Spain and N. Italy. Among the rare fruits are the fig, almond, lemon, pomegranate and citron. On the other hand, the pastures, which are interspersed with copse of the heath tribe, are less luxuriant than those to the N. of the Alps.

Zoology.—The fauna is on the whole less varied than that of the other divisions of the Old World, but is peculiarly exempt from noxious species. The chief rapacious animals—most abundant in Scandinavia and Western E.—are the bear, wolf, wild boar, and lynx; vast forms are now wholly awanting, while there are but few reptiles. Domestic animals, however, are plentiful almost everywhere. The buffalo feeds in the marshes of Hungary, Wallachia, and Italy; the reindeer is peculiar to the far North, and the camel thrives near the Black Sea. Many of the quadrupeds yield rich furs. The Barbary ape occurs at Gibraltar. In the Pyrenees and higher Alps are found the chamois, wild goat, and eagle. Among the commoner birds of prey are the vulture, falcon, and kite. The birds are inferior to those of other divisions in size and brilliancy of plumage, but are unexcelled for their sweetness of voice. The northern seas, lakes, and rivers surpass those of the S. in abundance of fish, chief of which are the cod, salmon, mackerel, and herring. Northern E. has a greater number of species of animals; the S. is more abundant in individuals.

Ethnology and Language.—The vast majority of Europeans belong to the Aryan (q.v.) family; only about one-nineteenth are Turanian. The former is distinctly divisible into four great groups—the Celtic in the W., the Greco-Romanic in the S., the Teutonic in the centre, and the Slavonic in the E. Of the Aryan groups, however, the Celt has in many cases failed to retain his original tongue, and therefore linguistically there are now only *three* large divisions of the population—the Teutonic, the Greco-Romanic, and the Slavonic. The first of these, numbering some 113⅔ millions, mainly embraces the Germans, Scandinavians, and English. Constituting the Greco-Romanic there are—(1) the Italic (101½ millions), comprising Italians, Spanish, Portuguese, French, Provençal, Walloons, Rhætians (Ladins), Rumans (Wallachians); (2) the Greeks, numbering some 5⅔ millions. The Slavs are 121⅓ millions in all, and are divided into E. Slavs—Russians, Cossacks; S. Slavs—Servians, Bosnians, Croatians, Bulgarians, Dalmatians, and Slovens; W. Slavs—Poles, Czechs, Slovachs, Wends, Sorbens. Celtic dialects are now spoken only in the Highlands of Scotland, Wales, Ireland, and Bretagne. The principal Turanian inhabitants of E. are the Turks (1¾ million), the Finns (3 millions, including the Esthonians, Livonians, Lapps, and Samoyedes), the Calmucks of Russia, the Magyars of Hungary (8½ millions), and probably the Basques of Spain. Gipsies are scattered in large numbers over E., while there are also some 7⅕ millions of Jews. In all, some sixty separate peoples, speaking fifty-three different languages, have been enumerated.

Religions.—All the *nations* of E. are Christian, excepting the Turks, who are Mohammedan. Christianity is split into three main divisions—the Roman Catholic, the Greek, and the Protestant Churches. The Catholic Church has the greatest number of adherents (155 millions), embracing the majority of the Greco-Romanic nations, about one-half of the Germanic, as well as a large proportion of the Slavs and Celts. Protestantism prevails in Britain, the Netherlands, Prussia, Denmark, Sweden, and Norway. The Greek form of religion is professed in Russia, Greece, and parts of Turkey and Austria. There are 85½ millions of Protestants and 90½ millions members of the Greek Church. The Mohammedans number 2 millions and the Jews 7⅕ millions, while there are also in the N. idolatrous Laps and Finns.

For the history of the continent see GREECE, ROME, and the various modern countries of E.

Euro'tas, the classic name of the modern Iris or Vasilo, a famous river of Greece, which flows through the ancient

Laconia, down a beautiful vale with dark gorges and through a fertile plain into the Gulf of Kolokythia, the ancient *Laconicus Sinus.* Sparta stood upon the right bank of the E., near its confluence with its only important tributary, the Œnus.

Eury'ale, a genus of waterlilies (*Nymphaceæ*), of which *E. ferox* of China and India is a familiar example, the seeds of this species being eaten by the Hindus. The flowers are red, the leaves about 12 inches in diameter, the fruit orange-shaped, containing numerous carpels, and the seeds black. The root-stock, or rhizome, contains starch. The E. is known to have been cultivated by the Chinese for at least 3000 years.

Euryale, a genus of starfishes (*Echinodermata*) belonging to the order *Ophiuroidea*, which also includes the sand-stars and brittle-stars. In E. the body exists in the form of a globose disk, with five obtuse angles, from which the prehensile arms are given off. The arms are long and contorted, but are even more so in the nearly allied *Asterophyton*, or "Medusa-head' starfish.

Eury'dice. See ORPHEUS.

Euse'bius Pam'phili (*i.e.*, E., the friend of Pamphilus) was born about A.D. 264 at Cæsarea, where he spent the most of his life. Till about forty years of age he lived in great intimacy with Pamphilus, Bishop of Cæsarea, who had an excellent library, in which E. studied diligently and profitably. On the martyrdom of his friend he fled first to Tyre and then to Egypt, where he remained till 315, when he returned to Cæsarea, and was elected bishop. In 325 he attended the Council of Nice, in which he took a prominent part, especially in trying to mediate between the Arians and the orthodox Church party. The first draft of the Nicene Creed was made by him, the term *homo-ousios* (importing that the Son was *of the same substance* with the Father, to which he was opposed as savouring of Sabellianism) and the anathemas being added by the Council. E., whose theology corresponds entirely with Origen's, 'was of the opinion that the Son could not be called absolutely eternal, like the Father; that it was necessary to ascribe to him an origin of existence from the Father, since thus only was it possible to hold fast the doctrine of *one* God; and that it was impossible to express the truth *after the manner of men* in any other way than by saying the existence of the Father precedes the existence and the origin of the Son.' E. was offered the patriarchate of Antioch about 330, but declined it. He died in 340. Of the writings of E., his *Chronicon*, a history of the world down to A.D. 328, is chiefly valuable for the extracts it contains from Berosus, Sanchuniathon, and other writers. The first complete edition was published by Mai and Zohrab (Milan, 1818). His most important work is his history of the Church from the death of Christ to 324. But his want of sound critical judgment is so manifest throughout—the history being full of references to spurious documents and names of unknown men, with improbable and ungrounded statements, and stories about miracles—that even his good faith has been called in question. The *editio princeps* of the Greek text appeared at Paris in 1549.—**E. of Nicome'dea,** Bishop first of Beryta (Beirut) and then of Nicomedea, and finally (338) Patriarch of Constantinople (died about 340), was the personal friend of Arius (q.v.), whom he attempted to defend at the Council of Nice. He consented, 'for the sake of peace,' to subscribe the creed drawn up at that council, but not the anathemas at the end, in which he was joined by Theognis of Nicæa. For this the two were condemned along with Arius, and banished to Gaul, being also recalled at the same time with Arius, 328. E. was the chief representative of the Semi-Arian (q.v.) party, which took up a middle position between the orthodox and the Arians, adopting the phrase *homoi-ousios* ('of a similar substance') to express the relation of the Son to the Father, from whom they received the name of Eusebians.—**E. of Emisa** (Phœnicia) was born at Edessa, and studied there, and at Alexandria and Antioch one of his instructors being E. of Cæsarea. As early as 312 he was distinguished for scholarship and modesty. He refused the bishopric of Alexandria when Athanasius was deposed in 341, but accepted that of Emisa soon after. He spent the close of his life at Antioch, and died about 360. In reference to the theological controversy of the day, E. probably belonged to the Semi-Arian party, of which his friend E. of Nicomedea was the chief.

Eusta'chian Tube. This is a tube leading from the back of the throat to the middle ear or tympanum. Its function is probably to equalise atmospheric pressure on both sides of the drum of the ear. Closure of this tube from inflammation and enlargement of the tonsils is one of the most common causes of deafness. See EAR.

Eusta'chius, Bartolommeo, a famous Italian anatomist, born early in the 16th c., but whose place and date of birth have not been ascertained, studied at Rome, practised there as physician, and died in poor circumstances in 1574. He enriched almost all departments of anatomical science by his discoveries, upon a number of which, as the *Eustachian tube* and *valve*, his own name has been conferred. Of his works, the *Tabulæ Anatomicæ*, the text of which appears to have been lost, consists of a number of excellent anatomical drawings, and was first published by Lancisi, at Rome, in 1714. Other works were issued under the editorship of Boerhaave at Leyden in 1707, and at Delft in 1736.

Eusta'thius, the most learned man of his age, was born in Constantinople, and flourished in the latter half of the 12th c. Successively monk, professor of rhetoric, and deacon, he died Archbishop of Thessalonica in 1198. His works consist of commentaries on Greek poets, theological treatises, &c., and establish both his learning and his oratorical power. The chief are his Commentaries on the Iliad and Odyssey (Leipz. 1825-29), on Dionysius Periegetes (Bernhardy's edition of that author, Leipz. 1828), and on Pindar. These commentaries are of the greatest value, as containing extracts from important works that are now lost.

Eusta'tius, St. (St. Eustache), a Dutch island in the W. Indies, 12 miles N.W. of St. Christopher. St. E. forms part of the colony of Curaçao, and is under a chief nominated by the Crown. Area, 7 sq. miles; pop. 1633. It is a mountainous mass of volcanic rock covered with vegetation, but has only one, and that a strongly-fortified landing-place. The chief productions are maize, sugar, cotton, and tobacco. The island is often visited by severe earthquakes.

Euter'pe (Gr. 'the charming one') was the Muse of lyric poetry. She was represented in ancient works of art with a flute.

Euterpe, a genus of *Palmæ* or palms. Of this group the mountain cabbage-palm and the edible E. are familiar species. The plants occur in S. America and the W. Indies. The male and female flowers occur on the same inflorescence. The stems are faintly annulated or ringed; the leaves are pinnate; and the bases of the leaf-stalks are very large, and form sheaths to the stem.

Eutro'pius, a Roman historian belonging to the 4th c. A.D., of whose life almost the only facts known are that he was an imperial secretary under Constantine, that he accompanied Julian in his invasion of Persia, and died probably about 370. He wrote an epitome of Roman history, *Breviarium Rerum Romanarum*, from the early kings to the reign of Jovian, which seems to have been carefully compiled, and which is composed in a succinct and singularly pure and simple style. It was once very popular, and was much used as a school-book, for which it was seemingly intended. The *editio princeps* appeared at Rome in 1471.

Eu'tyches, abbot of a monastery at Constantinople in the 5th c., who in seeking to combat Nestorianism fell into heresy himself. When the orthodox doctrine of the perfect equality of the Son with the Father had been established at the Council of Nice (325), the next difficulty was the union of this perfect God with the man Jesus; and Apollinaris (q.v.), holding the idea of a God-man to be a logical monstrosity comparable to a minotaur, affirmed that the Logos took the place of the mind in Jesus, whose soul and body alone were human, so that there was in reality but one nature in Jesus. In opposition to this the orthodox doctrine was next established (Council of Constantinople, 381) of the complete and real manhood of Jesus. But now the divine and the human nature, in being distinguished so carefully, came to be separated; they were held by some to be conjoined but not united. Nestorius, for instance, separated them so far as to refuse to call Mary the mother of God, which she was declared to be at the Council of Ephesus, 431. That council decided that in Jesus the two natures were not merely annexed but united. It was in pressing this doctrine one step too far that E. and his partisans revived the Monophysism of Apollinarius. E. declared that though there were two natures before the incarnation, there was but one after. He was also wont to call the body of Christ the body of God, and though he did not deny to him a human body, yet from a feeling of reverence he would not call it the same in essence as other human bodies. The Council of Chalcedon (451) condemned E., and defined the orthodox doctrine to be that in Jesus were united the two natures of a true God and a perfect man, 'unconfounded, unchanged, undivided, inseparable.' After this E. disappears from history, but his doctrines are still held by the Armenian and Coptic Churches.

Eux'ine (Gr. *euxeinos*, 'hospitable') is a name of the Black Sea. The earliest Greek navigators called it Axeinos (or 'inhospitable'), from the savage tribes that surrounded it; but when these had been civilised by commerce, they changed the name to Euxeinos.

Evan'der, of Pallantium, in Arcadia, was the son of Hermes by the nymph Themis, or according to Roman legend by the prophetess Carmenta or Tiburtis. Sixty years before the Trojan war, E. sailed for Italy with a Pelasgian colony. He landed on the bank of the Tiber at the foot of the Palatine, and there built the city Pallantium, from which, according to Varro, the names Palatium and Palatinus are derived. He taught the people laws, music, and the art of writing. He received Hercules after the conquest of Geryon, and raised altars to that hero, as well as to the Lycæan Pan, Demeter, and Poseidon, and assisted Æneas on his arrival in Italy. Divine honours were paid to E. at Pallantium in Arcadia and on Mount Aventine.

Evangel'ical Alliance, The, 'for the union and co-operation of Christians throughout the world,' was organized in London in 1846, at a meeting of some 800 professing Christians—Episcopalians, Methodists, Presbyterians, Independents, Baptists, Moravians, Lutherans, and others, and has taken root in many countries. Branches now exist in Great Britain and the Colonies, France, Belgium, Switzerland, Germany, Sweden, Norway, Italy, Greece, Turkey, Syria, Australia, India, New Zealand, and the United States. The chief object of the E. A. is 'to exhibit the unity of the one Church of God in doctrine, mutual recognition, and Christian co-operation for the advancement of evangelical truth throughout the world,' its motto being 'Unum corpus sumus in Christo.' The basis of the Alliance is that it is to be composed of such only as hold evangelical views in regard to the following points of doctrine:—(1) the divine inspiration, authority, and sufficiency of the Holy Scriptures; (2) the right and duty of private judgment in the interpretation of the Holy Scriptures; (3) the unity of the Godhead, and the Trinity of persons therein; (4) the utter depravity of human nature in consequence of the Fall; (5) the incarnation of the Son of God, his work of atonement for sinners of mankind, and his mediatorial intercession and reign; (6) the justification of the sinner by faith alone; (7) the work of the Holy Spirit in the conversion and sanctification of the sinner; (8) the immortality of the soul, the resurrection of the body, the judgment of the world by our Lord Jesus Christ, with the eternal blessedness of the righteous and the eternal punishment of the wicked; (9) the divine institution of the Christian ministry, and the obligation and perpetuity of the ordinances of Baptism and the Lord's Supper. A week of Universal Prayer takes place among the members throughout the world annually in January.

Since the formation of the E. A. general conferences, to which Christians of all nations were invited, have been held since 1846 in London, Paris, Berlin, Geneva, Amsterdam, New York, Basle, Florence, and Copenhagen, besides annual conferences in towns in the United Kingdom, and great national conferences elsewhere.

Evangelical Union, The, is a denomination of Christians which may be said to have been founded by Rev. James Morison, from whom it sometimes gets the improper title of Morisonians. Morison, minister of a congregation of the United Secession Church at Kilmarnock, was deposed for heresy in 1841, chiefly on the charge of teaching the universality of the atonement, and the ability of man to believe the gospel. His father, Robert Morison, United Secession minister at Bathgate, was also deposed in 1842, and A. C. Rutherford (Falkirk) and John Guthrie (Kendal) in 1843—all for holding similar views. These men and 'others, principally elders and delegates from Christian Churches,' met at Kilmarnock in 1843, at which conference a 'statement of principles' was adopted as the basis of an association, which was forthwith formed under the designation of the E. U., 'for the purpose of countenancing, counselling, and otherwise aiding one another; and also for the purpose of training up spiritual and devoted young men to carry on the work and pleasure of the Lord.' The E. U. does not profess to be based on any peculiar or distinctive Church polity, but to be a protest against certain of the leading dogmas of Calvinism; in short, those belonging to it take up the position of theological Nonconformists in Scotland. Their theology affirms:—I. as regards the divine purpose in redemption—(1) the universal fatherhood of God, and in consequence his desire to save all men, in opposition to the Calvinistic election; (2) the universal atonement of Christ, making the salvation of every man possible, in opposition to an atonement for the elect only; (3) the universal work of the Holy Spirit, or its desire to reach all men, and its sufficiency in every case to secure conversion: in opposition to the limitation of its work to the elect. II. as regards the application—(1) that the will of man must be in the matter of his salvation free and active: in opposition to the Calvinistic doctrine that man by the Fall 'hath wholly lost all ability of will to any spiritual good accompanying salvation'; (2) that a man is regenerated through faith, not in order to it; (3) that a man is elected to salvation 'through sanctification of the Spirit and belief of the truth,' and not predestinated by God unto life 'without any foresight of faith or good works, or any other thing in the creature, as conditions or causes moving him thereunto.'

There are in Scotland some ninety congregations belonging to the E. U., or affiliated therewith, that is, sympathizing with it in doctrine, and co-operating in Christian work without being formally connected. In England there are few churches belonging to the Union, but a large number of ministers, its ministers being eligible for Congregational churches there.'

Evan'gelist means (1) 'a bringer of good news'; (2) in the New Testament, a preacher of the gospel, *i.e.*, not a settled pastor, but an itinerant preacher or missionary (2 Tim. iv. 5), the pastor being called presbyter or elder. Eusebius speaks of the E. as if he had been a colporteur of the written Gospels, which he could not have been at the time he speaks of. This idea led to the later meaning attached to the name of the E. *par excellence*, as (3) the writer of a Gospel. (4) In still later liturgical language the E. was the reader of the Gospel for the day.

Ev'ans, Lieutenant-General Sir De Lacy, G.C.B., a distinguished British soldier and Liberal politician, was born at Moig, in Ireland, in 1787; entered the army in 1807; distinguished himself in the Peninsular War, especially at Vittoria and Toulouse; in 1814-15 served in N. America, and was severely wounded at New Orleans; in 1815 was at Quatre-Bras and Waterloo as aide-de-camp to General Ponsonby. In 1831 he was elected member for Rye, and in 1833 for Westminster. In 1835 he accepted the command of the British Legion, of 10,000 men, raised to maintain the throne of Isabella II. of Spain against the Carlists, and was victorious before San Sebastian, Pasages, and on the heights of Amozagana, and closed the campaign by the storm and capture of Irun. He was defeated for Westminster in 1841, but was re-elected in 1846, and retained his seat till 1865, when he retired from public life. In June, 1854, he was raised to the rank of lieutenant-general in the British army, and in the Crimean war of 1854-55 commanded the second division of the British forces, fighting with signal intrepidity at Alma and Inkerman. Failing health forced him to return to England in the beginning of 1855, when he received the thanks of Parliament for his services in the field. He received the Grand Cross of the Bath, the Grand Cordon of the Legion of Honour, and the degree of D.C.L. from Oxford. E. died 9th January, 1870.

Ev'ansville, an important city of Indiana, U.S., on the Ohio, 50 miles above the confluence of the Wabash. It has a U.S. marine hospital and several public halls. As the southern terminus of the Wabash and Erie Canal, E. has great facilities for trade and navigation. There are flour-mills, iron-foundries, and manufactures of wool, leather, &c. The town has several daily newspapers. Pop. 50,756. In 1880 the inhabitants numbered 29,280.

Evapora'tion is the conversion of a liquid at its surface into the gaseous form. Dalton showed that if a liquid be permitted to evaporate in a vacuum, the E. goes on till a certain quantity of vapour is formed, whose pressure depends upon the temperature. When a liquid is vaporised, heat is absorbed, and therefore must be abstracted from surrounding matter or from the liquid itself. For instance, if a thermometer bulb be dipped in ether and then exposed to the air, the ether is rapidly evaporated, the heat necessary for this being obtained from the mercury, whose temperature is therefore lowered. Again, if a tube terminating at each end by a bulb be taken, with a little water in the one bulb and water vapour in the rest of the tube, by simply immersing the other bulb in a cold liquid a condensation of the vapour there takes place, and this necessitates an E. and therefore cooling of the water, which is thus made *to freeze by its own E.* Liquids which vaporise rapidly at ordinary temperatures are said to be volatile, and every liquid increases in volatility as its temperature approaches that of its boiling-point. Pressure also has a very great effect upon E., so much so that by a rapid diminution of pressure a liquid may be made to boil at a temperature considerably below its true boiling-point. When it is considered how great a proportion of the earth's surface is liquid, it is evident that E. must play an important part in the economy of nature. The air always contains water vapour in varying quantities, depending on the temperature and pressure. When air saturated with water vapour is cooled, the vapour is condensed and forms clouds of rain, snow, or hail, according to the circumstances in which it has been cooled. This physical E. is so intimately involved in other meteorological operations that for further information in this connection reference is made to such articles as CLIMATE, CLOUDS, DEW, WINDS, &c.

A very beautiful explanation of E. is furnished by the modern Molecular Theory (q.v.) of the constitution of matter. According to this theory the average velocity of the molecules of a liquid is less than that of its vapour; but some of the former may be moving with velocities equal to, or even greater than, the average velocity in the vapour. If such a molecule should be at the surface and be moving *from* the liquid, it will fly off into space as a vapour molecule. Also, a vapour molecule striking the liquid may become part of the liquid if entangled among the liquid molecules. Such is the theory of E. and condensation. The former depends on the temperature and extent of surface of the liquid, the latter upon the temperature and pressure of the vapour. If the liquid be evaporated in a closed vessel, things will go on until the pressure of the vapour is sufficient to render the number of the molecules condensed equal to the number evaporated. At this stage E. is usually said to cease, but upon the theory it is going on as fast as ever, only it is neutralised by an equal condensation.

Eve is the name given in the Hebrew scriptures to the first woman, who was so called by Adam, according to the narrative, 'because she was the mother of all living' (Heb. *khavah*, 'life' or 'life-maker'). See ADAM.

Evec'tion (Lat. *evectio*, 'a carrying out'), the name applied by Bullialdus to an inequality, first noticed by Hipparchus, which consists in the alteration of the eccentricity of the lunar orbit, produced by the difference of the sun's attractions upon the moon at its apogee and perigee—a difference which depends upon the relative positions of the lunar line of apsides and the earth's radius-vector.

Eve et Treve (Scotch law), a term for slaves or servants. See COLLIERS AND SALTERS.

Ev'elyn, John, an English author and man of science, was born at Wotton, Surrey, 31st October, 1620. Educated at Balliol College, Oxford, he seems to have been intended for the law, for he studied at the Middle Temple (1640-41); but the civil war, in which he took the side of the Royalists, compelled him to travel for a time, particularly in France and Italy. Assisting in the Restoration of 1660, he was received with favour at the Court of Charles II., became one of the founders of the Royal Society in 1662, and at its request, when the English Naval Commissioners dreaded a scarcity of naval timber in the country, wrote (1664) *Sylva, or a Discourse on Forest Trees, and the Propagation of Timber in His Majesty's Dominions,* which induced landowners to plant a great number of young oak-trees, from which were obtained the war-ships of the next century. He died 20th February, 1706. E. wrote popular works on various subjects, such as sculpture, architecture, &c., but will be chiefly remembered as perhaps the first in England to treat gardening and planting scientifically, and for his *Diary*, which is probably unsurpassed for the curious and minute information which it gives regarding society in the latter half of the 17th c. It was published under the editorship of W. Bray in 1818, and has gone through several editions.

Eve'ning Primrose. See ŒNOTHERA.

Ev'erett, Alexander Hill, an American author and diplomatist, was born at Boston, Massachusetts, 19th March, 1792. He graduated at Harvard in 1806, studied law in the office of John Quincey Adams, and in 1809 accompanied him on his mission to Russia. He was appointed minister at the Hague in 1818, and at the court of Spain in 1825. Returning to the United States in 1829, he became editor and proprietor of the *North American Review.* In 1845 he was sent as minister to China, and died in Canton, 29th June, 1847. E.'s works, which exhibit much learning, varied knowledge, and fine talent, are—*Europe, or a General Survey of the Principal Powers* (1822); *America, or a General Survey*, &c. (1827); *New Ideas on Population* (1822); *Essays* (1845 and 1847).—**Edward E.,** brother of the foregoing, was born at Dorchester, near Boston, Massachusetts, 11th April, 1794. He studied at Harvard College, and graduated in 1811. At twenty years of age he became pastor of a Unitarian church in Cambridge, and soon gained distinction by his brilliant pulpit efforts. He appeared as an author in 1814 with a *Defence of Christianity*, and next year was elected Eliot Professor of Greek in Harvard College. To prepare himself for this position he resided four years in Europe, associating with some of the most distinguished men, Cousin regarding him as 'one of the best Grecians he ever knew.' E. returned to the United States in 1819, became member of the House of Representatives in 1824, and Governor of Massachusetts in 1835. He was made minister at the court of St. James in 1841, became President of Harvard College in 1845, was appointed Secretary of State in 1852, a United States senator in 1853, and died 9th January, 1865. E.'s *Orations and Speeches* (1850-68) are a brilliant embodiment of his public career. Although not a profound statesman, he was one of the most eloquent and accomplished of American orators.

Ev'ergreens, a name popularly applied to such plants as retain their verdure and foliage throughout the year, this property being chiefly due to the thickness of the leaf substance, and to the retardation or absence of the chemical changes in virtue of which the leaves of other plants fall and wither. Of E., firs, heath, rhododendrons, laurels, holly, ivy, box, privet, some oaks, bays, myrtles, &c., are well-known examples. E. are much in request for the decoration of garden policies, churches, &c.

Everlast′ing Flowers, the name given to certain kinds of flowers belonging to Composite plants, from their dry, firm structure, which enables them to resist the process of decay for a long period. The species of the genus *Gnaphalium* (*e.g., G. orientale*) are much in request as E. F.; and species of *Helichrysum* are also termed E. F. from their durability. The flowers of *G. orientale* are used by the French in making *immortelles* to decorate tombs. The species of *Helichrysum* are chiefly natives of Africa, but some (*H. arenarium*) grow in Southern Europe.

Ev′ersley, Viscount, Charles Shaw Lefevre, an English politician, was born 22nd February, 1794, educated at Winchester School and Trinity College, Cambridge, entered Parliament in 1830, and from 1832 to 1857 represented N. Hants. In May, 1839, he was chosen Speaker of the House of Commons after the elevation of Abercromby to the peerage as Lord Dunfermline, and this post he held uninterruptedly for eighteen years, the Conservative ministry of Sir Robert Peel having offered no opposition to his re-election. A fine and dignified presence, affable manners, perfect acquaintance with the forms of the House of Commons, and absolute impartiality, made Lefevre one of the most popular and successful of Speakers. When he retired from public life with a peerage as Viscount E. and a pension of £4000, his retirement was universally regretted. E. was a D.C.L., and held numerous posts, including those of High Steward of Winchester, Governor of the Isle of Wight, Commissioner of Church Estates, and (in 1859) Ecclesiastical Commissioner. Died 28th December, 1888.

Eves′ham (Old Eng. *Eofesham*, 'the dwelling by the river's brink'), a market-town of Worcestershire, 15 miles S.E. of Worcester. It stands on a slope above the Avon, in the vale of E., which is famous for its beauty and fertility. The chief buildings are the churches of All Saints (13th c.) and of St. Lawrence, a fine corn exchange, institute, efficient grammar school, and public library. Of the abbey, only the bell-tower (commenced in 1553), 110 feet high, remains. There are manufactures of agricultural implements, gloves, and hosiery. E. arose from a monastery founded in 709. Here Prince Edward, afterwards Edward I., defeated Simon Montfort, 4th August, 1265. Till 1867 E. returned two members to Parliament; till 1885 only one. Pop. parl. div. of county 49,538; reg. sub-dist. 9112; and mun. bor. 5836.

Evic′tion, in Scotch law, is the dispossessing one of property, heritable or moveable, in virtue of a preferable title in the person of him by whom the E. is made. The dispossessed party will be entitled to institute an action against his author, the value of the claim being regulated by the nature and extent of the Warrandice (q.v.). A purchaser is not bound to defend a hopeless case, and he may bring his action of relief before E. actually has taken place, if it be imminent or the author disputes the right of relief. A tacksman or rentaller has also a remedy in case of E. Thus, if the E. be permanent and total, or if it be temporary, an ordinary action of damages lies; if the E. be permanent and partial, the claim will be for an abatement of rent. If the E. be caused by that for which neither party is responsible, then no action lies. In England the possessory action by which the title to lands and tenements could be tried and possession recovered was called Ejectment (q.v.). The Common Law Procedure Act of 1852 abolished the action of ejectment and substituted one of simply claiming the land, and this action has now been called, under the Judicature Act, *Recovery of Land*.

Ev′idence, Le′gal, may be defined as any matter of fact tending to affirm or disaffirm the alleged existence of some other matter of fact. It may be in writing or by testimony of witnesses. Written proofs consist of records, ancient deeds, and wills thirty years old, which prove themselves; but modern deeds and other writings must be attested and verified by the parol testimony of witnesses, if still living. See PAROL PROOF.

The rule in all trials is that the best evidence must be produced which the case admits of, for if it be shown that better evidence exists than that which is produced, then the non-production causes a presumption that it would have disclosed some hidden falsehood. Thus it would not be allowed to prove the terms of a lease by an attested copy or by parol evidence, the lease itself being proved to be forthcoming; but the deed being shown to be lost, then secondary evidence is available.

Letters are evidence *against* the writers but not for them. Entries in family Bibles and other books by parents or heads of families are good evidence of the facts recorded. A receipt *in full*, when obtained without fraud or collusion, is conclusive against the party who grants it. An account in a tradesman's books, if supported by collateral proof of fairness and regularity, would probably be sufficient evidence of debt. In England the law limits this proof to transactions within *one year* before the action brought, unless between merchants in the usual course of trade.

The Statutes 6 & 7 Vict. c. 85, 14 & 15 Vict. c. 99, 16 & 17 Vict. c. 83, and 28 & 29 Vict. c. 104, render the following persons competent, and (with the exception of the Sovereign and foreign ambassadors) compellable witnesses:—The Sovereign, foreign ambassadors, persons interested in the result, parties in civil cases, and their wives and husbands, believers of all creeds, and atheists (if they comply with the Oaths Act of 1888), deaf mutes, accomplices, and convicts; also bankers, when not parties to the proceedings, but only by judge's order to produce and prove their books. But a husband is not a competent witness against his wife, nor a wife against her husband, in criminal procedure or in case of adultery. During marriage, neither husband nor wife can be compelled to disclose any communication made by the one to the other. Infancy (to a certain extent), lunacy, drunkenness, &c., when preventing a person from understanding the nature of an oath or from giving rational testimony, renders that person incompetent as a witness. In criminal proceedings an accused person, and, as stated, the husband or wife of accused, and a person jointly indicted and tried with the accused, are incompetent except in certain cases and offences. In violence between husband and wife, either can be called as a witness against the accused, and also in criminal proceedings under the Married Women's Property Act of 1882. Persons charged under Criminal Law Amendment Act of 1885 may give evidence, and their husbands or wives are competent but not compellable witnesses; also the same rule applies as to competency under the Merchandise Marks Act of 1887, the Libel Amendment Act of 1888, and the Prevention of Cruelty to Children Act of 1889.

The Act 32 & 33 Vict. c. 48 allows the judge, in place of the former oath, to administer to a witness this declaration if he objects to be sworn and states as the ground of his objection that the taking of an oath is contrary to his religious belief, or if he objects to be sworn and states as the ground of such objection that he has no religious belief; in *civil cases*:—'I, A. B., do solemnly, sincerely, and truly declare and affirm.' Here follow the words addressed to A. B. by the officer of the Court: 'The evidence that you shall give to the Court and jury *touching the matter in issue*, shall be the truth, the whole truth, and nothing but the truth.' And in *criminal cases*, the form of affirmation is the same, save the words italicised, for which is substituted, '*between our Sovereign Lady the Queen and the prisoner at the bar*,' or '*between our Sovereign Lady the Queen and the defendant*' (when the accused is not in custody). Any one giving false evidence after making this declaration is liable to the penalties of perjury.

No counsel, attorney, or other person *professionally* connected with the cause can be compelled to disclose matter confidentially intrusted to him. But lawyers not engaged in the cause, physicians, divines, servants, and friends can be compelled to divulge all matter relevant to the issue, though it has been imparted to them in the strictest professional confidence, and however delicate its nature. The courts of law in England, Scotland, and Ireland are empowered to summon witnesses *out* of their jurisdiction; witnesses not appearing to be punished by the court of the county in which the process has been served in the same manner as in disobedience to a writ of Subpœna (q.v.). The superior courts at London and Dublin, the Court of Session in Scotland, and the supreme court in any colony or possession of her Majesty, are authorised on due application to issue an order to examine witnesses in suits pending before any tribunal in her Majesty's dominions. See WITNESS.

E'vil (Old Eng. *yfel*, Pl. Deut. *oevel*, Dut. *euvel*, Fris. *evel*, Ger. *übel*, Old High Ger. *ubil*, Mœso-Goth. *ubels*; the root is uncertain) is a term of theological origin, partially adopted into the language of common life, and usually understood to mean whatever is contrary to our ideas of moral rectitude and tends to interfere with the general happiness of mankind physically, morally, and socially. Traces of something wrong in all the departments of human life, that seems irreconcilable with the rule of infinite power, wisdom, and goodness in the universe, are not far to seek nor hard to find. Besides the more directly physical evils, such as the havoc caused by hurricanes of wind on sea and land, earthquakes, explosions, epidemics, &c., we find, *e.g.*, tribes of human beings living for centuries in brutish ignorance, and finally left to perish by pestilence and internecine war. We have the sufferings and sorrows of the multitudes who are born into the world with constitutions predisposing them to physical disease and pain, and to moral obliquity, and who get in their upbringing a special training to vice, cruelty, and crime. We see the talented, the useful, and the benevolent cut down in the prime of life, while the stupid and the useless are spared. We see on the one side honesty in rags, innocence ruined and oppressed, martyrs imprisoned, tortured, and put to death; and on the other knavery and tyranny stalking in prosperity and honour. The mystery of the existence and cause of all this is one which men have been trying to explain ever since speculation began. Two great modes of solution have been attempted, the *Dualistic* and the *Pantheistic*. 1. Under the former may be classed:—(1) The Eastern speculators, who accounted for E. in the world by the innate opposition of matter to the divine will. By the one absolute, uncreated, universal Being—according to the Zend-Avesta, the sacred books of the ancient Parsees—were created two deities, the gods of light and darkness, of wisdom and ignorance, of good and E.; the latter coming first, and the former being produced as a remedial principle to regulate the work of the latter. The Gnostic sects of the early Christian Church adopted these dualistic notions from the East, which were fully developed by (2) the Manichæans, who either ascribed the origin of E. to the Demiurgus (the creator of the material world, himself created by the Eternal), or maintained that it was inherent in matter. The ascetic practices, so common among Christians at the time, indicate the prevalence in the Church of the view akin to this, that the body is the seat and organ of sin. (3) The Christian fathers, who, generally speaking, traced the origin of E. to the rebellion of the human will against the will of God, although some of them ascribed it to sensuality, and Athanasius, as well as Origen, regarded moral E. as something negative. Augustine arrived at the same conclusion by a different road. (4) Another theory accounts for E. on the principle of necessary opposition or antagonism. As there is no rest without fatigue, no pleasure without pain, &c., so there could be no virtue without vice. Moral goodness is the mastery over moral evil. 2. The *Pantheistic* theory of E. depends of course on its theory of ontology. This system, the earliest known origin of which was in India, teaches that the eternal, infinite Being creates by self-evolution, whereby he becomes and is all existence. Accordingly, as it is expressed (1) by the modern philosophers of this school (*e.g.*, Spinoza), E. is only limitation or modified good, for the modes of action are all alike modes of God's activity. Thus the less of being the less of good, and E. is what is finite, for the finite is simply the negation or limitation of infinite being. We may also note another theory associated with the name of Leibnitz, who resolves sin into privation, and refers it to the necessary limitation of a creature. God could not create a world without sin, because he could not make creatures absolutely perfect. (2) The theory held by Bolingbroke, and the sceptics of his time, who account for the origin of E. on the æsthetic principle of the proportion of parts in the scale of sentient being. As animal life is graduated from the highest intelligence down to the point at which the animal seems half a plant, so in the moral world 'there is a ladder whose top reaches the loftiest unselfishness, and whose rounds gradually descend to the grossest forms of moral life.' (3) The fatalistic theory of the Deists of last century, which Butler sought to refute. As the universe is the necessary outcome of the necessary existence of God, all the orders of existence in the universe, which must also be necessary, are fated to form links in one chain of eternal and unalterable necessity, and to be as they are at any given stage of their development.

The great difficulty in the way of accounting for the existence of E. lies in the two doctrines of the existence of a personal God of infinite power, wisdom, and goodness, and of the free, self-determining action of the human will. Accordingly most of the theories enumerated above try to get rid more or less of one or other of these two doctrines; some of them of both. Those who give up the personality of God find a solution of the problem to their own satisfaction in maintaining that by so doing they render E. and sin in the ordinary sense *meaningless*, because these terms point back to a period in the childhood of mankind when human duty was held to consist in obeying a series of positive commands, and that what they represent are merely the results of imperfection or ignorance. Of all the solutions of the mysterious problem given by those who retain the two conditions, not one amounts to a real explanation of the difficulty. Perhaps no adequate explanation is possible to finite beings in their present condition. But as science more and more fully reveals the beautiful evolution by which from the lowest forms in nature endless varieties have been produced, as history gradually recognises in civilisation the outcome of a perpetual struggle against obstacles to its advance, a hope arises in the human mind that there is in the dread phenomena of E. a purpose which may one day be seen to be not incompatible with the wisdom and goodness of an Almighty Being.

Evil Eye. The belief that the human eye can put forth powers of positive mischief, can blight and destroy everything that has life, appears to have prevailed universally over the ancient world—in Europe, Asia, and Africa. It is still prevalent in heathen countries, and maintains its ground to some extent in Christendom. The Greeks used the word *baskainō*, the Latins *fascino*, to describe this baleful influence. In Italian we have the *mal occhio*, in French the *mauvais œil*; and most languages bear witness to the existence of the belief. We meet with the phrase 'eye-bitten cattle,' 'eye-biting witches,' in treatises on the subject, and it was an old belief in England that those persons who 'had two balls, or two *blacks* in the apple of the eye' (what is called a double pupil), possessed much of this baneful power. Hence probably the common saying, 'No one can say that black is the white of my eye'—can say that I have an E. E. The number of amulets, charms, and spells 'defensative' or 'counteractive,' recommended in books, ancient and modern, against the E.E. is very great. Bathing the eye with saliva is thought very effective in neutralising the destructive influence for a time, and it is still common when any object of great value or beauty is to be viewed to hear one person say to another, 'Bathe your eye before you look at it'; and 'spitting three times in the eye' is sufficient to undo the strongest spell. In England 'turning the coal,' as it is called, will not merely neutralise the evil, but actually turn the tables on the witch, and make her feel as if a red-hot coal lay on her heart until she withdraws her charms. In Scotland the 'mountain ash,' or rowan-tree, is the great preservative or 'saining' agent. A piece of this wood worn on the breast keeps a man scatheless. A branch of rowan laid above the byre-door will ordinarily protect the cattle, and in special circumstances a twig twisted in the hair of the cow's tail will guard any individual cow; or, laid under the churn, will ensure its yielding the due proportion of butter.

The belief in an E. E., though it has assumed a multitude of grossly superstitious forms, has doubtless originated, like many other superstitions, in the exaggeration of a natural fact. The power of the eye is in reality almost unlimited; some men can read unerringly the thoughts of others by a single glance. This mysterious capability in times of widespread ignorance would naturally engender a thousand crude fancies in the breasts of ignorant people, which astute and cunning men would easily turn to their advantage.

Ev'olute and In'volute. If a stretched inextensible cord be supposed wound round a given plane curve, each point of the cord, when unwound under tension, will describe a curve, of which the original curve is the E. These evolved curves again are *involutes* of the original curve. It is apparent, then, that a given plane curve has an infinite number of similar involutes, but has only one E. A kinematical consideration of the above method of description shows that tangents of a curve are normals to its I., and normals to a curve are tangents to its E.; and that an E. may, therefore, be defined as the locus of the ultimate intersections of the normals, or, in other words, the locus of the centres of curvature. The circle has no E., or rather its E. is reduced to a single point. Its I. is a spiral, and is of some practical importance in the making of toothed wheels. The involutes of the cycloid and equiangular spiral are geometrical curiosities, as being similar and equal cycloids and spirals. The analytical methods of investigation of these derived curves will be found in most text-books on the elements of the differential and integral calculus.

Evolu'tion and Involu'tion are two inverse algebraic operations, the latter concerning itself with the *raising* of numbers or expressions to *powers*, the latter with the *extraction of roots* of similar quantities. Thus $a \times a \times a$ is a raised to the third power, and is written a^3; and in the same way a^n is unity multiplied by a n times. This is a case of I., and is the case which occurs constantly in arithmetic. In algebra, however, the term has a far wider significance, being the expression of the sum of n quantities raised to the mth power as the sum of a series of determinable quantities, or in other words, the expansion of

$$(a_1 + a_2 + a_3 + \ldots\ldots + a_n)m.$$

The binomial theorem

$$(a + b)^n = a^n + na^n - 1b + \frac{n^2}{1\cdot 2} a^n - {}^2b^2 + \ldots\ldots$$

is a special case of I., and one of very frequent occurrence, and of great importance in both pure and mixed mathematics.

E. is usually called in arithmetic the *extraction of roots;* that is to say, given any number or expression, it is required to find that quantity which when raised to a given power will be the given quantity. It thus requires in the first place a knowledge of I.; and this knowledge is sufficient to obtain the method of solution. We shall here indicate the general method by the consideration of the special case presented by the *cube root.* From I., we know that

$$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3.$$

The cube root, then, of the right-hand expression is $a + b$, the first term of which is a, the cube root of a^3.

$$\begin{array}{r|l}
 & a^3 + 3a^2b + 3ab^2 + b^3\,(a + b) \\
3a^2 + 3ab + b^2 & a^3 \\
\cline{2-2}
 & \qquad 3a^2b + 3ab^2 + b^3 \\
 & \qquad 3a^2b + 3ab^2 + b^3
\end{array}$$

Subtracting a^3, we have three terms remaining for which we must find a divisor such that the quotient may be b. The first term of this divisor is evidently three times the square of the first term of the answer; and to this must be added three times the product of the first and second (which latter is obtained from consideration of the trial divisor $3a^2$) and the square of the second. If there be a third term in the answer, the first two must be taken as one term and treated in the same way. The application to arithmetic is easy, if the value of each figure in the number, as to whether it represents units, tens, hundreds, or thousands, be always kept in view. The full treatment both of the square and cube roots, which are alone of any practical importance, may be found in any treatise on elementary algebra.

Evolution Theory, in its widest signification, is an hypothesis which regards all nature, physical and biological, as the result of a development from the general to the special, from the simple to the complex; at the same time viewing human progress, the growth of language, literature, moral and religious sentiments, science, and art, as but the higher and ultimate results of the same natural laws acting through endless variations. The idea of evolution is truly philosophical, but no full explanation of its working has as yet been given, notwithstanding numerous attempts. Darwin's theory of natural selection (see DARWINIAN THEORY) may account for the transmission and perpetuation of useful variations, but it cannot account for variation itself; while Herbert Spencer's bold attempt to produce from a homogeneous distribution of matter a heterogeneous but dynamically stable universe, with the subsequent development of life, instinct, reason, and social and moral qualities, is unsatisfactory, and even in certain instances self-destructive in its reasoning.

Evolutions, Military, include all the movements of troops under command, in times of peace and war. The tendency of the development of the art of warfare is to simplify E.; and in modern Drill (q.v.) the soldier is in many cases intrusted to perform some of them in the manner which, in certain circumstances, seems to him the best. See TACTICS.

Ev'ora (anc. *Ebora* and *Liberalitas Julia*), a town in the district of E., and the capital of Alemtejo, Portugal, situated on a high plain, 73 miles E. by S. of Lisbon by railway. It is the see of an archbishop (since 1541), was often in former times the residence of the king and the seat of the Cortes, and has two ruined forts, a large Gothic cathedral (1186), several convents, and a library of 50,000 vols. Its manufactures are chiefly leather and ironwares. Pop. 25,177. E. was captured by Sertorius in 80 B.C. Taken by the Arabs in 712, it was recovered in 1166. The Roman antiquities of E. have attracted much attention. They consist chiefly of a temple of Diana, with Corinthian columns, now used as a slaughter-house, and an aqueduct, part of which was demolished in 1875. At the end of the aqueduct is an exquisite tower, one of the finest specimens of Ionic architecture in the Peninsula.

Ev'remond, Charles de Marquetel de St. Denis, Seigneur de St., a famous wit and epicurean of the 17th c., was born at St. Denis du Guast, near Coutances, 1st April, 1613. He was the son of a baron, and after studying in a Jesuit college, entered the army, where his wit and bravery won him the friendship of Turenne, Condé, and other distinguished men. Condé gave him a lieutenancy, which he lost, along with the prince's favour, for indulging in indiscreet raillery. At the time of the Fronde he satirised the king's enemies, but shortly afterwards was imprisoned during three months for a rash witticism on Mazarin, and his sprightly sallies against the treaty of the Pyrenees compelled him to flee to England in 1662. There he became one of the brightest ornaments of the giddy Restoration society. Charles II. gave him a pension of £300. William III. was also charmed with E., who, though pardoned by Louis XIV. in 1689, remained in England till his death at London, 20th September, 1703. His letters were scarcely surpassed, even in French literature, for polished and easy vivacity.

Évreux' ('on the waters,' anc. *Mediolanum*, later *Eburovices*), the capital of the department of Eure, France, on the Iton, 67 miles W.N.W. of Paris by railway. It is the seat of a bishop, and has a fine cathedral of the 11th c., a clock-tower of 1417, an episcopal palace (1484), a theatre, a botanic garden, and elegant promenades. The manufactures are cotton and woollen fabrics, leather, liqueurs, &c. E. was pillaged by Rollo and his Northmen in 892, and was burned by Henry I. of England in 1119. In the reigns of Henry V. and Henry VI. it was repeatedly in the hands of the English. Pop. town 16,932; arrond. 111,261.

E'wald, Georg Heinrich August von, one of the most illustrious biblical scholars of the 19th c., was born at Göttingen, 16th November, 1803, studied at the university of his native town, where he became in 1827 extraordinary, and in 1831 ordinary, Professor of Philosophy. In 1835 he was appointed Professor of the Oriental Languages. Travels in search of Oriental MSS. took him in 1826, 1829, and 1836 to Berlin, Paris, and Italy. As one of the seven Göttingen professors who protested against the abolition of constitutional law and liberty in Hanover, he was dismissed from his chair, 12th December, 1837, and thereby obtained leisure for a visit to England. In 1838 he accepted a call as ordinary Professor of Theology to Tübingen, was ennobled by the King of Würtemburg in 1841, and returned to Göttingen in 1848; and in the North German *Reichstag* of 1867 was conspicuous by his Hanoverian and anti-Prussian policy. E.'s works on the Hebrew language, his exegesis of the Old Testament, and his treatment of Jewish history in this department of learned labour, have that supreme merit which the Germans call 'epoch-making.' They have moulded the critical conceptions of all subsequent scholars, and have left a lasting impress on biblical study. E. is probably the greatest genius that has adorned modern German theology. E. also thoroughly studied the other Oriental languages, epecially the Arabic, Aramaic, Ethiopic, Phœnician, Persian, and Sanskrit. In some respects his *Grammatica Critica Linguæ Arabicæ* (Leipz. 1831-33) is still unsurpassed. He made numerous contributions to Oriental and biblical literature. E. died at Göttingen, 5th May, 1875.

Ewald, Johannes, the greatest lyric poet of Denmark, was born at Copenhagen, 18th November, 1743. He lost his father at the age of eleven, and was educated at Slesvig school. His romantic adventurous spirit prompted him, when only sixteen, to join the Prussian army, which he afterwards quitted for the Austrian service. In 1760 he returned to Copenhagen and devoted himself to theology, but his studies were cut short by a disappointment in love. He was then aged twenty-two, and had given no proofs of a poetic gift; but a funeral ode which he wrote on the death of Frederik V. of Denmark in 1767 gave him a high literary standing. He became rapidly famous as a lyric and dramatic poet, but sank into dissipation and poverty, and was deserted by his mother and nearest relatives. Finally he received a government pension, and died at Copenhagen, 17th March, 1781. In E.'s time a bitter feud was going on between the French and the German schools in Danish literature, and E., who was an ardent disciple of Klopstock, did much to introduce German ideas and tastes. E.'s lyrics are the finest in Danish poetry. His *Kong Christian stod ved höien Mast*, which is translated by Longfellow, has become the Danish national anthem, and many of his sea-songs are very popular. His works are carefully finished, sometimes bombastic, and sometimes bright with heroic exultation or fantastic humour. His dramas include *Adam og Eva*, *Lykkens Tempel*, *Balders Död*, and *Fiskerne*—the two last being probably his masterpieces. See the lives of E. by Molbech (1831), Hammerich (1851), and Olsen (1861).

Ewe, a female sheep, whose wool has been twice clipped, and which has proved itself fertile. *Ewe hogg*, a female lamb. The origin of *hogg* is thought to be the Celtic *og*, 'young,' whence *ogan*, 'a young man,' and *oigie*, 'a virgin.' *Eild gimmer*, a ewe hogg twice shorn, which has not been mated. See Stephen's *Book of the Farm*.

Examinations for the Public Service. Formerly appointments in the Civil Service could only be obtained through patronage. In 1853 a Committee of Inquiry was appointed, and in conformity with its recommendation, a qualifying examination was instituted in 1855 for entrance to many of the departments, in addition to the nomination. By an Order in Council, dated 4th June, 1870, the appointments in most of the public offices were thrown open to persons who, without previous nomination or private influence, should offer themselves as candidates, and compete at the appointed examinations under regulations framed, or to be framed, in pursuance of 5th clause of that Order, by the Civil Service Commissioners and with the approval of the Lords of the Treasury.

At the present day there are five ways of admission to the Civil Service:—

(1) By open competition, under the clause of the Order in Council already referred to, and subject to the 'General Regulations.'

(2) By open competition, not under the said clause and not subject to the 'General Regulations.'

(3) By limited competition and nomination by heads of departments in which the vacancies occur.

(4) By qualifying examination and nomination—by competition, should the head of the nominating department require it.

(5) By nomination and qualifying examination, which may be partial or may be dispensed with altogether on the Commissioners being satisfied that the candidate possesses the requisite qualifications.

The subjects of examination (1) for clerkships (Class I.), together with the maximum of marks allotted to each subject, are substantially identical with those prescribed for the Indian Civil Service, which are here set forth:—English composition, 500; Sanskrit language and literature, 500; Arabic language and literature, 500; Greek language and literature, 750; Latin language and literature, 750; English language and literature (including special period named by the Commissioners), 500; French language and literature, 500; German language and literature, 500; mathematics (pure and applied), 900; advanced mathematical subjects (pure and applied), 900; natural science (any number not exceeding three), elementary chemistry and elementary physics (not to be taken up with either higher chemistry or higher physics), 600; higher chemistry, 600; higher physics, 600; geology, 600; botany, 600; zoology, 600; animal physiology, 600; Greek history (ancient, including constitution), 400; Roman history (ancient, including constitution), 400; English history, 500; general modern history (period to be selected by candidates from list issued by the Commissioners, one period at least to include Indian history), 500; logic and mental philosophy (ancient and modern), 400; moral philosophy (ancient and modern), 400; political economy and economic history, 500; political science (including analytical jurisprudence, the early history of institutions, and theory of legislation), 500; Roman law, 500; English law (to include law of contract, law of evidence, law of the constitution, criminal law, law of real property—only four of these subjects may be offered), 500. No subject is obligatory, and a candidate may offer any or all of them. The limit of age for the appointments in England is 22-24; and that for those in India is 21-23. The fee payable by the candidate is £6. It may be mentioned here that six of the candidates who were declared in October, 1895, by the Civil Service Commissioners to have shown a competent knowledge of the subjects of the Final Examination for the Indian Service, were Asiatics, and that one of these headed the list, another was third, another fourth, and another seventh.

The following posts have been placed under (1):—Clerkships in the Admiralty, Civil Service Commission, Colonial Office, Customs, Ecclesiastical Commission, Home Office, India Office, Inland Revenue, Local Government Board (England and Ireland), Lunacy Commission, Patent Office, Record Office (England and Ireland), Science and Art Department, Board of Trade, Treasury, and War Office; also clerkship in the Veterinary branch of the Chief Secretary's Office (Ireland), clerkship in the Inspector General's Office (Constabulary, Ireland), and clerkship in Secretary's Office (Post Office, Grade I.).

The examination for Clerkships of the Second Division, which come under (2), is held under the same conditions as the examination for clerkships under (1), the subjects being adapted to persons of inferior education, and the appointments consequent on passing being of course of smaller value and importance. The subjects are—Handwriting, orthography, arithmetic, copying MS. (to test accuracy), indexing or docketing, digesting returns into summaries, English composition, geography, English history, book-keeping. The fee is £2, and candidates must be over 17 and under 20 years of age on the first day of the examination.

The most important and lucrative branch of the Civil Service open to competition is that of India. Every candidate for appointment, either in the United Kingdom or in

India, must satisfy the Civil Service Commissioners that he is a natural-born subject of the Queen, that his age is within the prescribed limits, that he has no bodily infirmity unfitting him for the Civil Service, and that he is of good moral character.

The examination for the appointment of Abstractor in the Civil Service, which is classed under (1), is in handwriting, orthography, arithmetic (including Vulgar and Decimal Fractions), English composition, and digesting returns into summaries. The limit of age is 20 to 25, and the fee is ten shillings. Boy-clerks as candidates must be between 15 and 17 years of age. They are classed under (2), and are examined in handwriting, orthography, arithmetic (including Vulgar and Decimal Fractions), copying MS. to test accuracy, English composition, and geography. The fee is ten shillings. Temporary boy-copyists must be between 14 and 18 years of age, and are examined in handwriting, orthography, and elementary arithmetic. The fee is one shilling. Temporary boy-messengers must be between 13 and 15 years of age, and are examined in reading and writing. The fee is one shilling. Female typists are classed under (3) and (4), and are examined in writing, spelling, arithmetic (first four rules, simple and compound, including English weights and measures, and reduction), and typewriting. The candidates must be between 18 and 30 years of age. The fee is one shilling.

For fuller information concerning the above and other examinations held in connection with the Civil Services of the United Kingdom and India the reader is referred to the handbook of rules and regulations issued by the Civil Service Commissioners. These rules and regulations are liable to alteration from time to time, but from the above details the reader may form a tolerably accurate idea of the method, scope, restrictions, &c., of the examinations, as the variations, if any occur, are usually slight.

In 1889 it was provided by the rules and regulations applicable to the Indian Civil Service that *selected* candidates, who have passed the competitive examination, before proceeding to India should be on probation for one year, at the end of which time they should be examined with a view of testing their progress in Indian law, the Vernacular of the province to which each is assigned, History of British India, and certain optional subjects. The candidates are also tested as to their ability to ride, which is obligatory, and if they pass the final examination they receive £100 as allowance for residence during their probation at one of the Universities or Colleges approved by the Secretary of State, viz., Oxford, Cambridge, Dublin, Glasgow, Edinburgh, St. Andrews, Aberdeen, and University and King's Colleges, London.

The Royal Indian Engineering College at Cooper's Hill, Staines, was established in 1870, with a view to the education of civil engineers for this department. Admission is obtained by competitive examination, to which all natural-born British subjects between the ages of seventeen and twenty-one, on the 1st day of July, and of sound constitution and good character, are eligible. There are also competitive examinations in connection with valuable appointments in the Forest Service of India (limit of age, 17-20; fee, London, £2—elsewhere, £3), and in the Crown colonies: also in the Indian Police Service (unmarried, British-born or naturalised British subject, and between 19 and 21 years of age; fee, London, £2; elsewhere, £3.

Exam'ined Copy, in English law, is a copy or extract of a deed or entry in the record certified by the proper officer. With regard to the admissibility of C. in evidence, see *Taylor on Evidence*, s. 1323. The analogous term in Scotch law is Extract (q.v.).

Exanthem'ata (Gr. lit. 'blossoms,' 'what burst forth,' then 'eruptions,' from *exantheō*, 'I burst forth as a flower'), a class of febrile diseases, attended by eruptions on the skin, which appear at a definite period and run a definite course. The E., or eruptive fevers, belong to the miasmatic order of zymotic diseases, and are small-pox, chicken-pox or varicella, miliary fever, scarlet fever, hybrid of measles and scarlet fever, rubeola, dengue, erysipelas, and plague.

Ex'arch (Gr. *exarchos*, 'a leader'), a title which was at first given to the leader of the chorus in a Greek play, was afterwards conferred on bishops in the Greek Church, and is now applied to a deputy of a patriarch in the Russian Greek Church. Under the Byzantine empire the governor of a border province was called an E. When Narses, the general of Justinian, destroyed the Ostrogothic kingdom in Italy, he ruled that country as an *exarchate* of the Byzantine empire until his death in 567. The Bishop of Rome and the *duces* or rulers of the various Italian provinces soon made themselves independent of the exarchate, which became confined to the districts round Ravenna, and remained subject to the Eastern empire until Aistulf, king of the Lombards, took Ravenna in 752. Another exarchate was founded in Africa in 534, and was abolished by the Arabs in 698.

Excam'bion is, in Scotch law, the name of the contract by which one piece of land is exchanged for another. The implied Warrandice (q.v.) of this contract is real warrandice, in virtue of which either party in the event of eviction from the land which he has received in E. may recover the land which he gave in exchange. The portions exchanged must not be more than one-fourth of the value of the estate, and they must not include the principal mansion, house, garden, park, or home farm. In English law, see Exchange, Deed of.

Ex'cellence, or **Ex'cellency**, a title first borne by the Lombardic, then by the Frankish kings, and by the German emperors till the 14th c. The Italian princes used it in the 15th c., but from the 17th exchanged it for *Altezza* ('highness,' Fr. *Altesse*). It has since become in most countries the designation of ambassadors; but in Italy the title *Eccelenza*, though properly belonging only to noblemen, is given by courtesy to every stranger to whom it is sought to show civility. The governors of British colonies are addressed by the title of E., as are some of the military commanders.

Exceptions, Bill of. In England, if the counsel for either party at the hearing or determining of a cause held that the judge mistook the law in his directions to the jury, or in withholding from them, or admitting, evidence, &c., he might require the judge publicly to seal a B. of E., stating the point in which he was supposed to err. This the judge was obliged to seal, or if he refused, the party might have a compulsory writ against him. The question of law in dispute was then determined in a Court of Error. The Judicature Act of 1875 did away with the procedure, and left to either party dissatisfied with the ruling of the judge on a question of law, the right to move in the High Court of Justice or in the Court of Appeal, and provided 'that nothing in the Act or in any rule should prejudice the right of any party to any action to have the issues for trial by jury submitted and left by the judge to the jury.' When jury-trial in civil causes was extended to Scotland, it having been deemed proper to adopt sundry English law terms and forms, amongst others Bills of E. were introduced, the form being prescribed in the Appendix to the Acts of Sederunt, 9th December and 3rd July, 1823.

Exchange', the name given in the great commercial cities of Britain to the institution where merchants, bankers, and stock-brokers meet for the transaction of business, or to obtain intelligence respecting the value of stock, &c. The institution, known as the *Bourse* (Lat. *bursa*, 'purse') in France and Belgium, the *Börse* in Hamburg and other German cities, the *Borsa* in Italy, is of foreign origin. Sir Thomas Gresham, who had long acted as British agent at Antwerp, resolved to reproduce the Bourse of that city in England. Gresham's Burse, as the new building was called, was commenced in 1566, finished in the following year, and inaugurated by Queen Elizabeth (23rd January, 1570-71), under the title of 'The Royal E.' This building was destroyed by the great fire of 1666. It was replaced by a new E. in 1669, which was also destroyed by fire in 1838. The present London E. was built in 1842-45, at the cost of £150,000, and inaugurated by Queen Victoria on the first day of the latter year as 'The Royal E.' The business carried on 'on 'Change' consists of buying and selling merchandise, and paying, receiving, and exchanging money. After that of London may be mentioned, in Great Britain, those of Birmingham and Glasgow. The Bourse of Paris, that of Berlin, and the E. of New York are remarkable for their elegant architecture.

Exchange, in political economy, means the conversion of the money of one country into the money of another. *Rate of E.* means the price at which the conversion can be effected. This rate fluctuates according to the Balance of Trade (q.v.), it being in favour of that country owing least to the other. Thus, if England owes twenty millions of pounds to the United States, while the latter country owes England thirty millions, E. will be in favour of England; that is to say, if a resident in the United States wishes to convert a certain weight of gold or silver in American coin into British coin, he will receive less weight in British coin; while the resident in London who converts British into American coin will receive more weight than he gives. When E. is weight for weight, then it is said to be *at par*. Between England and France *par* is 25·2 francs per £1. If A of London owes B of Paris £100, and B owes C of London £100, the whole may be adjusted without transmission of bullion by A paying C £100. But if Paris owes London five millions of pounds, while London owes Paris only four millions, it is plain that the whole relative debt cannot be extinguished in this convenient way, and there must be the trouble and expense of transmitting bullion. The fact that Paris owes more to London than London to Paris causes a greater competition among Parisians for orders payable in London than there is in London for orders payable in Paris; E. will therefore be against Paris.

Exchange, Deed of, in English law, is a deed by which one owner of land exchanges land with another. The portions exchanged must be of equal value, and the legal tenure must be equal. Thus estates held in fee-simple cannot be exchanged for estates held in fee-tail. (See FEE-SIMPLE.) By 4 & 5 Will. IV. c. 30, the proprietor of any land in *common field* may exchange it for any other land, whether lying in the same or in another common field, or for any enclosed land lying in the same or in an adjoining parish. E., according to Statute 8 & 9 Vict. c. 106, no longer implies right of re-entry or general warranty, but an actual entry is absolutely necessary to complete the E., as the heir of a deceased party, who has never entered, cannot enter and take as purchaser. The General Inclosure Act of 1836, and the Settled Land Act of 1882, provide for E. of lands within the same parish, and of settled for other lands by a tenant for life. For the exchange of land held in right of the Church the consent of the patron and of the bishop is necessary.

Exchange, Military. By the Act 5 & 6 Edw. VI. c. 16, it was declared that all sales, or bargains for money or reward, of or about offices in the administration of justice or in the civil service, &c., should be void, and the intending seller should lose all right to the office, and the intending buyer should be disabled for ever from acquiring. By the Act 49 Geo. III. c. 126, this Act was extended to all offices in the gift of the Crown, and was also extended to Scotland and Ireland. There were, however, excepted from this Act all *purchases* or *exchanges* of commissions in the royal forces at prices fixed by his Majesty's regulations. Any one giving or taking more than the regulation price was to forfeit his commission and to be cashiered. These Acts are known as the Army Brokerage Acts. In 1683 a royal warrant ordered the payment of one shilling in the pound on the surrender of a commission to the person surrendering. William III. forbade all payments, and exacted an oath from all officers that they had given no money. This rule was omitted from the Mutiny Act of 1701; and gradually purchase, recognised by the Court of Chancery, grew up into a system. The subject was often dealt with by committees, but it was impossible to make overpayments cease, because the permission to buy led to the practice of bargaining. Hence in 1871, when Mr. Gladstone's government failed to carry their bill abolishing purchase, they abolished it by royal warrant, dated 20th July, 1871. The method of abolition was by cancelling all royal regulation of the prices at which purchases or exchanges were alone lawful. The regulations now require, as regards first appointments, a certain standard of examination; as regards promotion, a certain term of satisfactory service, and in most cases further examination. It was provided that officers of equal substantive rank on full pay may exchange from one regiment or corps to another with the sanction of the commander-in-chief, and on a certificate from their superior officer that the E. does not originate in any cause affecting the character or efficiency of the parties, and on a medical certificate of fitness to serve, no officer being permitted to retire within twelve months of his E. It was explained that the warrant did not intend to interpose any obstacle in the way of exchanges between officers on full pay which are made to suit the reasonable convenience of officers. By the Act 38 Vict. c. 16 (1875), it is provided that her Majesty may authorise exchanges from one regiment or corps to another, *on such conditions as may seem expedient for the time.* The chief points that arise in reference to an E. are the reasons for the exchange and the manner in which it is carried out. Both *receiver* and *payer* are compelled by the regulations now in force to sign declarations that the proposed E. does not originate in any cause affecting the honour, character, or professional efficiency of either party, that they intend, *bonâ fide*, to join and serve in, for at least twelve months, the regiments to which they exchange, and that not one of the officers of either regiment has contributed or promised to contribute to the sum arranged as payment for the E., or has paid, or promised to pay, any sum of money to either or for either of them (the Exchangers) in reference to the E.

Exchange, Stock. In former times the business now carried on in the S. E. of London was transacted in the Bank of England; but about the year 1700 the dealers in public securities changed their place of meeting to what is now called *Change Alley.* In 1773 some of the brokers hired rooms for business purposes in Sweeting Alley. To these they gave the name of *S. E.* Subscriptions were subsequently raised to erect a building for the special purpose of dealing in stocks. The site chosen was Capel Court, so called after William Capel, Lord Mayor of London, who had resided there. Admission to the society of the brokers, which had formerly been free, was now appointed to be by ballot and subscription. The old building was removed and the present one opened in 1854. Members are governed by a committee, who have power to suspend or expel any member 'guilty of dishonourable or disgraceful conduct.' A member is not allowed to transact business with any one who is not a member, and all transactions must be according to the custom of 'the house.' 'Settling days' are, for consols, once a month, on a day between the 6th and the 11th; for other English and foreign stocks twice a month, about the middle and the end. Members of the S. E. are either 'jobbers' or 'brokers.' A jobber deals on his own account. A broker acts for a client, deals with the jobber, and is paid by commission. A 'bull' buys for settlement at a future date on the speculation of a rise in price in the interval. A 'bear' sells for future settlement, on the speculation of a fall in price in the interval. Hence what are called *bull* transactions and *bear* transactions are speculations for the 'rise' or 'fall' of stocks. 'Contango' is a payment for postponing settlement of a bull transaction from the original settling day to the next. It is the interest on the purchase-money for the time between the settling days. It is paid either to the seller of the stock, who agrees to wait a fortnight for his money, or it is paid to some one who lends the money to the bull. It thus often happens that the bear gets contango on the purchase-money on stock which he has not. If money is dear and stock plentiful, the contango rate is high. When conditions are reversed, as they often are from bear transactions, then the bear, instead of receiving contango from the bull, has to pay for not being required to deliver the stock sold. This payment is called a 'backwardation.' What is called the 'making-up' price of stocks is their average prices during the day, and the difference between this and the prices at which business is actually done is received and paid by the bulls and bears, or accounts are carried over on this principle. Such is the nature of what are called *time bargains.* PUTTS AND REFUSALS, or contracts for the sale of supposed stock on a day not arrived, were rendered illegal by statute 7 Geo. II. c. 8, which, however, was repealed by statute 23 & 24 Vict. c. 28.

Scrip—an abbreviation of subscription—is the document which certifies payment of deposits and calls on shares previous to the issue of the final certificate. It is negotiable.

Excheq'uer Bills are bills of credit issued (generally by authority of Act of Parliament) by the Exchequer, and pledging the Government to repay the sum advanced with usual interest, generally 1½ to 2½ *per diem* per £100. Those issued by statutory authority are charged on the Consolidated Fund. By such bills the bank advances to Government are made. E. B. and Exchequer Bonds constitute the bulk of the unfunded debt. Public notice is given from time to time for repayment. Bankers prefer this security, because its value does not fluctuate. Statute 29 & 30 Vict. c. 25 consolidated the laws under which the issue, payment, &c., of E. B. and E. Bonds have been regulated. Statutes 24 & 25 Vict. c. 98, 29 & 30 Vict. c. 25, and 36 & 37 Vict. c. 54, provide for the punishment of forgery of E. B.

Exchequer Bonds differ in being issued at fixed rates of interest for considerable terms of years.

Exchequer, Chancellor of, was at first the head of the clerks of the royal chapel, after they were formed, in the reign of Henry III., into a court which had both judicial and financial functions, and which as a financial body was called the *Court of the Exchequer*. It became solely judicial, but the C. of E. remained a financial minister, and is now the first minister of finance in the British Government. The Prime Minister, if he be a member of the Commons, can hold the office.

Exchequer, Court of. See COMMON LAW, COURTS OF; COURT OF JUDICATURE, SUPREME, ACTS.

Exchequer, Court of, in Scotland. The Scots C. of E. prior to the Union was the King's Chamberlain-Court, and consisted of the treasurer, the treasurer-depute, and as many lords of Exchequer as the king chose to appoint. By the Treaty of Union the court was continued until Parliament should constitute a new one, which was done by 6 Anne, c. 26. This court consisted of the Lord High Treasurer of Great Britain and a Chief Baron, with four other Barons of the Exchequer (the last being serjeants-at-law, English barristers, or Scots advocates of five years' standing). In 1833 their ministerial duties passed to the Treasury, and in 1856 their judicial authority was transferred to the Court of Session. The Crown is still preferred to other creditors, and the duties in connection with the revenue, as formerly belonging to the sheriff and justices, remain as they were under the statute of Anne.

Excip'ients (from Lat. *excipio*, 'I take out' or 'receive,' *i.e.*, along with something else), in materia medica, are inert or slightly active substances used as a medium of administration for active medicines, such as rose-water, mucilage, and syrups.

Excise' Laws. The taxes levied upon articles of consumption produced within the kingdom are called Excise Duties. They were first resorted to as a temporary expedient by the Long Parliament. They have ever since continued to be an important source of the imperial revenue of Great Britain. In 1733 Sir Robert Walpole introduced a bill for extending the operation of the excise, while at the same time it diminished its pressure by the Bonding or Warehousing System (q.v.), under which the taxed commodity may be locked in a Government warehouse and removed in instalments, a proportional part of the duty being paid at each removal. The scheme was, however, then defeated. It was not brought forward again till 1802, when it became law. The collection and management of the excise were placed under special commissioners, but in 1849 they were transferred to the Board of Inland Revenue, which appoints collectors, accountants, and other subordinate officers. The levying of the revenue is facilitated in England and Wales by the division of the counties into districts of collection, with subdivisions of each district, each subdivision having a supervisor with a gauger or surveying officer. The excise duties are increased by the duties on licenses. Those within the limits of the chief office in London are granted by the Commissioners of Inland Revenue, or by persons employed by them for the purpose. Within the limits of the cities of Edinburgh and Dublin licenses are granted by the commissioners or assistant-commissioners there, elsewhere by the collectors and supervisors of the respective excise collections. Upon death or removal, a license may be transferred by endorsement for the residue of the term, but a fresh entry must be made of the premises. The penalties attached to the sale of excisable commodities without a license are heavy, in some cases amounting to £500. These commodities are beer, cider and perry, chicory, coffee mixtures or substitutes, game, patent medicines, plate, playing cards, spirits, tobacco and snuff, vinegar, wine, &c. Besides these sources of revenue, there are also licenses to appraisers, auctioneers, brewers; possessors of dogs, armorial bearings, carriages, male servants, &c.; hawkers, carriers of guns, pawnbrokers, &c. The total revenue derived from excise was, for the year ending 31st March, 1895, £26,050,000; and the cost to the country of the Inland Revenue Department, which collects the excise amongst other items of revenue, was for the same period £1,804,539 (net).

Excommunica'tion is the banishment of a member from the privileges of a religious community on account of impiety or other conduct inconsistent with the rules of the society. The first express mention of it among the Jews is in Ezra x. 7, 8, and Neh. xiii. 3. In later Rabbinical writings three degrees of E. are distinguished:—(1) *Nidui*, involving certain privations in civil and religious matters for thirty days. This was probably the 'casting out of the synagogue' mentioned Luke vi. 22, John ix. 22 and xvi. 2. (2) *Cherem*, a more severe exclusion, prohibiting the offender from buying and selling, and including a curse or *anathema* (in the LXX. the Greek equivalent for Hebrew *cherem*, 'devoted,' *i.e.*, to destruction; in the New Testament rendered 'accursed,' *e.g.*, Rom. ix. 3, 1 Cor. xii. 3, Gal. i. 8, 9, that is, a sentence signifying danger of death). (3) *Shammatha*, by which an offender was given over totally and finally to the divine judgment. This is supposed to be the same curse as that pronounced by St. Paul, 1 Cor. xvi. 22,—*Anathema Maranatha*. The latter word is the Hebrew form of the Aramaic for 'the (or "our") Lord will come,' and was part of a cursing formula from the Book of Enoch—*cf.* Jude 14-16, and 2 Thess. i. 7-10.

E. was adopted in the Christian Church as a part of her discipline for preserving the unity and purity of her members, and consisted in excluding from the common benefits and privileges consequent on baptism until signs of repentance were shown. There were two degrees of the infliction, according to the heinousness of the offence committed:—(1) By the Lesser E. (called 'separation' or 'suspension'), inflicted for such offences as being absent from church on three successive Sundays, ante-nuptial incontinence, marrying a third time, &c., offenders were excluded from the Eucharist, the prayers of the faithful, and from offering oblations. (2) The Greater E., inflicted for the greater sins of fraud, apostasy, blasphemy, murder, idolatry, &c., was total expulsion from the Church with an anathema or curse, and deprived the offender of Christian burial. At first the power claimed by the Church in this matter was entirely spiritual. While she excluded offenders from spiritual privileges, she left all their civil or natural rights unaffected, and so it always remained to a great extent except in Europe. Mosheim ascribes the greater severity of the sentence of E., which came into vogue in Europe, to the influence of paganism. Those excommunicated by the Druidical priests, for example, were counted criminals, were shunned as if infected by the plague, and deprived even of the protection of the laws (Cæsar, *De Bell. Gall.*, vi. 13). So from the 8th c. onward in Europe a person excluded from the Church by a bishop, and especially by the Pope, was no longer regarded as a king or a lord, nor as a citizen, a husband, a father, or even as a man, but was considered a beast. Three gradations of guilt, in those liable to ecclesiastical censure, were established by the Council of Pavia (850). The first included those who willingly confessed their sins and submitted to the penance imposed; the second, those who for greater sins were excommunicated, but who submitted to the penance imposed, and were then restored to communion; the third, those who refused to submit to the penance imposed, and were in consequence anathematised, a sentence which excluded them not only from the Church, but from the society of Christians; in other words, they were outlawed. The sentence of E. was inflicted on a king for the first time by Pope Gregory V.—on Robert of France, 889. But Pope Gregory VII. was the first to carry out the full severity of the sentence described above—in the case of Heinrich IV., Emperor of Germany. The practice of laying whole nations under sentence of E. or an 'interdict' dates from the time of the same pope, or, according to others, of Alexander III., about 1160. The most illustrious princes of the Middle Ages were obliged to succumb to the effects of an interdict, but some time before the Reformation the terror of such a sentence was in great measure dissipated. From that time the effect of E. has been again, practically at least, entirely confined to spiritual matters.

Excoria'tion (Lat. *ex* and *corium*, 'the skin'), a part of the skin from which the cuticle has been removed by friction, heat, or the action of some acrid substance. Excoriations are common among infants, and may be cured by dusting flour, starch, or puff-powder, or oxide of zinc over the parts.

Excre'tion (from Lat. *excerno*, 'I separate'). This is the process by which refuse materials are thrown out of the body. These materials come from two sources—(1) The matters in food which are incapable of digestion or of assimilation, and which are ejected from the alimentary canal; and (2) matters formed by the disintegration of the tissues in consequence of their vital activity. Both of these kinds of materials, being not only useless but injurious, are thrown out of the body by various organs and channels. The channels of E. are—(1) *The lungs*, which separate watery vapour, carbonic acid, and a small amount of refuse organic matters which give frequently a taint to the breath. (2) *The liver*, which separates water, holding in solution, in the form of bile, various hydrocarbons, such as taurocholic and glycocholic acids, cholesterine, colouring matters, leucin, tyrosin, and other matters obtained from the disintegration of the tissues, and various salts, such as sulphates, phosphates, and chlorides of the alkalies and alkaline earths, and as a separate product, glycogen or animal starch. (3) *The kidney*, which separates nitrogenous matters, such as urea, uric acid, creatine, creatinine, &c., colouring matters, salts of various kinds, namely, the sulphates of soda, potash, and lime, the phosphates of soda, magnesia, and ammonia, and the chlorides of sodium and potassium. (4) *The skin*, which separates oily matter from the sebaceous glands, and sweat from the sweat glands, consisting of water holding in solution a small quantity of the salts of soda, potash, and lime, and occasionally urea, uric acid, grape sugar, albumen, and biliary colouring matters. (5) *The intestinal canal*, which discharges the fæces consisting of the refuse material of food along with a small amount of the constituents of the bile, mucus, fatty matter, &c.

Exculpa'tion, Letters of, were, in Scotch law, a warrant granted at the suit of the panel or defender in a criminal prosecution, for citing and compelling the attendance of witnesses in proof either of his defence against the libel or of the validity of an objection against any juryman or witness. These letters were issued on application at the Justiciary Office, or in the case of sheriff-court libels, on application to the clerk of court. 'Evidence in exculpation may *now* be adduced without raising a special defence, or in support of such a defence, or in both ways.' The officers of the court undertake to cite the witnesses just as if they were to be called for the prosecution. Special rules are framed for each special defence.

Exe' (Cymric, *wysk*; hence Lat. *isca*; comp. Gael. *uisg*), an English river, rises in Exmoor, Somersetshire, and 19 miles from its source reaches Devonshire. After a further course of 35 miles in a southerly direction through Devonshire it falls into the English Channel at Exmouth Bar. The tideway is 5 miles long and 1 mile broad at high water, and by means of this and of a canal, formed in the reign of Henry VIII., but considerably lengthened since, vessels can get up to Exeter. See AXE and ESK.

Ex'ecuted and **Exec'utory,** in English law, are terms expressive of the different stages of a contract. Matter is *executory* regarding which there is a contract binding the possessor to transfer it to some one else. When the property is transferred, it is executed. Thus an executory estate is one created by deed, but which must afterwards be *executed* by entry, &c.

Execu'tion, Civil (English law). If the judgment is not appealed against, suspended or reversed, E.—that is, the enforcing of the sentence of the law—follows, and does so immediately, in ordinary cases under the Rules of the Supreme Court of 1883, Order 42. E. is of different kinds. If the plaintiff obtain a verdict awarding real estate to him, a writ is directed to the sheriff commanding him to give actual possession to the plaintiff, and the sheriff may break open doors if possession is not peaceably yielded; but if the property is quietly given up, symbolical delivery is sufficient. Executions in actions where money only is recovered may be entered against the goods and chattels of the defendant. Every writ of E. must be sued out within a year and a day after the judgment is entered, or renewed, otherwise the court concludes that the judgment is satisfied and extinct.

Execution, Civil (Scotch law), is an attestation by a Messenger-at-Arms (q.v.), or other officer of the law, that he has given the citation or executed the diligence in terms of his warrant for so doing. It corresponds to an affidavit of service of writ or summons in England. Two witnesses were formerly required in Scotland to executions, but one is now sufficient, except in cases of poinding, in which two are still required, or in small debt cases, where no attestation is required at all.

Execution, Criminal. See CAPITAL PUNISHMENT.

Execution, Military and Naval. See CAPITAL PUNISHMENT.

Execu'tioner, the person who carries into execution the last demand of the law by arranging and controlling the machinery for inflicting Capital Punishment (q.v.). Nominally this duty in the United Kingdom falls to be performed by the sheriff or by his deputy, but a deputy has always been employed. Before 1868 the hanging of a convicted criminal took place in public, but since the statute 31 Vict. c. 24 was passed, the execution has taken place within the prison walls and in the presence of the sheriff, gaoler, chaplain, and surgeon of the prison, and other officers of the prison whom the sheriff may require or allow. In England and in some other states the office was at one time hereditary, and it was only in 1861 that the last headsman of the Tower of London died. But if the lineage of the E. be subject to vicissitude, his name is generally long-lived, for a distinguished practitioner has in many instances handed it down to several successors. Frenchmen have for many generations spoken of the functionary who superintends executions in the capital as 'Monsieur de Paris'; while in England, Dryden (see *Epilogue to the Duke of Guise*) and popular habit have immortalised the name of Jack Ketch. In the reign of James I. the London E. was named Gregory Brandon, and long after his demise the name Gregory was the household word for the hangman. Brandon was an esquire in virtue of his office, having had the influence to obtain armorial bearings from the College of Heralds. With 'Squire Dun,' mentioned by the poet Butler, the gentry of the gallows became extinct; for we find that Jack Ketch, whose name has ever since been synonymous with hangman, was the next E. The very obvious moral to be derived from practising hanging as a profession does not always appear to have been perceived by its professors, for we find that on the 31st May, 1718, John Price, the London E., was himself executed for murder. Again, on 24th May, 1736, returning from Tyburn, where he had suspended five thieves, the London E., stubbornly sinning against the light, picked a woman's pocket of 3s. 6d.; and as that was about the amount for the theft of which, in those days, persons were condemned to death, there is ground for the hope that this E. in his own person illustrated the law which he had himself done so much to uphold. It is questionable whether in Scotland the business was followed by persons any more respectable, for in 1682 the Edinburgh hangman, Alexander Cockburn, was himself hanged for murder. Of Scottish executioners, John Dalgliesh is almost historical as the functionary who executed Wilson the smuggler in 1736, on which occasion Captain Porteous ordered his men to fire upon the crowd, an act which led to remarkable consequences. In 1784 John High or Heigh, convicted of stealing poultry, was offered the alternative of undergoing due punishment for his crime or accepting the post of Edinburgh E., and chose the latter. This official survived to 1817, and was succeeded by John Scot, who was assaulted and killed in 1847. The mitigations which have taken place in the criminal code within recent years, by limiting the class of offences for which the punishment of death is inflicted, have produced great changes with respect to the E. In London executions were performed by Calcraft till 1874, by Marwood till 1883, by Berry till 1889, then by Billington, though the last has not been specially retained. By the London E. all executions are performed in Scotland, and as a rule in the provinces of England, although in more than one district of England a local functionary is available. Sanson, the E. of Louis XVI., was the official employed in Paris on similar occasions for many years, and was succeeded by his son (see *Memoirs of the Sanson Family*, 1875). In the United States the sentence of death is carried out by the sheriff, assisted by the under-gaoler.

Execution of Deed. In England the formalities required to make a deed valid against the grantor are *signing*, *sealing*, and *delivering*. (See DELIVERY OF A DEED.) These again require to be verified by Attestation (q.v.). Delivery to the grantee renders a deed absolute. The E. of wills in England is by the testator signing or acknowledging his signature to the will in presence of two witnesses.

In Scotland E. of D. is by the grantor signing or owning his signature before two witnesses, who sign their names, writing after them the word *witness*. E. was verified by what is called the Testing Clause (q.v.), but by the Conveyancing Act of 1874 this clause has been dispensed with.

Exec'utive. See GOVERNMENT.

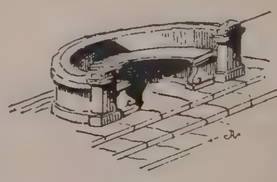
Exec'utor, in England, is the person to whom a testator commits the execution of his last will and testament. If the testator make a will without naming executors, or if he name incapable persons, or if the executors named refuse to act, the Court may appoint an administrator, whose duties are nearly the same as those of an E. The personal property of one deceased vests from the time of his death in his E. When a person dies intestate, the Probate, Divorce, and Admiralty Division of the Supreme Court will grant administration to the widow, children, or next of kin (if any). An E. may be appointed by words which are indirect. No one is bound to accept the office; but if he do any act of administration, he will be held to have accepted, and he cannot then renounce without sufficient cause. It is the duty of an E. or administrator to apply for probate of the will or for letters of administration within six months, and he incurs a penalty of £100 and £10 per cent. additional duty if he exceed that time. Neither will be granted until the probate duty has been paid on the full value of the deceased's personal property, including leasehold. After obtaining probate, an inventory must be made of the whole of the deceased's goods and chattels, which if required must be delivered on oath in presence of two credible witnesses. So delivered, no creditor can afterwards object to it. An E. must be careful as to the order in which he pays debts, as should he pay one kind of debt before another kind to which it is legally postponed, he will be personally liable in the event of a deficiency of assets.

In Scotland the office of E. is conferred either by the written nomination of the deceased, or, failing that, by decree of the Sheriff (q.v.); the E. in the former case being called an E.-nominate, and in the latter an E.-dative. In either case the E. must complete his title to administer by a judicial proceeding called a confirmation, without which he has no title to sue; nor is it safe for a debtor of the deceased to pay him. An E. should pay no debt of the deceased without the authority of a decree; and even when a decree is produced, he should pay no debt within six months after the death of the deceased, except what are called Privileged Debts (q.v.).

Executors, or heirs *in mobilibus*, are in Scotland the whole next of kin of one deceased, that is, all the nearest in degree of blood. They succeed *ab intestato* to equal portions of the moveable estate, without regard to primogeniture or sex. But when one of the next of kin is heir to the heritage, he is not entitled to share in the moveable succession, unless he choose to collate. (See COLLATION.) Formerly there was no right of representation regarding succession to moveable estate in Scotland. Thus children of one deceased excluded the grandchildren. But this has been changed by the Moveable Succession Act, yet only in the case of the predeceased. Representation is only permitted where some persons would have been the next-of-kin, if they had survived the intestate, and have predeceased him. In collateral succession full brothers and sisters exclude half; and if there be no descendants of an intestate, a father is entitled to one-half, the remainder being equally divided between brothers and sisters. If the father be dead, the mother takes one-third; and if there be no other surviving relatives, the other two-thirds go to the Crown.

Exec'utory Devise', in English law, is the term which denotes the devise of an interest which does not vest on the death of the testator, but the vesting of which is deferred or contingent. The law on this subject underwent much learned discussion regarding the will of Thellusson, an eminent London merchant. He died leaving three sons, to whom he left small legacies. The rest of his property, £4500 a year of real estate and £600,000 of personal property, he devised to trustees, to be accumulated during the lives of his three sons and of their sons. On the death of his last surviving grandson the accumulated fund was to be divided into three shares, one share to go to the eldest male lineal descendant of each of his three sons, with provision in case of failure. When Thellusson died he had three sons and four grandsons, two being born afterwards. Had the intention of the testator been carried out without litigation, it has been calculated that the fund would, when it came to be divided, have been over thirty-two millions of pounds. But the result was protracted and enormously expensive litigation. The judges in the House of Lords ultimately unanimously resolved that the will was legal. But to prevent repetition of the eccentricity, the Act 39 & 40 Geo. III. c. 98 was passed—which does not apply to Ireland—prohibiting any settlement of property for accumulation for more than twenty-one years after the death of the testator, or beyond the coming of age of any one entitled to the profits under the settlement.

Exedra, a term used in architecture to signify a semicircular bench resembling in shape those used by the philosophic schools in Greece and Rome. In Christian basilicæ an E. is placed on each side of the episcopal throne in the centre of the apse and raised some steps above the level of the floor. Priests used to sit on E. at official meetings. See *Art Dictionary*.



Exedra.

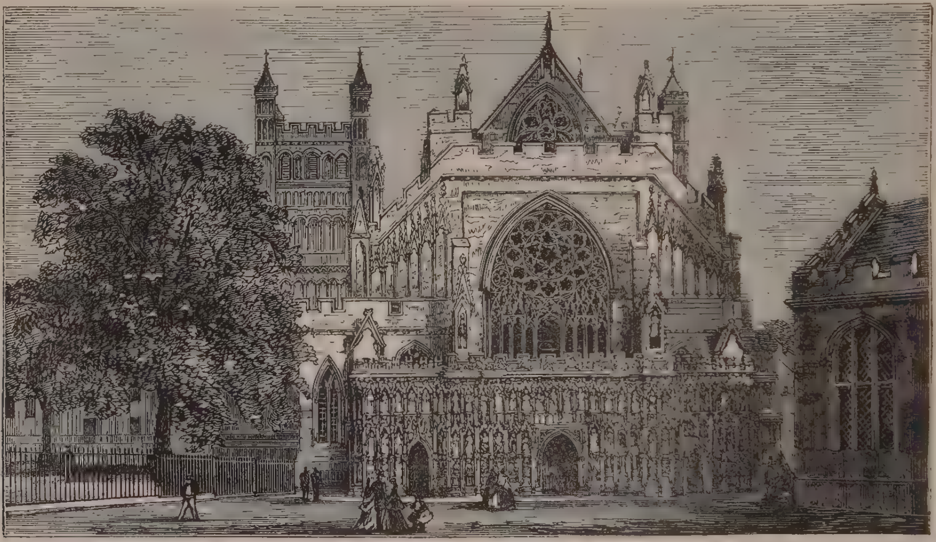
Exege'sis (Gr. from *exēgeomai*, 'I lead the way,' 'set forth,' 'explain'; used of diviners and priests) is the art or science of interpretation, or of discovering the true meaning intended to be conveyed by a writer, and is generally, although not necessarily, understood to refer to the Holy Scriptures, in which sense it is treated in the present article. The relation of E. to Hermeneutics is that of practice to theory. The task the exegete or interpreter has to perform is to explain the sense of what is written, so that others, as far as possible, may think the same that the writer or speaker intended they should think. And since, in order to properly accomplish this task, he must first understand what he is to explain, he must first overcome all the difficulties that lie in the way of his doing so—difficulties arising from: (1) the language in which the books are written; (2) the subjects of which they treat; and (3) his own preconceived notions and prejudices. 1. For the first there is required a thorough knowledge of the languages used—Hebrew and Greek—in their words, idioms, and figures: *grammatical* interpretation. 2. For the second, a knowledge of various subjects and sciences—*e.g.*, history, geography, chronology, antiquities, astronomy, geology, &c.—in order to place what is written in the light of the age from which it is descended, as thus only can the writer's meaning be known: *historical* interpretation. 3. The interpreter must consider the passage in connection with the writer's general way of thinking and of viewing matters, in order to illustrate thereby what has been ascertained by grammatical and historical means: this has been called *dogmatical* interpretation. Such are the true principles of E., but various other methods have been followed, which may be briefly noticed. Perhaps the most remarkable, as it is the earliest, is the allegorical. Allegorical E. is the system of explaining as allegorical what is not allegory, of giving to words a secondary, mediate, and mystical sense in addition to their primary, direct, and literal sense, retaining the latter merely as a veil to the former. Allegorical interpretation was very common among all the nations of the East. For example, when the Greeks began to feel that the mythical stories about their deities were too gross to be understood literally, their philosophers ingeniously discovered in the descriptions of the poets 'ideas less revolting to virtue and more worthy of the gods themselves.' The custom existed also among the Jews, especially those residing in Egypt. The *Therapeutæ* rejected the literal sense of Scripture altogether. Philo, who expounded the Pentateuch in the light of the Neo-Platonic philosophy, did not deny the reality of the literal sense, but represented Moses as having an exoteric doctrine for the illiterate and an esoteric for the cultivated, who are able to reach the secret spiritual sense of his writings. Among the Jews of Palestine also the same desire appeared to remove in the same way everything objectionable in the Bible. In the oldest Rabbinical writings the same distinction is made between the *body* and the *soul* of the text. The same method was pursued by almost all the Christian fathers down to the 7th c. One of them, Justin Martyr, alludes to three of the four senses of Scripture mentioned by many of the succeeding fathers—namely the *literal*, the *allegorical*, and the *tropological;* and of the fourth, the *anagogical*, according to which accounts of things in this life are applied to spiritual and heavenly things, many examples occur in his writings. The principles of E. followed by the Alexandrian school of divines, at the head of whom stands Clement, was connected with their theology. They made a distinction between *pistis*, an immediate reception of the truth without proof, and *gnōsis*, a complete view of the truth, by means of which the object of faith becomes a firm and sure possession. By this distinction, and the separation of Christians into *pistoi* (believing) and *gnōstikoi* (discerning), the latter came to be regarded as possessed of a divine qualification, by virtue of which alone all revelation could be expounded. Further, it is the allegorical sense of Scripture which leads to the *gnōsis*, while the *pistis* alone is produced by, and can understand only, the literal sense. Clement also makes mention of 'a rule of truth,' that is, a tradition or principle of E. About the beginning of the 6th c., a practice took its rise of making extracts from the commentaries of preceding fathers. When the annotations of several writers upon one book of Scripture were collected and arranged in succession, it was called a *chain*, Lat. *catena*. The custom soon became general with the decline of sacred literature; the very practice itself, which took for granted that everything connected with the interpretation of the Bible was anticipated and exhausted, being a sign of degeneracy; and a great many of the subsequent commentators were merely compilers of catenæ. A new era in the history of E. was initiated by the paraphrases and annotations on books of the New Testament of Erasmus, whose E. was to a great extent the guide of the Reformers, and whose 'great object was to ascertain what the words of Scripture were designed to express, without pursuing the far-fetched senses among which the schoolmen and mystics loved to lose themselves.' Since the Reformation E. has not run into the same excesses as before, but nevertheless various arbitrary and unwarrantable systems have been followed. (1) The Mystic, a modification of the old allegorical system, which has always found favour among a certain class of Protestants as well as Roman Catholics. According to this system, of which there have been various phases, a mystic, spiritual, mediate, or sub-sense is sought for when the literal is thought not to be subservient to morality. (2) The Pietistic, in which the regulating principle is an inward light, somewhat analogous to the ancient *gnōsis*, which guides to a true faith and a pure morality. This inspiration furnishes explanations without scientific investigation; hence the feelings rather than the understanding are consulted and followed. (3) The Moral, a mode of E. which was advocated by Kant, and which consists 'in educing from Scripture such ideas alone as are conformable to the pure principles of practical morality implanted in the bosoms of men.' 'The historical part of the Scriptures, which contributes nothing to make men better, is purely indifferent.' (4) The Historico-Psychological, chiefly developed by Paulus and Eichhorn, according to which everything—in the Gospel narratives, *e.g.*—is explained quite naturally, that is, all the miracles, when disentangled from the misconceptions of the narrators, and divested of all subsequent accretions, are explained as actual facts within the limits of the general laws of nature. (5) According to the Accommodation theory, usually associated with Semler, Jesus and the apostles accommodated themselves to the erroneous opinions of the Jews so far as was thought necessary or useful for the reception of the doctrines inculcated. (6) According to the Mythical system, which was followed by Strauss in his *Leben Jesu*, portions of the historical accounts of the Evangelists, especially those containing miracles, are to be regarded as mere myths, although the Evangelists themselves intended to relate history. (7) In the Rationalistic system, an external standard is set up to which Scripture must bend. It proceeds on the assumption that the sacred books should be subjected to the same treatment as, *e.g.*, the Greek and Roman classics, and that what is contradictory to reason is to be discarded.

Ex'elmans, or **Ex'celmans, Remy Joseph Isidore, Comte,** Marshal and Peer of France, born at Bar-le-Duc, 13th November, 1775, entered the French army in his sixteenth year, distinguished himself at the capture of Naples (1799), and served as aide-de-camp to Murat in 1801. After Eylau he was appointed brigadier-general; in 1808 he cooperated with Murat in Spain, where he was taken prisoner, and sent to England. Regaining his freedom after three years' captivity, he rejoined the French army. He fought with distinction throughout the Russian campaign, was appointed general of division, and received the decoration of the Legion of Honour in 1813. Proscribed after the fall of Napoleon, he lived in exile until the July revolution of 1830, after which Louis Philippe named him Grand Cross of the Legion of Honour and Peer of France. He was one of the first adherents of Louis Napoleon, who created him Marshal of France in 1851. E. died on the 21st July, 1852, from the effects of a fall from his horse.

Exemplifica'tion of Letters Patent is a copy or transcript of the letters patent made from the enrolment, and sealed with the Great Seal of England. In legal force the E. is equivalent to the letters.

Ex'ercise, Physiolog'ical Ac'tion of. E., either mental or muscular, if not pushed beyond a certain limit, cannot fail in being beneficial to the economy of the body. Moderate E. increases the nutrition of both the muscular and nervous systems, and so makes them stronger and more fit for a certain amount of work. The effect of such E. is seen in the well-developed muscles of the artisan, or in the quickness of perception and of volition in the active brain of the man accustomed to mental work. Moderate E. also increases the action of the heart. The muscular movements, for example, made in active walking drive, by pressure on the veins, more blood to the heart. This organ consequently beats faster, and sends more blood to the lungs and to the system than it would otherwise have done in a more lethargic state of the circulation. Hence, muscular activity improves the nutrition, and consequently the whole tone and power of work of the body. The effect of excessive E. is to produce fatigue and a feeling of great nervous depression.

Exe'ter (Old Eng. *Exanceastre*, 'the town on the Exe' (q.v.); the Roman *Isca*, and the *Caer-Isc* of the Britons), a city of England, the capital of Devonshire, lies picturesquely on a height overlooking the Exe, 9 miles from the sea, and 75 S.W. of Bristol by railway. It is in part well built, and has some fine squares and gardens. The see of a bishop, E. has a Norman-Gothic cathedral (1112-1369), with a length of 383 feet and 35,370 feet of area. Its W. façade is one of the finest in England, and it has a magnificent organ, a canopy over the bishop's chair, 53 feet high, the parts of which are dovetailed into each other, and a bell, the 'Great Tom of E.,' weighing 12,500 lbs. The cathedral was opened 18th October, 1877, after a restoration which cost nearly £50,000. E. also has a bishop's palace, a guildhall of 1593, restored in 1684, an Albert Memorial Museum (1868), a theatre, &c. There is a dock 917 feet long, 90 to 110 feet broad, and 18 feet deep, connected by a navigable canal (5 miles in length) with the lower part of the Exe, by means of which it has considerable trade by sea. The city has manufactures of paper, beer, gloves, lace, castings, &c. The lace is especially beautiful. E. was in existence when the Romans conquered the island, and was called by them *Isca Damnoniorum*, and from that day to this it has been uninterruptedly occupied. Roman remains—coins, bronze statues, penates, tesselated pavements, &c.—have been found in the neighbourhood, and beneath the old walls. It was the scene of many a fierce siege by the English, Danes, and Cornish Britons. Æthelstan founded an abbey here in 932, and E. soon after had so many religious buildings that it was called 'Monk Town.' In the time of Harold it was held by his mother Gytha, and was stormed by William the Conqueror in 1068, who built a castle, called by its Norman occupiers *Rougemont* ('red mount'), which completely commanded the city. In the civil war of the 12th c. it was held for Maud by the Earl of Devon, and was besieged for two months by the troops of Stephen. In 1537 Henry VIII. made E. a county by itself. Queen Elizabeth conferred on it the title of *semper fidelis*. It was Royalist during the Puritan struggle, and was for a time the headquarters of Charles's forces in the W. of England. The parl. bor. returns one member, and consists of the city and county of Exeter, and parts of the parishes of Heavitree, St. Thomas the Apostle, Topsham, and Alphington. Pop. parl. bor. 50,573; reg. dist. 37,568; county bor. 37,404; and diocese 629,009.



Exeter Cathedral.

Exeter College, Oxford, founded in 1314 by Walter de Stapledon, Bishop of Exeter, and sometime Lord High Treasurer of England, for a rector and twelve fellows, which is the number at the present day, although three of them are suspended. Twenty-five scholarships have been founded; of these eight (Stapledon) are limited to persons born or educated in the old diocese of Exeter; one or more (King Charles I.) are limited to persons born in the Channel Islands or educated at Victoria College, Jersey, or at Elizabeth College, Guernsey. The others are open, and four of them are awarded for mathematical proficiency. The Stapledon Scholarships are valued at not less than £60 per annum, the rest at £80; the former may be thrown open in the case of no candidates from Exeter and the Channel Isles. There are twelve exhibitions in the gift of the college. The college has the patronage of nine livings. The number of undergraduates is 158, while the college has 541 members of Convocation, and 858 on the books.

Exeter Hall, a fine building in the Strand, London, capable of holding 5000 persons in its auditorium. In former years it used to be let for concerts, public meetings, &c., but in 1880 the Young Men's Christian Association purchased it and it is now the property of that Society, which lets it also for religious meetings.

Exhaus'tions, Method of, a geometrical method employed by the ancient mathematicians, which may be looked upon as anticipating the principles upon which the differential calculus is founded. It was the method by which Archimedes squared the parabola, and discovered his famous theorems of the sphere and cylinder; and it depended upon the assumption that a curved line may be regarded as the limit of the circumscribing and inscribing polygons as the number of the sides is increased, and therefore the size of each side diminished.

Exhibi′tion, a term of Scotch law applied to an action for compelling production or delivery of writings. See DILIGENCE.

Exhibitions, Art. See ART EXHIBITIONS.

Exhibitions, Indus′trial, are collections of industrial products and manufactures exhibited, generally for a limited period, by different manufacturers and producers, with the view of showing the nature of their calling or the perfection of their manufactures. Some are merely local, and confined to the peculiar products and manufactures of the district in which they are held. Others are devoted to special branches of industry, the 'exhibits' in which are not necessarily confined to any example. A third class is universal in its scope, and aims at nothing less than illustrating the natural products, processes of manufacture, and finished articles of the entire world. Indeed, the later E. of this third class have been even more ambitious still, and in addition to illustrating the industry of the world, they have attempted to bring together representations of the fine arts, archæology, social condition, habits, and religious practices of all mankind. The parent of all the I. E. of modern times was one projected by the Marquis d'Avèze, and opened in 1798 in the Maison d'Orsay. The second exhibition was held in 1801, under the patronage of Napoleon as First Consul. The number of exhibitors, meantime, had increased from 110 to 229. From this period onwards E. came to be of frequent occurrence in Paris and the French provinces, and they gradually extended to every state of Europe. It was not till 1828 that an industrial exhibition was attempted in London, but in that year an organization selected from mechanics' institutes throughout the country, under the presidency of Dr. Birkbeck, instituted an exhibition in London under the lengthy title of 'The National Repository for the Exhibition of Specimens of New and Improved Productions of the Artisans and Manufacturers of the United Kingdom, Royal Mews, Charing Cross.' At a later period the Society of Arts held annual E. of the new inventions and manufactures in the Society's house, London. Of agricultural E., the most noteworthy are the great annual shows of the Royal Agricultural Society of England and the Highland and Agricultural Society of Scotland. See AGRICULTURAL SOCIETIES.

The era of great international E. began with the opening of Sir Joseph Paxton's palace of glass in Hyde Park, London, by her Majesty Queen Victoria in May, 1851. The conception of the gigantic idea, and much of the credit of its realisation, were due to the Prince Consort, who at a meeting of the Society of Arts in June, 1849, propounded the scheme. The story of the many difficulties regarding plans for a suitable building, and the ultimate acceptance of Paxton's plans, founded on his experience of conservatory building as a practical gardener, has often been told. The building of glass and iron, at a cost of £193,168, enclosed 20 acres, and was 1851 feet in length. It accommodated the works of 13,937 exhibitors, of whom 6861 were British, 520 colonial, and 6556 foreign. The exhibition remained open five months and a half, during which time it was visited by 6,039,195 visitors, the admission fees amounting to £423,792. After all expenses were paid, a surplus of about £180,000 remained, which her Majesty's Commissioners invested in the purchase of an estate at South Kensington, on which subsequently the South Kensington Museum, the Royal Horticultural Society's Garden, the International Exhibition of 1862, the Albert Hall, and other institutions, were placed. The Great Exhibition of 1851 was hailed by the public with extraordinary enthusiasm, and the most extravagant expectations of millennial peace, combined with increased trade, were widely entertained. That the comparisons which it permitted quickened industrial energy, and more particularly made British manufacturers realise their backwardness in taste and artistic design, cannot be doubted, but the other dreams to which it gave occasion were quickly dissipated. The success, pecuniary and otherwise, of the exhibition, however, gave birth to a numerous train of successors, among which we shall only enumerate those which were on even a greater scale and more cosmopolitan in character.

The *Exposition Universelle* of Paris in 1855 was held in the *Palais de l'Industrie*, a specially erected permanent building, which, with its temporary annexes, cost half a million sterling. It accommodated 20,839 exhibitors, and while open, from 15th May to 30th November, was visited by 5,162,230 persons; the total receipts being £128,000, against an expenditure of about one million. In this and subsequent E. international collections of pictures formed a peculiar feature. The next great exhibition, in order of time, was the London International Exhibition of 1862. The building was of brick, the main hall being a parallelogram 1150 feet long by 560 wide, which with annexes cost £460,000. Remaining open from the 1st May till the 15th November, it was visited by 6,211,103 persons, and the total receipts were £408,530. A second *Exposition Universelle* was opened on the Champs de Mars in May, 1867, the building for which was oviform, and the different sections were arranged in concentric bands. By the arrangement adopted, the entire collections of any nation could be examined by proceeding from the outer band to the centre, and special classes of articles from all nations could be visited by making the circuit of the building in any continuous ring. Beyond the exhibition building, part of the park was enclosed for illustrations of national habitations; and the life, clothing, food, and domestic habits of various peoples were practically illustrated by living families brought from all corners of the globe to inhabit the houses of their countries. The *Exposition* was visited by 6,805,969 persons, and the receipts from all sources were £420,735. The *Weltausstellung* of Vienna, 1873, a building with a central rotunda 312 feet in diameter, covered by a dome, supported on iron girders, larger than that of St. Peter's at Rome, was constructed by J. Scott Russell, and was visited by 6,740,500 persons during the six months it remained open, and the total receipts amounted to £206,477. The Centennial Exhibition of the United States was held in 1876, in Fairmount Park, Philadelphia, and was then the 'biggest thing' which had ever been drawn together. It comprised a main building 1880 feet long by 464 wide, covering 21½ acres, a permanent art gallery, a machinery hall, an agricultural hall, and a horticultural hall, the whole extending over 40 acres. An exhibition on a still more gigantic scale was held in Paris, in 1878, and presented many very striking features; while in London, since the International Fisheries Exhibition of 1883, every year has witnessed an exhibition relating to some particular art or industry; and her example has been followed by leading provincial towns. In 1889 the Paris Exhibition was a notable success, and a 'World's Fair' was held in Chicago in 1892.

While they are regarded as a good advertising medium by exhibitors, faith in their mission to promote universal brotherhood is gone, and it is seriously doubted whether they do much towards a real extension of commercial relationship, or aid in the improvement of manufacturing processes.

Ex′itus may denote the issues or profits of anything, or the children or offspring of animals. *E. terræ* are the rents and fruits of the land.

Ex′moor For′est, a high wild tract of moorland, broken by deep romantic glens, in the W. of Somersetshire, and N. and N.E. of Devon. Its highest point is Dunkerry Beacon, Somersetshire (1668 feet). It is traversed by the rivers Exe and Barle. E. F. was formerly of greater extent, but is being brought under cultivation, and has iron mines. Red deer are to be seen, and E. is famous for its hardy ponies.

Ex′mouth, a flourishing and healthy watering-place in S. Devon, on the English Channel, and on a rising ground at the mouth of the Exe, 10 miles S.E. of Exeter, with which it is connected by rail. It has a mild climate, being sheltered from E. winds by a range of hills. Its chief industries are lace-making and the fisheries. A sea-wall, 18 feet high, affords an excellent promenade. The docks are suitable to the requirements of the place, and the beautiful sands are ever a great attraction to children. Till the rise of Torquay it was the most noted watering-place in Devonshire. Pop. reg. sub-dist. 10,394; urb. san. dist. 8097.

Exmouth, Edward Pellew, Viscount, an English naval commander, was born at Dover, 19th April, 1757. He entered the navy at thirteen, and had a career of uninterrupted success and honour. In 1793, when captain of the *Nymph*, he captured, after a fierce fight, a French frigate, *La Cleopatre*. For this he was knighted. During the wars with France he performed many brilliant exploits off the French coast. In 1804 he was appointed to the command of the English fleet in the E. Indies, and after 1808 held a similar post in the Mediterranean. In 1814 he was raised to the peerage, and two years later, at the head of an English and Dutch fleet, he bombarded Algiers, destroyed its fleet, and compelled the Dey to accept the terms imposed upon him, which included the total abolition of the slave trade. This was the crowning achievement of his career. He was made Viscount Exmouth, and publicly thanked for his services by both Houses of Parliament. E. died 23rd January, 1833. See Osler's *Life of Viscount E.*

Exoce'tus. See FLYING-FISH.

Ex'odus, the second book of the Pentateuch and of the Bible, and so called from its narrating the departure (Gr. *exodos*) of the Hebrews from Egypt, consists of two parts, an historical and a legislative. It is a continuation of Genesis, and the first part relates how the descendants of Jacob were reduced to slavery by a successor of the Pharaoh the patron of Joseph, and grievously oppressed (i.), till at last Jehovah, their God, took pity upon them, and appointed his servant Moses, who had been providentially preserved in his infancy, and was at the time in the land of Midian, to deliver them (ii.-iv.); how Pharaoh, by means of miraculous plagues sent on the land by Jehovah, was compelled to let the Hebrews go, in commemoration of which deliverance the Passover was instituted (v.-xiii.); and how, pursuing after them, he and his host were drowned in the Red sea, while the Hebrews, for whom a path through the sea had been miraculously opened, passed southwards along the shore till they arrived at the desert of Sinai (xiv.-xviii.). The second part of the book relates how Moses received from Jehovah on Mount Sinai the Decalogue (xix.-xx.), laws for the regulation of the social life of the people (xxi.-xxiii.), and instructions for the making and all the appointments of the Tabernacle, and for the keeping of the Sabbath (xxiv.-xxxi.); and how the Tabernacle was made and inaugurated in the first month of the second year after the departure from Egypt (xxxii.-xl.). This article will deal principally with the E. as an historical fact. The question of the *authorship* of the book is involved in that of the authorship of the Pentateuch; other details will be found under MOSES, PLAGUES OF EGYPT, PASSOVER, SABBATH, &c.

The Exodus.—1. *Time.*—The important questions connected with the chronology of the E. are—(1) how long did the oppression of the Hebrews by the Egyptians last, and (2) when did it cease. The light on the subject comes from two sources, the Hebrews themselves and the Egyptians. The narrative in E. implies that the oppression did not last long, for, beginning as soon as the generation of Joseph had passed away, and a king who knew him not sat upon the throne (in whose reign Moses was born), it ended with the E. in the reign of his successor (ii. 23). This is confirmed by the genealogy of Moses, given in vi. 16-20. He was at the same time the grandson and the great-grandson of Levi, the son of Jacob, which corresponds with the statement in Genesis xv. 16, that they would return to Canaan in the fourth generation after the settlement in Egypt. On the other hand it is stated elsewhere (Gen. xv. 13, and Exod. xii. 40) that the slavery lasted 400 years, and the whole sojourn in Egypt 430 years. But the Apostle Paul (Gal. iii. 17) dates the beginning of the 430 years, not from the time of the going down into Egypt, but from the giving of the promise to Abram (Gen. xv.), which, counting 25 years from Abram's leaving Haran to the birth of Isaac (Gen. xii. 4, xxi. 5), 60 to the birth of Jacob (Gen. xv. 26), and 130 to the going down into Egypt —in all 215 years—leaves 215 for the sojourn in Egypt. This is in fact the only way that the time can be made nearly to correspond with the genealogy of Moses (Exod. vi. 16-20), because, if the sojourn in Egypt lasted 430 years, Moses, who was 80 years old at the E. (Acts vii. 23, 30), must have been born when his mother was 256 years old, even if we suppose her to have been begotten in the last year of her father's life; for her father, Levi, who lived 137 years (Exod. vi. 16), was 43 years old when he went down to Egypt with his father [being four years older than Joseph, because born in the third year after Jacob's marriage with Leah (Gen. xxix. 34), and Joseph in the seventh (Gen. xxx. 25, *cf.* xxxi. 41), and Joseph was 39 years old at the time (*cf.* Gen. xli. 46, and add nine years)], which gives 430 – (137 – 43 + 80). There would, moreover, be no necessity for putting St. Paul, who followed the LXX., in the wrong, were it not for the numbers of the nation who are said to have gone out of Egypt—600,000 fighting men, which implies a population of at least 2,500,000. This increase from the 70 persons who went down to Egypt (Gen. xlvi. 27) in 215 years appears to some so improbable as to make them adopt the 430, or even a longer period, while to others the 215 seems quite sufficient, with allowances for polygamy and foreign marriages. According to the traditional Biblical chronology, then, the date of the E. would be about 1650 B.C. or 1865 B.C.

The Egyptian accounts are derived from inscriptions on monuments, and from the history of Manetho (q.v.). Manetho (*apud* Josephus) tells the following story:—King Amenophis desired the privilege, which had been granted to Horus, of seeing the gods. One of the priests told him there would be no difficulty about it if he would rid Egypt of all who were unclean or leprous. Whereupon the king assembled all the lepers, to the number of 80,000, and sent them to work in the quarries E. of the Nile. The priest, in terror for the consequences of what he had done, took his own life, but first sent to the king a prediction that these outcasts, with foreign help, would be masters of Egypt for thirteen years, the revenge of the gods for the indignity offered to their servants, the priests among the lepers. Thereupon the king relieved them all from their bondage, and permitted them to remove to the town of Avaris, where Osarsiph, a priest of Heliopolis, who afterwards took the name of Moses, put himself at their head, gave them laws which violated all the customs of the Egyptians, and sending for the remnant of the Hyksos, who had been expelled, with their help conquered Egypt. After a rule of 13 years they were driven out by the king's son, Sethos or Ramses, and pursued to the borders of Syria. The question here is to identify the King Amenophis and his son Sethos-Ramses with the historical rulers mentioned on the monuments. It is in the reign of Rameses II. (Miamun of the monuments, Gr. Sesostris), of the nineteenth dynasty, who ascended the throne about 1400, that there occur events recorded on the monuments which correspond with those recorded in E. This Pher-ao, who reigned sixty-six years, erected as a bulwark against the Asiatics a great wall on the E. side of Egypt, from Pelusium to Heliopolis, with a chain of forts, the two chief of which were Pa-khatem (Pithom) and Paramessu (or 'city of Rameses,' *cf.* Exod. i. ii.). In an official report of the king's reign, preserved on a papyrus which is in the museum of Leyden, a scribe reports to his superior that he has distributed the rations 'among the *Hebrews* (Apuru) who carry the stones to the great city of Rameses-Miamun.' Several other distinct references are made to the Hebrews in other papyri, and in the rock inscriptions of Hamamat. Rameses was succeeded about 1334 B.C. by his son Menephtah (the Amenophis of Manetho), who continued the construction of Paramessu, and the brickmakers were condemned to send in a certain number every day (*cf.* Exod. v. 8). It is generally supposed by Egyptologists that this is the Pher-ao in whose reign the E. took place, on which supposition, as he reigned about twenty years, the date would be about 1334-14.

2. *Route.*—The traditional route followed by the Hebrews in their march from Egypt is in a sense well known. Setting out from Rameses, supposed to have been about 40 miles N.W. of Suez, they went S. and E. a three days' journey, halting at Succoth and Etham, and encamped on the Red

Sea, near the head of the Gulf of Suez, the only controversy being as to the place—a few miles up or down—at which the passage took place. Those who wish to avoid the miraculous, and to account for the crossing by natural causes, *e.g.*, an ebb-tide, &c., place it at the very head of the Gulf. Another theory has, however, been put forth by Professor Brugsch-Bey, which he asserts corresponds far better with the geography of the time, namely, that the route taken was E. and then N. between Lake Serbonis and the Mediterranean Sea. He asserts that Rameses, from which they started, was Paramessu, afterwards called Zoan, and still later Tanis by the Greeks, and that Succoth was Pithom. He conjectures Etham to be the Egyptian *Khetam*, which is on the borders of the desert (*cf.* Exod. xiii. 20), to the W. of the modern El-Khantereh. From there, he thinks, they directed their course northwards, to Migdol (Gr. *Magdolon*, the modern Tel-es-Semout). Then they encamped between Migdol and the Mediterranean, in face of Pihahiroth and before Baal-zephon (Egypt. *Baali-Tsapuna*), a sanctuary close to Mount Kasios; and it was in the isthmus there, between Lake Serbonis (the 'Serbonian Bog') and the Mediterranean, that the Egyptian army, when in pursuit of the Hebrews, perished amidst 'a sea of seaweeds' or 'reeds,' which has often proved fatal to numerous hosts and single travellers, notably a large part of the Persian army of Ochus about 350 B.C. Arrived at Mount Kasios, the E. frontier of Egypt, they went S. to Marah, or the Bitter Lakes, and from there to Elim (Egypt. *Aalim*, 'fish-town') to the N. of the Red Sea. It may be mentioned that for 'Red Sea' in the authorised version of E. the Hebrew has simply the 'sea'—xiv. 2, 9, &c.; in other passages it is 'sea of weeds' or 'reeds'—x. 19. See Colenso's *Pentateuch and Book of Joshua* and Birch's *Egypt from the Monuments*.

Ex Offi'cio is a term legally applied to acts done by a functionary in virtue of his office, and not at the suit or on the employment of any other party. In the law of England, an E. O. information is an Information (q.v.) filed by the Attorney-General without the intervention of any judicial authority, in the Queen's Bench Divisional Court at the instance of the Crown, and the case is tried by a county jury in the county where the proceedings have taken place.

Ex'ogens, Exog'enous Plants, terms used in botany in opposition to the name *Endogenous* and *Endogens* (q.v.). E. P. are 'outward growers,' that is, increase by the growth of new matter on the external or outer surface of the already-formed material. All our familiar trees and plants are E., and the name may therefore be regarded as synonymous with Dicotyledons (q.v.). In its young state, an E. stem is entirely composed of cells, but soon, by the growth of bundles of vessels, the stem of the young exogen divides into two parts—an inner or central part, the pith or medulla; and an outer or cutical part, the bark, which is covered by the Epidermis (q.v.). The pith and bark are connected by lines of cellular tissue, named *medullary rays*, which radiate through the wood. The pith is separated from the wood by the medullary sheath. The old wood next the pith is usually hard and dry, and is hence named *duramen* or *heart-wood*, the outer and softer wood being termed *alburnum* or *sap-wood*. Between the wood and bark we find the *cambium* layer of cells, which forms the new wood, arranging it in concentric circles or zones, each representing one year's growth. The bark, cellular at first, consists of the liber or inner bark, and of the corky layer which forms the outer bark. The bark increases by additions to its inner surface, but as its rate of growth is in many cases slower than that of the true wood, it cracks and exhibits the familiar gnarled appearance. The branches of E. are lateral, that is, are given off from the sides of the axis of the stem.

Exogo'nium (or **Ipomæ'a**) **Purg'a,** the species of *Convolvulaceæ* which affords the Jalap (q.v.) of medicine. It is a native of Mexico, but is cultivated with success in many parts of Britain as an open-air plant. Other species are *I. Orizabensis*, from which an inferior quality of Jalap is obtained, named 'fusiform' or 'light jalap.'

Exonera'tion (Lat. *ex*, 'out of,' and *onus*, 'a burden'), in law, signifies the legal act which frees one from an obligation.

Exophthal'mia (Gr. *ex*, 'out,' and *ophthalmos*, 'the eye'), protrusion of the eyeball, may be caused by disease of the eye, or by any kind of growth within the orbit. If the case is left to itself, the protruded eye sometimes inflames and bursts.

Ex'orcism (Eccl. Gr. from *exorkizō*, 'I administer an oath'), or the driving out of Demons (q.v.) from those possessed by them, has been practised by Jews, Christians, and Pagans. The power of E. was regarded as a peculiar gift or art, the means used in it being certain incantations or charms, drugs, and ligatures. The first trace of the art among the Jews occurs in the case of Saul, whose demon was exorcised by David's music. Various words, especially names, were used for this purpose. Origen (*Cont. Cels.*) says that the name of Abraham was irresistible, even when used by those who knew not who Abraham was. So was that of Solomon, who, Josephus tells us, was particularly instructed in the art of E. by God, and left rules and charms for it, which Josephus himself saw effectually used by one Eleazar (*Ant. Jud.* viii. 2, 5; *cf.* Matt. xii. 27, and Acts xix. 13.) Several acts of E. performed by Jesus Christ are recorded in the Gospels. The power was part of the equipment of the apostles (Matt. x. 1, 8; Luke x. 17-19); hence St. Paul, as a true apostle, possessed it also (Acts xvi. 16-18). According to ecclesiastical historians, the same power was continued in the Church. At first it was not confined to particular persons; any Christian could do it by the irresistible charm of the name of Jesus and the sign of the cross. Then, as the whole world was held to be divided between the kingdom of God or the Church, in which demons could only persecute and afflict, and the kingdom of Satan, that is, the pagan world, in which they possessed supreme power, it was specially required that all candidates for baptism should be properly exorcised. For this purpose, in the 3rd c., an inferior order of clergy, called exorcists, was instituted, who were ordained to the office. There seems to have been great numbers of demoniacs in those early ages, who were kept in a certain part of the churches, as in an hospital, and it was the duty of the exorcists 'to pray over them on some occasions, and to provide their daily food, and keep them employed in some bodily exercise and innocent business, of sweeping the church and the like, to prevent the more violent agitations of Satan.' After the E. of all candidates for baptism was thus reduced to the ordinary duty of an order of the clergy, the power of extraordinary E. of demoniacs seems to have ceased, and it is admitted by all classes of writers that E. died out altogether about the time when Christianity was made the established religion by Constantine (324). This was only for a time, however, for there were instances of it after, as well attested as any in the earlier ages. Christian apologists hold very various opinions as to the time when this miraculous power ceased in the church. The Church historians down to the Reformation all relate the exercise of it down to their own time. By many eminent Roman Catholic writers the same power is brought down to the present day. Among Protestants, the most prevailing opinion perhaps is that it ceased after the time of the apostles, although a century ago it was just as well received that it continued through the first three centuries till the time of Constantine. Others, again, drew the line at the end of the 4th c., others at the end of the 5th, while others put it back to the 2nd. Besides persons, certain things were exorcised, *e.g.*, water, salt, and oil, to be used for sacred purposes.

Ex'osmose (Gr. 'outward motion') and **En'dosmose** ('inward motion'), terms applied by Dutrochet to denote the transfusion resulting from the separation of two liquids or gases by an animal or vegetable membrane. See CELLULAR TISSUE.

Exostemm'a, a genus of plants belonging to the *Cinchonaceæ* (q.v.). The species of E. afford varieties of cinchona, known as 'false cinchona,' which may be distinguished from the true cinchonas by having *exserted* stamens, that is, stamens extending beyond the corolla. *E. floribunda* of the W. Indies is a familiar example.

Exosto′sis (Gr. *ex*, 'out of,' and *osteon*, 'a bone'), an unnatural protuberance or morbid enlargement of a bone. E. is predisposed to by scrofula, cancer, &c., and is sometimes hereditary; but, in general, it occurs without any distinct or appreciable exciting cause. *Hard E.* differs in appearance and composition from true bone. *Soft E.* grows rapidly, often attains a considerable size, and is very commonly multiple. In structure and chemical composition soft E. is identical with cancellated bone. It is often necessary to remove such tumours by operation on account of the pain they give rise to from pressure.

Exoter′ic. See ESOTERIC.

Exot′ic Plants, the name generally applied to plants derived from a foreign country. E. P. may grow openly and without care, or may require delicate attention and shelter.

Ex Par′te. In judicial proceedings a step is said to be taken *ex parte* when the opponent is not present. See DEFAULT, ABSENCE.

Expectation ('a waiting or looking out'), the observance of disease without application of active remedies, but with the use of physiological means to counteract any evil consequences, as in the case of a fractured bone, when splints are fitted, and adjusted from time to time if necessary, yet the union of the two pieces is left to nature.

Expectation Week, was the name given to the interval between Ascension Day and Whit-Sunday, during which the apostles are said to have continued in prayer and E. of the Holy Spirit.

Expec′torants (Lat. *ex*, 'out of,' and *pectus*, 'the breast'), medicines which promote the secretion of bronchial mucus, modify the character of the secretions, and promote their discharge. E. are all stimulants, and most of them contain a resinous element. Their use is contra-indicated during the acute or inflammatory stage of bronchitis. The principal E. are—acid, benzoicum, ammonia, A. carbon, ammoniacum, ammonii chloridum, antim. tart., bals. Peruv., bals. Tolut., copaiba, cubeba, galbanum, ipecacuanha, myrrha, scilla, and senega.

Expen′ses. The Costs (q.v.) of a lawsuit are called E. in Scotland. The general rule of law is that the party found in the right is entitled to a decree for his E.; but as it often happens that right is found to be partly on both sides, or that the party mainly in the right has somewhat erred in legal procedure, the adjustment of E. often involves nice calculation and considerable legal difficulty. The practice is for the judge, after deciding points of law affecting E., to remit accounts to the Auditor (q.v.) of the Court of Session to adjust accordingly, and subject to a revision by the Court, the latter being seldom resorted to. Clients may require taxation of their agents' accounts. The amount of fees paid to counsel is never interfered with if *bonâ fide* and reasonable; but a certificate from the counsel or his clerk must if required be produced, that the fees paid were of the amounts and dates stated in the accounts.

Expe′rience is now recognised as the only ultimate source of our knowledge of nature and nature's so-called laws. It is the accumulated result of human observation and experiment, is consequently exceedingly limited, and forms the backbone of all inductive science. For man, whose E. therefore rests upon the knowledge acquired by experiment, and observation through some six thousand years only, to term any one of his experiences as a *law* of nature is as presumptuous as it may be erroneous. Experiment differs from observation solely in the fact that the phenomena observed are controlled and directed to a greater or less extent by human agency, and it is usually undertaken with a view to the testing of preconceived truths, or to the further elucidation of some phenomenon, though frequently the result obtained is not that which was expected. Many of the most important physical *laws*, indeed, have been discovered from experiments which the investigator made to test some relation which his fancy conceived to exist. On account of the varied combinations which the experimenter has at his disposal, it would naturally be expected that a science in which experiment is possible would be developed much more rapidly and with greater unity than one in which E. rests upon observation merely. Such, indeed, is the case; for of all sciences, meteorology seems the most disjointed and unsatisfactory. Astronomy, it is true, is the most complete of all, and in it experiment in the true sense of the word is not possible; but here such uniformity reigns, that observation aided by theory has acquired a degree of certainty which is scarcely equalled in any branch of experimental science. When once a great general principle in nature is laid bare, progress and development follow immediately. This principle, however, can be discovered only by experiment, or by appeal to experiment. In astronomy, Newton's discovery of the *law* of gravitation was the signal of progress; and what Newton did for astronomy, Œrsted, Ampère, and Faraday have done for electricity, Young and Fresnel for light, and Rumford, Davy, and Joule for thermo-dynamics. The principle of the conservation of energy is itself a scientific induction from experiment, and to it are due the great strides which scientific knowledge has taken during the last half of a century.

Ex′pert (Lat. *expertus*, 'one thoroughly proved by experience'), a term applied to one who has special practical knowledge on any subject, and particularly to an adept in handwriting for detecting forgery, or to a witness in a law-court who has peculiar scientific knowledge, as in the exposure of a case of poisoning.

Explo′sives, the name given to substances which, under the influence of heat, electricity, or percussion, are suddenly converted from a solid or liquid state into a gaseous form, producing an explosion whose force is proportional to the volume of the gas and its rapidity of disengagement. These substances are either chemical compounds or intimate mechanical mixtures. In the former the explosion results from the violent dissociation of the combined elements, as, for example, when the liquid chloride of nitrogen is resolved into its two component gases, chlorine and nitrogen; and in the latter the explosion arises from the combination or rearrangement of the elements composing the mixture, of which gunpowder is the type.

Gunpowder and analogous preparations have long been used for purposes of war and pyrotechnic display, but the bulk of the substances embraced under the term E. have only of late years been discovered, and already their manufacture and utilisation in mining and blasting operations have made wonderful progress. In their respective places in this work, the composition and character of the most important E. are dealt with; here we only can enumerate those kinds which have been commercially prepared, or practically used, and for convenience of arrangement we shall classify them as mixtures and compounds. In mechanical mixtures a nitrate or a chlorate is the predominant ingredient, and with heat it freely gives off oxygen, which in a nascent condition combines with the other ingredients, generally carbon and sulphur, forming gaseous products. The nitrate mixtures embrace gunpowder, pyrolithe (nitrate with carbonate of soda, sulphur, and sawdust), and poudre-saxifragine (nitrate of baryta, saltpetre, sulphur, and charcoal). The chlorate mixtures comprehend Horsley's blasting-powder (chlorate of potash, charcoal, powdered nut-galls, &c., soaked with nitro-glycerine), Brain's blasting-powder (resembling that of Horsley), Ehrhardt's powder (chlorate and nitrate of potash, powdered coal and tannin), teutonite, chlorated gun-cotton, &c. The chief chemical compounds constituting E. are—nitro-glycerine, and bodies prepared from it—dynamite, dualine, lithofracteur; glyoxiline (gun-cotton pulp and saltpetre saturated with nitro-glycerine and methylic nitrate), gun-cotton, cordite, cotton-gunpowder, Schultze's powder (woody fibres treated with nitric and sulphuric acid and hot alkalies, and afterwards saturated with nitrate of potash solution), nitro-mannite picric powder, the chloride and the iodide of nitrogen, and the fulminates of mercury, silver, &c.

In Great Britain, on the 1st January, 1876, the Explosive Substances Act, 1875 (38 Vict. c. 17), came into operation. It provides for the greater safety of the public, in so far as it secures the proper conduct of the manufacture, storage, transport, importation, and shipment of E., heavy penalties being exacted for non-observance of the regulations.

Storage of Explosives.—Mr. W. H. Chambers of the Control Department, Woolwich, some time since invented a magazine which reduces the danger attending storage of E. to a minimum. It takes the form of a cylinder or drum, the sides and bottom of which are formed of materials of low conducting power, as plaster of Paris, Portland cement, and ground cork, with outer, inner, and intermediate casings of galvanised sheet iron. The top is similarly constructed and is screwed down, and the outer casing is pierced with several small holes plugged with red lead. The holes, on the removal of the red lead, allow of the escape of moisture or steam that may be generated by the exposure of the magazine to great heat. A fire sufficiently strong to raise the outer casing to welding-heat in no way affects the gunpowder stored within. The magazines are as thoroughly damp-proof as fire-proof.

Explosive Material, Law Regarding.—By 24 & 25 Vict. c. 100, whoever shall maliciously, by gunpowder or other explosive substance, destroy or injure any dwelling-house, anyone being in it, is guilty of felony subjecting to penal servitude for life. To place or permit any spring-gun, man-trap, or other engine dangerous to life in his ground, renders the owner liable to penal servitude for life, or for any term not less than three years or to imprisonment for any term not more than two years, though he may make such arrangement within his dwelling-house for defence between sunset and sunrise (24 & 25 Vict. c. 100). See GUNPOWDER, LAW REGARDING.

Expo'nent, in algebra, is a number or symbol representing a number placed above and to the right of an expression, thus indicating the power to which that expression is to be raised. (See EVOLUTION AND INVOLUTION.) From this definition we have at once the *law of exponents*, $a^m \times a^n = a^{m+n}$; from which, by putting $n = -m$, we deduce that a^{-m} is the reciprocal of a^m, and by putting it equal to nothing, $a^0 = 1$. In these, m and n may be either integral or fractional. An *exponential* equation is one into which the unknown quantity enters as an E., such as $a^x = b$. The *exponential theorem* is the expansion of a^x in ascending powers of x. The whole subject is intimately connected with Logarithms (q.v.).

Expo'sing Chil'dren, under two years of age. If with intent to kill and the child die, this is murder; if the exposure be such that the child's life is endangered or the health of the child be, or be likely to be, permanently injured, this is a misdemeanour punishable with penal servitude for three years or imprisonment for two.

Ex Post Fac'to is a legal term denoting an act done to affect a right previously questioned or a demand previously made. An *ex post facto* law operates retrospectively. It is only in extraordinary circumstances that this effect is given to a penal measure.

Expressio'né, Con, or **Expressi'vo** (Ital. 'with expression'), a term used in music as a direction to the performer.

Exten'sion (Lat. *extensio*, 'a stretching out'). In logic most terms have a meaning in E. and a meaning in intension, the former comprising the individual things to which the term applies, the latter comprising the qualities which those things must possess. Thus *planet* in E. denotes the earth, Mars, Venus, &c.; in intension it means a heavenly body with the *quality* of revolving round the sun, &c. Different but related terms vary in the quantity of their E. and intension. Thus *animal* has a greater E. of meaning than *man*, as including all quadrupeds and other organically breathing creatures; while it has a less intension, for among the qualities of *man* must be the qualities of *animal* as well as others peculiar to *man*. If we add the adjective *white* to *man*, we narrow the meaning in E., but we deepen the meaning in intension, *white man* being applicable to fewer individuals than the term *man*, but implying a new quality in addition to the qualities implied by *man*. It is an invariable law that as the intension of a term is increased the E. is lessened, but not in any exact ratio. Hamilton uses *breadth* and *depth* for E. and intension, while Mill uses *denotation* and *connotation*.

Extent, in English law, is a writ issued to recover debts of record due to the Crown or at the suit of a Crown debtor against his own debtor. In the former case it is called an *E. in chief*; in the latter, an *E. in aid*. It is of the nature of a writ of execution, and binds all the defendant's lands and property; the person may also be taken unless otherwise directed. Appeals in cases of an E. lie in the Queen's Bench Divisional Court and also in Parliament.

Extent, Crown's, in Scotland. By the treaty of union between England and Scotland the revenue laws of the two countries were assimilated, and the Crown's preference and the English form of execution by extent were introduced in revenue matters, with limitation of operation to moveable property. By the Court of Exchequer Act the forms of procedure against Crown debtors have been remodelled and made similar to the procedure in other cases.

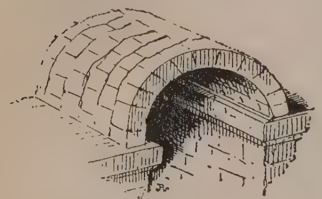
Extor'tion (from Lat. *ex*, and *torqueo*, 'I wrest'), in a wide legal sense, signifies any oppression under pretence of right. In a limited sense it denotes the offence of any one taking money or other valuable officially where none is due, or taking more than what is due, or of requiring a payment before the proper time. The punishment is removal from office, fine or imprisonment. By 24 & 25 Vict. c. 96, if any one, knowing the contents thereof, send, deliver, or utter, or directly or indirectly cause to be received any letter or writing demanding money or other valuable, and threatening to accuse any one of any crime punishable with death or penal servitude, he is liable to penal servitude for life. And any one accusing or threatening to accuse another of the crimes referred to is declared guilty of felony and subject to penal servitude.

Extract (Lat. *extractum*, 'what is drawn or taken out'), in Scotch law, signifies either the proper written evidence or warrant on which *diligence* or *execution* on a judicial decree may issue, or an authenticated copy of deed or other writing the principal of which, or a transcript of the principal, has been preserved in a public office. The official by whom the E. is prepared and authenticated, and who is usually the clerk of Court, is called an Extractor.

Extract of Meat is obtained by separating from animal food all the nutritious constituents and condensing them into small bulk. For commercial purposes the extract is placed in hermetically-closed vessels, that it may remain, for an indefinite length of time, without any putrefactive change occurring. It is useful in many circumstances, for with it beef-tea or soup can be prepared in a short time. Although the extract may contain all the nutritious constituents of animal food, it can never serve as an exclusive article of diet, for quantity is as necessary as quality for the sustenance of animal life.

Extracts are substances resulting from the evaporation of vegetable juices, or the solutions of their active principles. The solutions are obtained by means of such menstrua as water, acetic acid, alcohol, ether, and glycerine, cold or in various degrees of heat. The process of evaporation is best conducted *in vacuo*. E. vary in consistence from a soft paste to a hard, brittle solid, and they may be administered in pill, solution, or mixture. The group of E. comprehends all medicinal substances from the vegetable kingdom.

Extradi'tion (Lat. *extra*, and *ditio*, 'a giving over') is the giving up of a person accused of a crime committed in a foreign country to the foreign jurisdiction. Conventions were concluded by England with France and the United States in 1843 (by statute 6 & 7 Vict. cc. 75, 76, repealed by Act of 1870) for the E. on both sides of persons accused of specified offences. Treaties have been entered into with France, Germany, United States of America, Denmark, Italy, Belgium, Brazil, Austria, Sweden, and Spain, for such purposes of E. The E. Act of 1870 confers on the Queen a general power of making arrangements with any foreign state with respect to the surrender of any fugitive criminal charged with certain crimes, and provides that existing E. conventions should be carried out under the Act, special restrictions being imposed in reference to persons only charged with political offences. By the E. Amendment Act of 1873 accessories are liable to be surrendered.



Extrados.

Extrados, in architecture, means the upper convex surface of an arch or vault, also the curve formed by the upper side of the voussoirs or rows of niches for statuettes.

Extrajudi′cial. The term is usually applied in law in contradistinction to *judicial.* E. matter is that which is not intended to form any part of the record, or of the judicial pleadings, or admissions of the parties, such as communings or correspondence with a view to a private settlement of the case. E. concessions to avoid a lawsuit cannot be founded on where negotiation has failed.

Extravasa′tion (from Lat. *extra*, 'beyond,' and *vado*, 'I go quickly') is the escape of any of the fluids of the living body from their vessels owing to disease or injury of their coats. The term is most commonly applied to E. of blood, or blood effusions, where the contents of the vessels, arteries, capillaries, or veins, escape entire into the cellular tissue beneath the skin. In the broader sense of the term there may be E. of blood into any organ or part of the body, or E. of any fluid contained in vessels into any part of the body through which they pass.

Extre′me Unc′tion (Lat. *extrema unctio*, 'the final anointing') is one of the seven sacraments of the Roman Catholic Church, and is defined to be a sacrament 'wherein by the anointing with oil and prayer in the prescribed form, by the ministration of a priest, grace is conferred on the baptized dangerously ill, whereby sins are remitted and the strength of the soul is increased.' The ceremony of E. U. is first met with among the Marcosians, a Gnostic sect in the 2nd c., who anointed the dead with an oil or balsam, and pronounced a prayer over them, 'to the end that the souls of the departed, freed from the Demiurgus and all his powers, might be able to rise to their mother, the sophia.' Within the Church it originated in the act of anointing by a bishop or priest, which was immediately connected with the sacrament of the Lord's Supper, when administered to dying persons. An anointing of the sick is mentioned by Innocent I. in the beginning of the 5th c., and by Felix IV. in the beginning of the 6th. It came into general use from the 9th c., although it was not universally adopted in the West till the 12th. It is alluded to by St. Augustine, St. Gregory, Fortunatus of Poitiers, and Gregory of Tours; and in the Greek Church by Origen, Chrysostom, Victor of Antioch, and Cyril of Jerusalem, but the first who spoke of it as a sacrament was Hugo of St. Victor.

The Church of Rome founds her doctrine on the subject (Council of Trent, can. 2, 4; sess. xiv.) on Mark vi. 13, and James v. 14, 15, although both of these passages seem to have more reference to the recovery of the sick than to their death.

Extrin′sic Ev′idence is evidence beyond (Lat. *extra*) that of the deed or document under consideration. The general rule of law is that it is incompetent to contradict or modify the terms of formal writings unless fraud be alleged and proof offered; but in certain circumstances, as where there is ambiguity in the writing, such evidence is admitted in explanation. See Evidence.

Exuda′tion (Lat. *ex*, 'out,' and *sudatio*, 'a sweating') is the escape of a portion or constituent of the fluids of the living body from their vessels, and is not necessarily the result of disease or injury. E. never results from the rupture of a vessel, and in this respect it is distinguished from extravasation. When E. occurs, the vessels may be entire, or their coats may be in a relaxed condition, or a vein may be weakened from disease or injury; and the effusion takes place by mechanical filtration.

Exu′mas, The, a cluster of W. India islands forming part of the Bahamas (q.v.). They are known as the 'Great Exuma,' 'Little Exuma,' and 'Exuma Keys.' Great Exuma is 30 miles long and 3 broad. Agriculture and salt-making are the chief pursuits. Salt is exported amounting to 116,000 bushels in a year. Exuma town is next in importance to Nassau as a port of entry in the Bahamas. Pop. about 2000.

Ey′alet, the name used formerly for a division of Turkey, which was ruled by a pacha, but which gave place to the vilayet on the administrative reorganization of the empire in 1871.

Eyck, Hubert and **Jan Van,** two Flemish painters of the latter part of the 14th and the beginning of the 15th c., of whom the chief facts known are that they were the first to make the practice of painting in oils general (see Painting), and that they have exercised an extraordinary influence on the development of the art of modern times. Hubert, born at Maas-Eyck, near Liège, in 1366, was a member of the fraternity of Notre Dame at Ghent, where he died, 18th September, 1426. Of his art no distinctively authentic specimens remain, but from the circumstances that he was the instructor of his brother Jan (who was twenty-four years younger), and that they lived and painted together until the latter was thirty-six years of age, and had risen to fame, it is presumable that the reputation of the younger brother was shared in by the elder during the lifetime of the latter. Jan Van E., the great master of the old Flemish school, born at Maas-Eyck about 1390, resided and practised painting with his brother successively at Bruges and Ghent. He was the first to employ drying oils with suitable varnish in painting, and with such success that to the present day his works compare favourably for freshness of colour and for solidity with those of living painters. The 'Adoration of the Lamb,' on which both the brothers worked, but which was completed by Jan, and is his greatest work, is an altar-piece with folding wings. The centre pieces are at Ghent, the wings in Berlin. In the National Gallery are three pictures by Jan, but his chief works are in the museums of the Continent. He died at Bruges in 1440 or 1441. A colossal statue of Jan was completed at Brussels in April, 1878.

Eye (Old Eng. *eag*-e; *cf.* Ger. *aug*-e, Lat. *oc*-ulus). *Anatomy of the Eye.*—The organ of vision consists (1) of external protective parts or appendages; (2) of an optical apparatus of refractive media by which a distinct inverted image of any external object is formed on the retina or sensitive coat; and (3) of the terminal organ termed the retina, connected with the expansion of the optic nerve, which receives the impressions of rays of light and transmits these along the filaments of the optic nerve to the brain.

The External Protective Parts or Appendages.—These are the *eyelids*, which are movable folds of skin, having between the layers a thin plate of cartilage. Each eyelid is lined by a mucous membrane, which is reflected over the surface of the globe of the E. and constitutes the *conjunctiva.* Between the skin and the conjunctiva there are numerous fibres of connective tissue, muscular fibres, the cartilage above mentioned, and numerous small glands called the *meibomian* glands, which secrete matter for lubricating the surface of the eyeball. The *eyelashes* are hairs attached to the margin of the lids. Intimately connected with the external appendages of the E., there is an arrangement for the secretion of the tears, termed the *lachrymal apparatus*, consisting of the following parts: the gland (*lachrymal gland*) by which the tears are secreted near the upper side of the orbit; two small *canals* near the inner angle, into which the fluid secreted by the gland is received; and the *lachrymal sac* and *nasal duct*, or passage by which the tears are conveyed from the lachrymal canals to the cavity of the nose. The eyebrows, eyelids, and eyelashes shade the E. from excessive light, and prevent the access of dust floating in the air. The watery fluid secreted by the lachrymal gland keeps the anterior surface of the E. moist and translucent. When this fluid is formed in excess, under the influence either of an emotion or of an irritant applied to the surface of the E., it constitutes *tears*.

The eyeball is situated in the cavity of the skull termed the *orbit*, in which it lies embedded amongst a quantity of fat. It is moved about by the action of six muscles—four straight, or *recti*, and two *oblique*. By the action of these muscles it may be rotated upon either an antero-posterior, or a transverse axis.

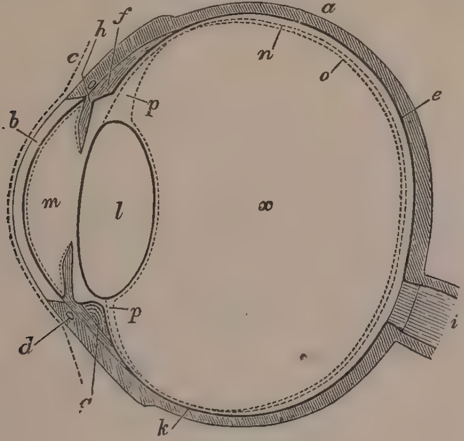


Fig. 1.

The general form and appearance of the eyeball are seen in Fig. 1. When viewed in profile, the E. is composed of segments of two spheres, of which the anterior is the smaller and more prominent. It consists of several investing membranes, enclosing certain fluid and semi-fluid matters. The membranes are three in number, viz.—(1) A tough fibrous covering termed the *sclerotic* (*a*); (2) a middle vascular, pigmentary, and partially muscular layer, divided into an anterior portion called the *choroid* (*k*), and a posterior, the *iris* (*h*); and (3) a nervous stratum, the *retina* (*n o*). The enclosed refracting media are also three in number, viz.—(1) The *aqueous humour* (*m*); (2) the *crystalline lens* (*l*); and (3) the *vitreous humour* (*x*). The anterior part of the eyeball, which is clear and transparent, is called the *cornea* (*b*). The cornea consists of a thick fibrous part, the cornea proper, covered in front by the *conjunctiva* (*c*), and a thin elastic layer known as the *anterior elastic lamina;* and behind by a similar elastic lamina, seen dotted in Fig. 1, usually called the *membrane of Demours*. The proper cornea is of the nature of epidermis rendered transparent. The middle tunic of the eyeball consists, as above mentioned, of two coats, viz., a vascular and pigmentary coat called the *choroid* (*k*), and a small anterior muscular part, the *iris* (*h*). The inner surface of the choroid is lined by a layer of hexagonal cells filled with black pigment, and serves the same purpose of absorbing extraneous rays of light as the blackening seen on the inner surface of a camera. The iris is the contractile and coloured membrane which is seen behind the cornea, and which gives colour to the E. Its centre is perforated by an aperture termed the *pupil*. Fibrous tissue and involuntary muscle form the tissue of the iris, in the meshes of which numerous pigment cells are also found. The iris serves as a contractile diaphragm, by which excess of light is cut off, and sharpness of definition of the retinal image is thus secured. The pupil contracts under the influence of light, so that with brilliant illumination it may be reduced to a very small size. The iris and the crystalline lens, the latter being held in position by a transparent capsule (*p*), divide the E. into two chambers, an *anterior* (*m*), containing the aqueous humour (*m*), and a *posterior* filled with the vitreous humour (*x*). The former consists simply of water holding in solution a small quantity of saline material, while the latter is composed of a jelly-like substance, lying in a meshwork of extremely delicate connective tissue. The *crystalline lens* (*l*) is a doubly convex, solid, transparent body, formed of numerous laminæ placed one outside of the other, and having in the centre a firm and hard *nucleus*. The convexity of the lens is greatest behind. Its various laminæ are formed of thin delicate fibres. The lens is held in its place by a *suspensory ligament*, which surrounds its margin, and it also possesses a transparent *capsule*. The *retina* (*n o*) is a most delicate pulpy substance, placed behind the vitreous humour, and in front of the choroid. It extends forward nearly to the anterior margin of the choroid. Its outer surface, that next to the choroid, is formed by a special layer named after its discoverer *Jacob's membrane*. After the soft retina has been hardened in alcohol or chromic acid, and thin sections are made perpendicular to its surface, an appearance similar to Fig. 2 may be obtained. It will be seen that it consists of a series of dissimilar strata, viz.—(1) A layer of rod and cone like bodies forming Jacob's membrane (*b c c′ b′*); (2) a fine granular layer (*d*); (3) another granular layer having larger granules (*f*); (4) a finely molecular layer, composed of molecules and extremely fine fibres (*g*); (5) a layer of large nerve-cells (*h*), which are connected by filaments (*h′*) with (6) the innermost layer (*i*) (that is, the one next the vitreous humour) formed by the expansion of the optic nerve. In the centre of the retina there is a *yellow spot*, where vision is most acute. In this spot the only part of the retina present is the layer of rods and cones. About one-tenth of an inch inside the yellow spot is a round disk, *porus opticus*, where the optic nerve expands, and where there is complete insensibility to light.

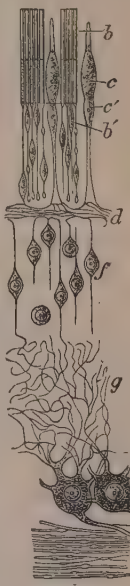


Fig. 2.

Physiology of the Eye.—Within the limits of this article it is impossible to do more than to give a brief outline of the more important points.

General Optical Character.—The E. may be regarded as a camera consisting of four lenses of different structures, densities, and curves, surrounded by a strong fibrous covering, the sclerotic, and lined by a pigmentary layer, the choroid. The four refractive structures through which a ray of light must pass before it reaches the retina are, from before backwards, the cornea, the aqueous humour, the crystalline lens, and the vitreous humour. The action of these four refractive structures is to form a picture of external objects on the retina. The action of rays of light on the retina is to stimulate the terminations of the filaments of the optic nerve, which are in connection with the retinal elements; the influence on the nerves is conveyed by them to the sensorium, and the consequence is consciousness of vision. It has been shown that the layer of rods and cones in the retina is the part really sensitive to the action of light, and that the specific action of light is to effect certain chemical changes in this part, which may be detected by the electrical variations they produce.

Position of Objects on the Retina.—All objects refracted on the retina are inverted, and yet they are seen in the natural position. The probable explanation of this is, that the mind is not conscious of images on the retina, but of the external object which produces the image.

Accommodation of the Eye.—A normal E. is capable of seeing objects distinctly which are placed at almost any distance, and consequently there must be some power of accommodating or of focussing the E. for different distances. It has been ascertained that this is accomplished by the action of a small muscle, the *ciliary muscle (f g)*, which relaxes the anterior layer of the capsule of the lens, and thus allows the lens, by its elasticity, to become more convex anteriorly. This is effected for near objects. A reflection of a candle flame on the anterior surface of the lens has been observed to approach the cornea when the E. was directed to a near object. The radii of curvature have also been carefully measured, and it has been found that the length of the radius of the anterior surface of the lens diminishes for near distances; consequently the anterior surface becomes less convex for distant objects. The mechanism occurs without consciousness. For further details see Hermann's *Human Physiology*, p. 372.

Anomalies and Peculiarities of the Eye.—As an optical instrument the E. is not absolutely faultless, but the defects are so slight as not to be observable unless the attention has been carefully directed to them, with the aid of special apparatus. The chief defects are:—(1) *Chromatic aberration* (see ABERRATION). When the E. is accommodated for too near a distance, the margin of the field is blue, and for too great a distance the margin is of a faint reddish yellow. Thus the power of accommodation is not equal for all colours. (2) *Spherical aberration* is nearly corrected by the action of the iris cutting off a large amount of the peripheral rays which fall upon the E. by the ellipsoidal form of the refracting surfaces, and by the density of the lens being greatest in the centre or nucleus; but when the pupil is dilated, a certain amount of spherical aberration is always present, giving rise to circles of diffuse light, and consequently to indistinct images. (3) *Astigmatism.* In many cases it will be found that fine vertical lines made by chalk upon a black board can be seen distinctly from a greater distance than similar horizontal lines. This depends on the fact that the vertical meridian of the cornea is more arched than the horizontal, so that the two meridians have different focal distances. This is astigmatism, an error, which, if too pronounced, may give rise to much discomfort, which may be remedied by the use of cylindrical glasses. (4) All the media of the E. are slightly *fluorescent*. (5) The E. is so affected by *polarized* light, that when, for example, we look at the sky (the blue rays of which are already polarized), a peculiar tuft-like image is seen, usually called *Haidinger's image*.

The Blind Spot of the Eye.—The point of the retina which corresponds to the entrance of the optic nerve is insensible to light, so that any image falling upon it does not excite a visual sensation. This proves that the optic nerve can only be affected by light through the medium of the retina.

The Sensitiveness of the Yellow Spot.—This spot is most sensitive to light, and when we wish to obtain an accurate view of any object, we unconsciously so move the E. as to bring its image upon the spot. For example, if we fix our attention, without moving our eyeballs, on a word in the centre of a long line of print, we see that word distinctly, while the other words on each side of it are but vaguely noticed. But if we wish to see the words separately, the E. is insensibly moved by the action of its muscles along the line, so as to bring each word successively on the yellow spot.

Quality of Luminous Impressions.—Light consisting of vibrations of the ether of different wave lengths, it is evident that the quality of luminous impressions depends on the characters of the wave. For example, the intensity, or, in other words, the *height*, of the wave determines the intensity of the luminous impression—the greater the intensity the greater the impression. The phenomenon of simple *colour* appears to depend upon the *length* of the wave. Thus certain waves, such as those below the red of the solar spectrum, give rise to no luminous impression; shorter waves above these excite a sensation of red; still shorter, orange; still shorter, yellow, green, indigo, and lastly, violet, in which the wave lengths are very small. Beyond the violet there are no luminous impressions except those seen in Fluorescence (q.v.). As the number of impulses in the same given time, say a second, must manifestly be greater with short waves than with long waves, sensation of simple colour may be said to depend on the number of impressions within a given time. For further details see LIGHT.

Various Modes of Exciting the Retina.—The retina may be excited not only by light but by mechanical or electrical stimulation. Thus pressure on the eyeball produces peculiar haloes of colour termed *phosgenes*, familiar to all. When electrical currents pass through the retina, weak luminous sensations also occur. Santonin (q.v.) has the property of so affecting the retina as to give a yellow colour to the field of vision.

Persistence of Impressions upon the Retina.—If the retina be excited sufficiently, the excited condition persists for some time after the exciting luminous cause has ceased to act. This effect is termed the *after-image*. Thus by whirling a wire red-hot at one end, the luminous describes a circle before the eye. The ingenious toy called the 'wheel of life' or *thaumatrope* illustrates the same phenomenon. With reference to colour, it may also be shown by rotating a disk divided into sectors of different colours. In this experiment the quality of the impression is altered. Thus with sectors of red and blue we obtain purple. The after-images produced by coloured objects are those of the complementary colour. Thus red will produce a green after-image, and *vice versâ*.

Ocular Spectra.—Fatigue of the retina, or a blow upon it, or the action of various drugs, may produce spectra of various colours, which are transferred to the outer world with all the semblance of reality.

Entoptical Phenomena.—These are appearances due to opacities or obscurations of the refracting media of the E., which throw shadows upon the retina sufficiently intense to excite it. They appear in the form of dots, irregular crosses, rows of beads, &c., and their appearance is often associated with a disordered state of the health.

Binocular Vision.—Although two images are formed in the two eyes, we see only one object. This is explained on the hypothesis that there are *corresponding points* in the retina which, if simultaneously excited, give rise to a single luminous impression. In normal circumstances the E. is so moved by its muscles as to bring images on corresponding points. When this action is deranged, as in squinting or by the use of narcotics, or by pushing one eyeball a little to the side with the finger, we see double.

Short-sightedness.—This defect, termed *myopia*, is usually due to the fact that the antero-posterior axis of the eyeball is longer than normal, so that rays of light are brought to a focus in front of the retina. Thus a blurred image is formed. Myopia is remedied by the use of *concave* lenses in spectacles.

Far-sightedness, usually termed *presbyopia*, is due to the antero-posterior axis being too short, so that the image would be formed *behind* the retina, a defect remedied by the use of *convex* lenses in spectacles. The normal eye is usually said to be *emmetropic*.

Stereoscopic Vision.—When you look at any solid object, it apparently stands out in relief. This depends upon the fact that the two images of the object formed in the two eyes can never be completely united, according to the law of corresponding points, so as to give one single impression. There are therefore two separate *perspective* images upon the retina, which are so combined as to cause a portion of them to overlap, and thus give rise to the perception of relief.

Determination of the Magnitude and Distance of Objects.—As regards the magnitude of an object, that depends upon the size of the retinal image—the greater the image the greater will be the apparent size of the object. The size of the retinal image will of course depend on that of the *visual* angle, or the angle formed in the lens by two lines drawn from the extreme ends of the object. In determining distance, the mind judges by the size of objects in the foreground. Thus it is extremely difficult to estimate distances at sea or on a wide plain, owing to the absence of this element of comparison. In judging of nearer distances, the influence of the muscular sensation produced by the convergence of the eyes, and also the effort at accommodation (undoubtedly a very vague impression), aid the mind in forming an opinion. Another aid to the estimation of distance is the intensity of the light, which usually decreases with the distance.

The Compound Eye.—The organ of vision in all the *Vertebrata* corresponds in general characters to what has been above described, and constitutes what is termed a simple E.; but in insects and *Crustacea* we find facetted eyes, consisting of conical segments, arranged as seen in Fig. 3. Each of these segments, two of which are seen in *C*, consists of a lens (*c*), and of internal nervous filaments which are in connection with the terminations of the optic nerve (*n*). Each segment contains pigment (*r*), and is optically distinct from those adjoining it. Thus light will fall in the direction of the axis of each segment, and the animal will have as many fields of view as there are segments in its E. The compound E. resembles the retina inverted, so that the nervous elements of the compound E. correspond to the individual rods and cones of Jacob's membrane. In the compound E., however, 'each retinal element has a telescope arranged for one particular direction.' See Hermann's *Physiology*, and Beaunis's *Éléments de Physiologie Humaine*.

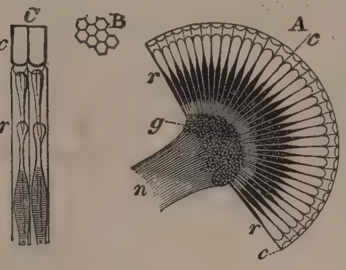


Fig. 3.

Comparative Anatomy of the Eye.—The first traces of organs of vision found in the animal world, as we proceed from lower to higher forms of life, probably occur in the *Protozoa* (q.v.), among the Infusorian animalcules, in which one or more spots of pigment may be seen. Whereever pigment is found in lower animals existing in definite masses, the naturalist is strongly inclined to attribute to such bodies the function of sight. Pigment spots, associated with lenses or refracting bodies, occur in the *Medusæ* or jellyfishes, in the sea-anemones and allied (Cœlenterate) organisms, situated around the margin of the swimming-bell in the former, and around the mouth in the latter forms. No nerves have been traced in the majority of *Cœlenterata*. In *Echinozoa*, such as star-fishes and sea-urchins, simple eyes or *ocelli* resembling those of Cœlenterates are found. Starfishes thus possess eyes at the tips of their rays, and in sea-urchins the eyes are situated at the upper pole of the shell, being borne on special (or *ocular*) plates. In *Annulosa*, the eyes may (as in worms, &c.) be of as simple character as in lower forms, but in such forms as insects, crustaceans, &c., large masses of simple eyes or *ocelli* are aggregated together to form large *compound* eyes, the separate *facets* or lenses in such eyes sometimes numbering many thousands. In *Mollusca* well-developed eyes, approaching in structure those of highest animals, may be found. The eyes of the *Cephalopoda* or cuttlefishes are thus of very complex structure, and of large size. Simpler eyes occur in *Gasteropoda* and *Lamellibranchiata*—the eyes of the latter class being well exemplified in the *pectens* or scallops, where they exist as numerous spots of pigment along the edge of the mantle lining the shell. In vertebrates, beginning with the fishes, eyes varying much in structure and adaptation to the element in which the animals possessing them live are found. The eyes of fishes are specially adapted to refract the straggling rays of light which pierce the dense medium in which they live. The lens of the E. in fishes is of spherical shape, and the entire structure of the organ is well adapted to constitute it a veritable magnifying instrument, in addition to its serving as a mere organ of sight. The eyeball is flat, little aqueous humour exists, and the pupil is large and motionless. In reptiles, a somewhat intermediate condition between the E. of the fish and that of higher vertebrates is presented. The chief structure of interest in the reptilian E. is the development of a third eyelid or *nictitating* membrane—also seen in some fishes (sharks, &c.), in birds, and in some mammals. This membrane is formed by a fold of the conjunctiva existing on the inner side of the E., and this fold, by means of special muscles, can be drawn over the surface of the E., so as to clear it from particles of foreign matter, and also to modify the light. In birds, the E. is generally protected by a ring of plates of bony nature, existing in the *sclerotic* or outer coat of the E. In *Mammalia*, variations exist in the E. structures, adapting the organs of vision for exercising their functions in various media—as in the case of the *Cetacea* or whales, seals, and other aquatic forms. But in essential structure the eyes of all *Mammalia* exhibit close agreement with the type of structure already described in man.

Diseases of the Eye.—Writers of systematic treatises on D. of the E. include under the term every injury and disease which interferes with normal vision. The nomenclature is thus very extensive, as normal vision may be interfered with from a great variety of accidents to, and disease of, parts contiguous to the eye, as the eyebrows, eyelids, and the orbits, as also the muscles regulating the movements of the eye and nerves supplying them. Some of these diseases, although not strictly ophthalmic, are so intimately connected with vision, as to warrant their being classed among D. of the E.; as *ptosis*, or falling down of the upper eyelid; *ectropium* and *entropium*, eversion and inversion of the eyelids; *hordeolum*, or stye; *trychiasis*, inversion of the eyelashes; *strabismus*, Squinting (q.v.). There are also diseases of the tunica conjunctiva and of the secreting and excreting lachrymal organs, of the semilunar membrane and *caruncula lacrymalis*, of the ocular capsule and the areolar and adipose tissue of the orbit, which interfere with vision. (See LACHRYMAL ORGANS, DISEASES OF.) The Ophthalmiæ (q.v.) are inflammatory diseases of the eyeball and conjunctiva, including sclerotitis, corneitis, iritis, choroiditis, retinitis, ophthalmitis, &c. Diseases subsequent to the ophthalmiæ, such as onyx, abscess of the cornea, specks or opacity, obliteration of the pupil, staphyloma, &c., obstruct vision or cause blindness. Cataract (q.v.), or opacity of the crystalline lens, is also a prominent disease of the eye, and a frequent cause of blindness. Obliteration of the pupil causes blindness. (See IRITIS, and PUPIL, ARTIFICIAL.) For an account of the nervous D. of E. see AMAUROSIS. There are also various affections of vision arising from peculiar or altered conditions of the refracting humours of the eye, as *myopia*, or near-sightedness, *presbyopia*, or far-sightedness. (See VISION, ABNORMAL; and COLOUR-BLINDNESS.) Blindness (q.v.) is occasionally caused by entozoa in the organ of vision. See ENTOZOA, and PARASITIC DISEASES.

Eye (Old. Eng. *Ig*, 'an island'), a town of England, in the county of Suffolk, 20 miles N. of Ipswich by rail. It got its name of 'island' from being situated between two streams, which unite here and fall into the Waveney. The principal industries are iron-founding, brewing, and the preparation of flax. It possesses a fine church of Perpendicular style of architecture, a corn exchange, town-hall, and grammar-school, 'restored' and enlarged in 1876-82. Pop. parl. div. of county 54,826; mun. bor., and civ. and ecc., par. (each) 2064.

Eye-Ag'ate, the name applied to any banded agate with a prominent central spot like the pupil of the eye. The name *eyestone* is given to stalactitic limestone, which presents a similar appearance.

Eye'bright, a species of plants of the genus *Euphrasia*, belonging to the natural order *Scrophulariaceæ*. They have a tubular calyx, a two-celled capsular fruit, with striated seeds, and the upper portion of the corolla divided. The common E., above named, attains a height of six or seven inches, has oval serrated leaves, and the flowers, coloured white or red, are developed in the axils of the leaves. It is abundant in Britain, also occurs in Europe, N. Asia, &c. Its popular name is derived from the conspicuous nature of its little flowers, and also from its having been used as a cure for eye diseases. E. is also interesting from the fact that some species appear to be partially parasitic on other plants.

Eye'mouth, a market-town in Berwickshire, Scotland, is situated on the river Eye. It is 7½ miles N.N.W. of Berwick-on-Tweed, is irregularly built, and the only buildings of note are the churches. It has profitable herring and haddock fisheries. Windbound vessels resort to the harbour, which is sheltered from all winds except the N. and N.E. Pop. civ. par. 2670; entire town 2638.

Eye'piece, of a telescope or microscope, is the lens or combination of lenses by which the image formed at the focus of the object glass is viewed.

Ey'lau, or **Prussian E.,** a town in the district of Königsberg, E. Prussia, 23 miles S. of Königsberg. Pop. town 3,523; district 52,924. E. has several industries, but is noteworthy chiefly for the battle fought here, 8th February, 1807, between the French, numbering 80,000, commanded by Napoleon, and the Allied Russians and Prussians, under Bennigsen and Lestocq. The Russians were 58,000 strong, but the Prussians were so pressed by Ney that only 5,500 were able to share in the combat. The battle lasted the entire day, and victory was claimed by both, but the French losses considerably exceeded those of the allies, which amounted to about 20,000.

Eyre, Edward John, a colonial governor, the son of a Yorkshire clergyman, was born in August, 1815. At the age of seventeen he emigrated to Australia, where his career was distinguished chiefly by his humane conduct, as resident magistrate, towards the aborigines, and by his explorations, which proved that there are no fertile spots in the central waste of Australia. In 1846 he was appointed Lieutenant-Governor of New Zealand. After holding this office for six years, he was made Lieutenant-Governor of St. Vincent, and *interim* Governor of the Leeward Islands. E. was appointed in 1862 temporary Governor of Jamaica, and in 1864 Governor and Commander-in-Chief of Jamaica. In October, 1865, he crushed a negro insurrection; but some sharp proceedings, and particularly the execution of George William Gordon, a coloured member of the Jamaica House of Assembly, on the ground that he had instigated the rebellion, caused such an outcry against him that he was superseded. Though a commission of inquiry to a great extent exonerated E., he was finally recalled. After E.'s return to England energetic efforts were made by those who disapproved of his policy to have him tried; but an 'E. Defence Fund' was raised by some of those who thought that his stern action merited praise rather than blame, and a charge of murder made against him before the Petty Sessions of Market Drayton, near which he had taken up his residence, was dismissed in 1867.

Eze'kiel (Heb. 'God strengthens,' or 'the strength of God'), the son of Buzi, was a priest in the temple at Jerusalem when, in the year 599 or 597 B.C., Jehoiakin the king, with the chief of the inhabitants, was carried off to Babylon. E. was one of the exiles settled on the river Chebar (perhaps the Chaboras, which flows into the Euphrates at Circesium). For his personal history we are entirely indebted to the book of his prophecies. According to chap. i., he received his prophetic call in a glorious vision in the fifth year of Jehoiakin's captivity. The latest date mentioned (xxix. 17) is the twenty-seventh, so that his prophecies extend over a period of twenty-two years. Of his subsequent fate nothing is known; he probably died in exile. The book of his prophecies contains twenty-nine utterances against the Israelites, especially the inhabitants of Jerusalem, made before the final fall of that city (i.-xxiv.); prophecies against some of the neighbouring tribes who were exulting over their overthrow (xxv.-xxxii.); nine utterances concerning the future condition of Israel (xxxiii.-xxxix.); and a series of visions relating to the circumstances of the people after the restoration (xl.-xlviii.). It is worthy of notice that the prophet's notion of God is a marked modification of previously existing ideas. With him the conception of Jehovah became purer and more elevated than before, but at the same time Jehovah is represented as much further removed from mankind. In the moral earnestness, combined with severity, of his own character E. has been compared to Calvin, and God is depicted by him exactly on the same pattern—one who sends good on the righteous man so long as he perseveres in his righteousness, but not a moment longer, and evil on the godless man, and him alone, while he also is rewarded immediately on his repentance (xiv. 12-23; xviii.; xxxiii. 10-20). The last part of the book is the most remarkable, on account of its relation to certain parts of the Pentateuch.

Ez'ra (Heb. 'help') was a Jewish priest at Babylon, who in the seventh year of the Persian king Artaxerxes (Longimanus, B.C. 465-425), with the permission and help of that prince, led a second company of the exiled Jews back to Jerusalem. Being deeply grieved to find his countrymen there living on such friendly terms with the heathen as to have intermarried with them, he appealed to them so powerfully that they all put away their heathen wives, and took an oath to keep themselves free from all heathen abominations. There is no further account of E., till, thirteen years after, in the 20th year of Artaxerxes, he is again at Jerusalem with Nehemiah (Neh. viii.). He is not mentioned after Nehemiah's departure from Jerusalem in the 32nd year of Artaxerxes, and it is not known whether he died at Jerusalem, or returned first to Babylon. The Book of E. is written partly in Hebrew and partly (iv. 8—vi. 18, and vii. 12-26) in Chaldee. As to the authorship, the second part (vii.-x.) was no doubt composed by E., although it bears traces (*e.g.*, vii. 1-6) of having been remodelled by a later hand. In the first part the chief difficulty is the letters sent to the kings of Persia—Xerxes (485-465) and Artaxerxes (Longimanus, 465-425)—by the Samaritans, and the answer of the latter to one of them (iv. 6-22). From the context (*cf.* ver. 23, 24) it would seem as if all these letters referred to the building of the temple, whereas it had been finished long before (516: vi. 15). In reality they refer to the fortification of the city (ver. 12, 13, 16, 21); and there is thus a confusion of persons and things which, it is thought, could not have been made by E., or by any one not writing at a later date.

Ezzeli'no, or **Ecceli'no, da Romano,** an Italian family, of German origin.—**E. I.** came to Italy about the middle of the 11th c., in the suite of Konrad II., from whom he received the castle of Romano near Padua, and several fiefs.—**E. II.** enlarged the family's lands, and commanded the forces of the Lombard league against Friedrich I. He died about 1183.—**E. III.,** son of **E. II.,** became podesta of Vicenza about 1150, and was a conspicuous Ghibelline chief. He died in 1193.—**E. IV.,** surnamed the Tyrant, was born 25th April, 1194, supported the Ghibelline cause, and in 1236, being hard pressed by the Marchese d'Este, sought aid from Friedrich II., was made captain of the imperial party, and extended his authority over Verona, Vicenza, Padua, Feltre, and Belluno. He contributed greatly to the Ghibelline victory at Cortenuova (27th November, 1237); in 1238 he married Selveggia, the emperor's natural daughter; and finally spread his power from the Adriatic to the neighbourhood of Milan. He consolidated his tyranny by horrible atrocities; and in 1252 he was excommunicated, and a league made against him by the chief Lombard towns, but without success. His career of aggrandisement continued until 1256, when, Alexander IV. having preached a crusade against him, a new alliance, joined by Venice, was formed to oppose him. In 1259, when marching on Milan, he was defeated and captured, whereupon he refused food, tore the dressings from his wounds, and died. His son Alberico was shortly afterwards killed, and E.'s lands were shared among his enemies.

F.

F the sixth letter of the English alphabet, occupying the same position in the Phœnician alphabet as *vau*, from which it has been derived through the Latin; in Greek its place was originally occupied, both in form and sound, by the archaic *digamma*. Its proper phonetic value, which is that of a softened *v*, must be carefully distinguished from the sound of *ph*, the Greek φ, which is really an aspirated *p*. In transliteration from Oriental languages this confusion often arises. But though these two letters are etymologically distinct, few languages retain both, and either can be forced to serve the purpose. The Greek *ph* is often represented in primitive Latin words by F, as *phuo* = *fui*, the same root as of Eng. 'be'; but in words directly borrowed, as *Philip*, it was retained; to be entirely discarded by modern Italian. The German pronunciation of *v* is hardly distinguished from our F. The interchanges of F are most numerous with the cognate labials and aspirates—Eng. 'father' is Ger. *vater* and Lat. *pater*; Lat. *fora* is Ger. *thura* and Eng. 'door'; Lat. *fero* is Eng. 'bear'; Eng. 'five' is Ger. *fünf*, Lat. *quinque*, and Gr. *pente*. As an abbreviation, F. stands for filius and Flavius in Latin, f. for *forte* and ff. for fortissimo in music, and FF. for *fragmenta*, used in referring to the Digest of Justinian. F. commonly stands for fellow, as F.R.S., Fellow of the Royal Society. F was also the letter formerly branded on felons in England who claimed the benefit of clergy. In the Middle Ages F was the symbol of the number 40, and in Arabic it represents 80.

F, in music, a note a perfect fourth above C. The vibration ratio F : C is equal to 4 : 3.

Faam′, or **Fa′ham,** a species of *Orchidaceæ* (q.v.), or orchids, found plentifully in the Mascarene Islands and the E. Indies. This plant is noted for the odour of its leaves, due to the presence of Coumarin (q.v.). The leaves are used in France for making an infusion popularly known as 'Isle of Bourbon tea,' greatly in vogue as a stomachic, and said to be also beneficial in consumption.

Faba′ceæ. See LEGUMINOSÆ.

Fa′ber, John, the name of two engravers in mezzotinto, of some repute in the 18th c., though of but little account now. The elder, who was born in Holland, and died at Bristol in 1721, besides engraving, drew portraits with the pen on vellum. His son, who died in London in 1756, was a superior artist. His best portraits are those of the beauties of Hampton Court, of the Kit-Cat Club, and of the Perceval family in the history of the House of Yvry.

Faber, Rev. George Stanley, an Anglican divine, was the eldest son of Rev. Thomas F., the descendant of a French Protestant refugee, and born 25th October, 1773. After a successful career at Oxford, where he became fellow and tutor of Lincoln College, he was made Bampton Lecturer in 1801, and his discourses were published the same year under the title of *Horæ Mosaicæ* (2nd ed. 1818). He married, and held various appointments, settling down finally in 1832 as master of Sherburn Hospital, near Durham, where he died 27th January, 1854. F. was a voluminous and popular writer on prophecy; among his works are *Dissertation on the Mysteries of the Cabiri* (1803); *The Origin of Pagan Idolatry* (1816); *Difficulties of Infidelity* (1824); *Papal Infallibility* (1851); *The Revival of the French Emperorship Anticipated from the Necessity of Prophecy* (1853).—His nephew, **Frederick William F.,** born 28th June, 1815, is notable for having, while an Anglican clergyman and Rector of Elton, been converted to the Roman Catholic faith (1845), and joining Dr. Newman's Oratory of St. Philip Neri. F., who was an eloquent preacher and voluminous writer both of prose and of poetry, became Superior of the Oratory at Brompton, and died 26th September, 1863. Among his works, several of which have been translated into French, German, Dutch, &c., may be mentioned *Sir Lancelot, a Poem* (2nd ed. 1858), *The Spirit and Genius of St. Philip Neri* (1850), and *Spiritual Conferences* (1859). See Bowden's *Life of F. W. F.*

Fa′bius, the name of an old Roman patrician family, whose members were distinguished in war, literature, and the arts. From 485-479 B.C. a F. constantly appears in the list of consuls; but according to the family legend, which passes for history, having been alienated from their fellow-patricians, the clan retired to the River Cremera, where (B.C. 477) they were destroyed by the Veientes, one youth, left at Rome, alone having escaped.—**Quintus F. Rullianus,** or **Rullus,** who first of the Fabian gens bore the surname Maximus, was the most distinguished Roman general in the second Samnite war. His march through the Ciminian forest, though a rash and hazardous step, was followed by a decisive victory over the Etruscans at the Vadimonian Lake, B.C. 310, and two years later he dispersed the Umbrians on the Upper Tiber.—**Quintus F. Maximus Verrucosus,** 'whose wise delay restored the Roman State,' was named the *Cunctator*, or the 'Lingerer,' from the persistence with which, in the second Punic war, he avoided all direct encounter with Hannibal. Appointed dictator after the disaster at Lake Trasimenus, his policy nearly achieved success when, following the invader on his retreat from Campania to Apulia, he closed the passes of the Appenines against him. Hannibal only escaped by a dexterous stratagem. The popular party at Rome misinterpreted the Fabian policy, and demanding more aggressive tactics, associated Minucius in command with the dictator; but the change of policy issued in the disgraceful rout at Cannæ (B.C. 216). In his fifth consulship (B.C. 209) F. recaptured Tarentum. He died B.C. 203. Mommsen pictures him as a man 'zealous in his reverence for the good old times, for the political omnipotence of the senate, and for the command of the burgomasters—one who looked, next to sacrifices and prayer, to a methodical prosecution of the war as the main means of saving the state.' **C. F. Pictor,** whose distinction as a painter acquired the name Pictor for a family of the Fabii. He lived about 300 B.C.—**Q. F. Pictor,** grandson of the preceding, flourished about 220 B.C. He was the earliest of the Roman annalists, and his work was of great value.

Fa′ble (Fr. *fable*, Lat. *fabula*, 'a narrative or story,' from *fari*, 'to speak'), a fictitious tale in prose or verse, in which animals or inanimate things are made to speak and act without regard to possibility, and which is intended to illustrate a moral truth or practical axiom, sometimes added to the story in the shape of a brief maxim called the *moral*. 'Jotham's F. of the trees (Judges ix.) is the oldest extant,' says Addison, 'and as beautiful as any made since.' Fables are especially popular in the East, and among the earliest known collections of them are Bidpai's (q.v.) or Pilpai's Indian and Lokman's Arabic fables. Some maintain the East to be the birthplace of F., and Max Müller traces La Fontaine's F. of the Milkmaid to a Sanskrit source. Among the most famous fabulists are the Greeks Æsop (q.v.) and Babrius (q.v.), the Latin Phædrus (q.v.), who recast the fables ascribed to Æsop, and added others of pure Roman origin, Aphthonius, a Greek prose writer, and Avianus, a Latin versifier of the 4th c., Planudes (q.v.), a Greek of the 14th c., Boner, and in modern times, La Fontaine (q.v.), who gave a novel piquancy to F. writing, Gay (q.v.), and the Spaniard Yriarte, who united the spirit of the Æsopian fables with the style of the Spanish romances. Fables were very popular in Germany in the 18th c., the best-known writers of them being Gellert (q.v.), Hagedorn (q.v.), Lichtwer, and Pfeffel. The greatest recent fabulist is the Russian Kriloff (q.v.), and many exquisite fables occur in Andersen's works. The most ambitious specimen of F. writing in England since Gay's time is the *Fables in Verse* of Lord Lytton ('Owen Meredith').

Fab'liau, pl. **Fabliaux** (formerly *fableau*, originally *fablel*, from Lat. *fabulellus*, a dim. of *fabula*, 'a story'), short, metrical tales written by the early French poets, which, unlike the *serventes* or songs of praise, the *tensons* or fantastic disquisitions on the 'art of love,' and the *lais* or miniature romances, were facetious and satirical, and mostly founded on proverbs and comic incidents. They are said to have originated at festive meetings, for which their brevity and piquancy were well adapted. While the *chansons de geste* deal with chivalrous adventure, the F. picture the humble and *bourgeois* life of the Middle Ages, and assail the vices and wrongs of the time, sparing neither king, baron, nor saint. Although stained with indecency, they evince fancy, pathos, and humour, bold satire, and greater narrative skill than the long rhyming romances. They belong principally to the 13th c., and are written generally in octosyllabic verse and in dialogue. Their sly banter and arch gaiety make them pleasanter reading than the prolix epics of the *trouvères*, or the lyrics embodying the amorous ritualism of the *troubadours;* and they were the delight and instruction of the people, until the Church, dreading their anti-clerical influence, made them a medium for orthodox doctrine. This brought them into popular disrepute; they died away during the 15th c., and their place was taken by the *sotties* or farces. From the F. arose the French comedy. In *Maistre Pierre Pathelin*, the first French comedy, we see the very spirit of the F., the same love for ludicrous incident and merry cajolery. Molière's *Médecin Malgré Lui* and *Georges Dandin*, and Piron's comedy of *Le Fils Ingrat* were founded on old F. The subjects of the F. were drawn from very varied sources—from the Old and New Testament, the *Acta Sanctorum*, the *Gesta Romanorum*, Apuleius, Ovid, and especially from the East. Many were adapted from the *Romance of the Seven Sages.* But notwithstanding their frequent Eastern colouring, their character is distinctly French; their authors are the earliest representatives of that peculiar *esprit Gaulois* which sparkles in Villon, Marot, Voltaire, and La Fontaine, preserving the same character in Rutebeuf and in Béranger. This peculiarly French quality, which we first find in the F., consists of a laughing, poignant irony, a frolic piquancy, expressed with Attic lightness and clearness, distinct alike from the boisterous humour of Rabelais and the prim, chill graces of the classical school. The *fablieri* have supplied innumerable themes to succeeding writers. From them La Fontaine drew many of his raciest stories, and Boccaccio most of the plots for his *Decamerone.* Chaucer was indebted to them for his tales of the Reeve, Frankeleyn, and Schypman. Stories now known through Europe were first popularised by the F.; for example, the tale of Griselda was retold by Chaucer and Hans Sachs from Boccaccio, who took it from a *fableor.* After the Conquest, Norman minstrels brought F. into England, where they were imitated in such poems as *Owl and the Nightingale*, and the story of *Sir Cleges.* The *fablieri* were not mere sprightly, licentious humourists. They were bold satirists, whose writings were a check on the priests and nobles, and who anticipated Cervantes in ridiculing chivalry. Among the most noted of them were Bernier, Gautier de Coinsi, Henri d'Andeli, Hughes Piancelle, Jean de Boves, Jean le Chapelain, and, especially, Rutebeuf, a wandering minstrel of the 13th c., the representative *fablier*, author of *Charlot le Juif*, *Moine Sacristain*, &c. The *Vert-Vert* of Gresset is a perfect modern specimen of a F. See Demogeot's *Littérature Française*, Besant's *French Humourists*, and Le Grand's *Fabliaux*, *Histoire de la Littérature Française*, by Charles Gidel.

Fabre d'Églantine, Philippe François Nazaire, was born at Carcassonne in 1755, and became a Jacobin leader in the French Revolution, joining Danton, La Croix, and Camille Desmoulins in all their terrible excesses. He represented Paris in the National convention, voted for the king's execution without appeal, and was nominated a member of the committee of public safety. He took an active part in passing the decree under which no English or Hanoverians were to be made prisoners. Falling under suspicion of holding moderate, or Royalist, principles, he was executed with Danton in 1794. His comedies were numerous and fairly popular at the time.

Fabrett'i, Raffaell'e, a famous Italian archæologist, born in 1618 at Urbino, repaired at an early age to Rome, and devoted himself to the study of its antiquities. His employments as Papal treasurer, chancellor to the Papal embassy at Madrid, and keeper of the papal archives in the castle of St. Angelo, gave him the best facilities for studying the classic works of the ancients. He is best known by his *De Aquæductibus Veteris Romæ* (Rome, 1680), his *De Columna Trajani* (Rome, 1683), and his *Inscriptionum Antiquarum, quæ in Ædibus Paternis asservantur, Explicatio* (Rome, 1699; 2nd ed. 1702). He died in Rome, 7th January, 1700. His valuable collections were deposited in the palace of Urbino.

Fabria'no, a city in the province of Macerata, Italy, 23 miles N.W. of the city of Macerata, has a cathedral and several churches containing numerous specimens of Italian sacred art. It has also been an important seat of paper manufacture for upwards of three centuries. Pop. 7910.

Fabriano, Gentile Da, an Italian painter, born at Fabriano about 1370, repaired at an early age to Florence to study under Fiesole. Among his first works were the fresco of the Madonna, preserved in the cathedral of Orvieto, which earned him the title of *magister magistrorum*, and an 'Adoration of the Kings,' for Holy Trinity Church, Florence, a work dated 1423, and one of the finest works of the school of Giotto. He afterwards painted sacred subjects for the churches of Sienna, Perugia, Gubbio, Fabriano, &c., and eventually removed to Venice, where the senate gave him the pension of one ducat *per diem* and the privilege of wearing the toga of the patricians, in recognition of the merit of his great fresco—a sea-fight between the Venetian fleet and that of the Emperor Barbarossa—painted for the council hall of the Doge's palace. The work was destroyed by fire in 1574. F. was employed by Pope Martin V. to decorate the church of San Giovanni Laterano, in which he painted the history of St. John, figures of several of the prophets, &c. He died in 1450. His works are bright and cheerful. Michael Angelo said of him, 'His genius is like his name—*gentile.*'

Fabri'cius or **Fabriz'io, ab Acquapenden'te, Geron'imo,** a famous Italian anatomist, was born at Acquapendente, near Orvieto, in 1537. He studied under Fallopius at Padua, where he was made professor of anatomy in 1565. F. soon became celebrated as a teacher, and his class-room was thronged by students from the various countries of Europe. After lecturing for fifty years he retired with a large fortune, and died at his country seat on the Brenta, 21st May, 1619. It was suspected that his heirs had poisoned him. Harvey, who attended F.'s lectures, states that his discovery of the circulation of the blood was suggested by F.'s remarks on the valves of the veins. F. wrote several Latin treatises on anatomy and surgery, showing careful, accurate investigation, and clear and vigorous in style. His complete works were published, with a memoir by Albinus, at Leyden in 1723, under the title *Opera Omnia Anatomica et Physiologica.*

Fabricius, Johann Christian, a Danish entomologist, born at Tondern, Slesvig, 7th January, 1743; studied medicine at Copenhagen, Edinburgh, and at Upsala under Linnæus; was chosen professor of natural history at Kiel in 1775; devoted himself to entomology; travelled over much of Europe, visiting Russia and England; and died at Kiel in 1807 or in 1808. His system of classification is by no means natural, yet entomology received from him a fresh impulse; and though later and better *savans* have pushed him into the background, he has a claim to be considered almost the founder of the science. His most important works are *Systema Entomologiæ* and *Supplementum Entomologiæ*.

Fabricius Lusci'nus, Cajus, figures in Roman history as a model of antique simplicity, courage, and patriotism. When consul in 282 B.C. he delivered the city of Thurii, which was besieged by the Lucanians and Bruttii, and subsequently defeated the Samnites. When Pyrrhus came over from Greece to assist the Tarentines, F. was sent to confer with him, after the defeat at Heraclea (280), about a ransom of captives. The Greek monarch offered him gold if he would try to induce the senate to make peace, but F. was proof against both his bribes and his threats. Pyrrhus was so much impressed with his patriotic fidelity that he restored the prisoners without ransom. During F.'s second consulship, 278, the physician of Pyrrhus secretly paid him a visit, and treacherously offered to poison his master for a reward. F. indignantly handed him over to the king, who again expressed his thanks by setting free all his Roman prisoners. While Pyrrhus was absent in Sicily, F. was victorious over the peoples of Lower Italy. He died poor, about 250, but the state charged itself with the upbringing of his only child.

Fabro'ni, An'gelo, an Italian biographer, born at Marradi in Tuscany, 1732, completed his studies at Rome. He wrote first in Latin, and afterwards in Italian; commenced at Pisa in 1771 his *Giornale de Letterati*, which at its close in 1796 formed 102 vols., and died at Pisa, 22nd September, 1803. Among his works are *Vitæ Italorum Doctrina Excellentium qui Sæculis XVII. et XVIII. floruerunt; Laurentii Medicei Magnifici, Vita; Magni Cosmi Medicei, Vita*, and *Elogi d' Illustri Italiani*.

Fa'byan, Robert, an English chronicler, born of a good Essex family in London, in the second half of the 15th c. He was a member of the Drapers' Company, and took an active part in civic affairs, becoming sheriff and alderman, and afterwards assessor of the London wards to Henry VII. He died 28th February, 1512. He wrote a *Concordance of Histories* (first printed in 1516), compiled from monkish annalists, and marked by a strong ecclesiastical bias. It gives the history of Britain from Brut to 1504, in English prose, and has a prologue and seven episodes in verse.

Façade' (Fr.; from the Ital. *facciata*, Lat. *facies*), a term in architecture which at first signified the principal front of a building, but is now applied to any front or face of an edifice. It is chiefly used in speaking of important buildings.

Facciola'ti, Gia'como, an Italian scholar, was born at Torreglia, near Padua, 4th January, 1682. He studied at the ecclesiastical seminary of Padua, of which he finally became the head. F. distinguished himself in criticism, grammar, antiquities, metaphysics, and theology, and wrote Ciceronian prose, but is remembered chiefly as a Latin lexicographer. He revised the lexicon of Schrevelius, and along with his pupil Forcellini produced a new edition of the *Calepine Lexicon*, or *Lexicon Septem Linguarum*. Finally, the same literary partners set to work to produce a new Latin dictionary, the basis of all subsequent dictionaries of the kind. F. did not live to see it completed (1771), as he died 26th August, 1769.

Face. The F. is composed of fourteen bones, of which twelve are in pairs, viz., the superior maxillary, molar, nasal, lachrymal, inferior turbinated and palate bones; and two single, namely, the vomer and inferior maxilla. It contains the cavities of the orbits, of the nose, and of the mouth. These bones are covered by the muscles of expression and of mastication, and by the contour of the bones, the degree of development of these muscles, and the amount of fat beneath the skin, the countenance in life is formed. The forehead, eyelids, nose, mouth, lips, and cheeks have sets of muscles by the movements of which the various emotions may be expressed. By absorption of fat and atrophy of muscle the F. becomes much altered in disease, and the near approach of death is characterized by a peculiar expression of countenance—the *facies Hippocratica*, thus described by the ancient physician Hippocrates: 'nose pinched, eyes sunk, temples hollow, ears cold and retracted, the skin of the forehead tense and dry, the complexion livid, the lips pendent, relaxed, and cold.' The arteries of the F. come from the external carotid; its veins end in the jugular; its nerves originate in the brain.

Face-Ache. See TIC-DOULOUREUX.

Fa'cet (Fr. *facette*, 'a little face'), the name applied to the small faces of a crystal or cut gem. Steel jewellery and other metal ornaments are often *facetted*.

Fa'cial Angle. This is an angle formed by two lines, one of them descending from the most prominent part of the forehead to the incisor margin of the upper jaw, the other passing through the external auditory opening and the nasal spine. It was intended by Camper, the distinguished ethnologist, to indicate by the size of this angle the degree of projection of the face in different races of men, and the relative development of the face to the cranium. The following are several facial angles which have been measured:—(1) Faces in antique works of art, 90° or even more; (2) average European, 80°; (3) European below the average, 70°; (4) Negro, 70°; (5) young anthropoid apes, 56° to 60°; (6) old anthropoid apes, 30° to 47°. See SKULL.

Facil'ity, a term of Scotch law denoting the mental condition of a person unable in an ordinary degree to protect himself from imposition. On sufficient evidence of F. being given against any one by his heir or next-of-kin, the Court of Session will 'interdict' him. (See INTERDICTION.) Any one conscious of the infirmity may place himself under interdiction. There is no corresponding term in English law, nor any similar remedy. See IDIOTS and LUNATICS.

Fac'tor, in mathematics, is one of the numbers or symbols which go to make up a given product. Thus in the expression $3ab^2\,(a^4-b^4)$ the factors are 3, a, b^2, and a^4-b^4; but of these the last two can be broken up into other factors, b, b, $a-b$, $a+b$, and a^2+b^2. This process of breaking up an algebraic expression into its *elementary factors* is of great importance in analysis. The term *factorial* is given to those continued products of consecutive numbers, beginning with unity, which constantly occur in series and expansions. Thus 1.2.3.4.5 is called *factorial* five, and is usually written $\underline{|5}$.

Factor (Lat. 'doer'), in a general sense, is any one who does business for another. In English law, a F. is the agent of a merchant or trader constituted by letter of attorney. (See ATTORNEY, LETTER OF.) A F. is generally paid by commission. If he buy goods on account of his principal when he is accustomed to do so, the contract binds the principal. But if the goods have been bought or exchanged without order, the merchant may refuse to take them from the F. Formerly the law was extremely hard on third parties in their transactions with factors. If an advance of money was made to one on the security of merchandise belonging to his principal, the principal was legally entitled to withdraw the security; and in the event of merchandise being bought from a F. not authorised to sell, the purchaser was liable, after paying the F., to have to pay the full value to the owner. To remove these hardships the Acts 4 & 6 Geo. IV. cc. 83 and 94 were passed, establishing the validity of contracts respecting merchandise entrusted to factors. Under 6 Geo. IV. c. 94 the person in whose name goods are shipped is declared to be the owner unless the contrary can be proved. The Factors Act of 1889 consolidated the law and amended it, and the law so amended and consolidated was extended to Scotland by the Factors Act of 1890. By the Larceny Act of 1861 a F. who obtained fraudulently an advance on the property of his principal is liable to seven years' penal servitude, &c.

In Scotland, the term F., besides its general legal meaning, which corresponds with the English, is especially applied to the manager for the proprietor of real (heritable) estates, for which the English equivalent is 'land-agent.' The great landowners have generally a F. resident on their estates, whose chief business it is to let the farms and draw the rents. The F. binds his principal to any engagement which he contracts within his powers. It has lately become to some extent customary to use the word *chamberlain* in Scotland as synonymous with F. in the above sense. Factors are also under certain circumstances appointed on estates in Scotland by the Court of Session. One so appointed is called a *Judicial F.* (q.v.).

Fac'tories and Mills, Law Regarding. Various Acts have been passed for the appointment of inspectors for the preservation of the health, and for regulating the education and hours of work, of children employed in M. and F. By 3 & 4 Will. IV. c. 103, children were required to attend a school chosen by parents or inspectors, to pay the expense of which one penny in each shilling was deducted from the child's earnings. It was rendered unlawful to employ children unless they produced weekly to the factory master the schoolmaster's ticket of attendance. Interior walls of mills and ceilings of rooms were to be limewashed yearly.

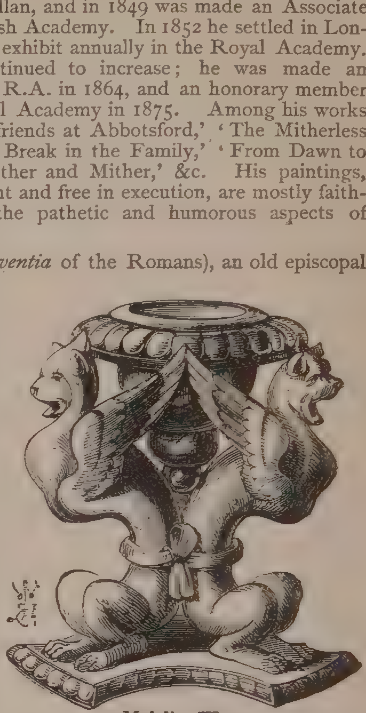
Act 7 & 8 Vict. c. 15 empowered inspectors to enter factories by day and night, to examine the inmates, the register, and other documents kept in pursuance of the Act. Penalties were imposed on persons endeavouring to prevent the examination of any child by the inspector, or otherwise endeavouring to impede him in the execution of his duty. Inspectors were empowered within limits to fix the surgeon's fees and appoint the times of his visits. The Act made stringent regulations for preventing injury to the health of children and 'young persons'—those between thirteen and eighteen years old—and for prevention of accidents from the machinery. By 16 & 17 Vict. c. 104, no 'child'—that is, one under thirteen years old—could be employed in any factory before six o'clock in the morning nor after six o'clock in the evening of any day, nor after two o'clock on Saturday. But between 30th September and 1st April children could be employed for one month on any day but Saturday from 7 A.M. to 7 P.M. The Factory and Workshop Act of 1878 consolidated and slightly amended these and other Acts bearing upon the same subject, and the Factory and Workshop Act of 1891 increased the powers of the inspectors, ordered means of escape from fire, prohibited the employment of children under eleven years of age, and women within one month after confinement. Any manufactory in which fifty or more persons are employed is under the Acts a factory. Statute 35 & 36 Vict. c. 61 placed the right of sanctioning or refusing the use of steam factory whistle with the local authorities. Children above eleven and under thirteen years of age may obtain half-time certificates on passing the prescribed educational standard, and may work to that extent in factories.

Fa'culæ, the brighter spots which are observed on the surface of the sun. The spots called *maculæ* are not so large or so bright.

Fac'ulty (Lat. *facultas*, 'a power,' 'means,' or 'opportunity'), in English law, is a privilege granted, under Statute 25 Hen. VIII. c. 21, to do something generally prohibited by law. There is a court for the purpose under the Archbishop of Canterbury or of York called the *Court of Faculties and Dispensations*, which has power to grant dispensations for a deacon under age to be ordained, and for exceptional procedure in other matters connected with the Church. The bishop of the diocese may grant a F. for a marriage without publication of banns; for erection of a monument, or for other addition or alteration in a church. See PEW.

Faed, John, a Scottish artist, son of a millwright, was born at Burley Mill, in the stewartry of Kirkcudbright, in 1820. He early showed a strong love of painting, and in 1841 went to Edinburgh, where in 1851 he exhibited several pictures, which soon made him widely known. In 1864 he removed to London. Among his works, which are mostly of humble Scottish life, are 'The Cottar's Saturday Night,' 'The Wappenschaw,' 'Tam O'Shanter,' 'Auld Mare Maggie,' 'John Anderson my Jo,' &c.—**Thomas F., R.A.,** brother of the above, was born at Burley Mill in 1826, joined the Edinburgh School of Design, where he received instruction from Sir W. Allan, and in 1849 was made an Associate of the Royal Scottish Academy. In 1852 he settled in London, and began to exhibit annually in the Royal Academy. His popularity continued to increase; he was made an A.R.A. in 1859, an R.A. in 1864, and an honorary member of the Vienna Royal Academy in 1875. Among his works are 'Scott and his friends at Abbotsford,' 'The Mitherless Bairn,' 'The First Break in the Family,' 'From Dawn to Sunset,' 'Baith Faither and Mither,' &c. His paintings, which are rich in tint and free in execution, are mostly faithful transcripts of the pathetic and humorous aspects of Scottish rustic life.

Faen'za (the *Faventia* of the Romans), an old episcopal town on the Lamone, in the province of Ravenna, N. Italy, on the railroad from Bologna to Ancona, and 20 miles S.W. of Ravenna. It is well built, four main streets branching off from the principal square, which is adorned with arcades and a fountain. The cathedral, courthouse, and theatre are the chief public buildings. F. manufactures articles of Majolica, known from the name of the town as 'Faience' (q.v.); also paper, silk, and linen. Pop. 36,490.



Majolica Ware.

Fæ'sulæ. See FIESOLE.

Fagel, Kaspar, was born at Haarlem in 1629, and became a celebrated Dutch statesman, Master of the Rolls in 1670 and Grand Pensionary in 1672. William III. owed his elevation to the English throne partly to the influence of F. In 1682 Comte d'Avaux, French ambassador in Holland, vainly offered F. a large bribe to win him over to the French side. F. died in 1688.

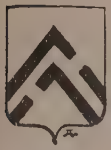
Fagg'ing, the name given to a system peculiar to the great public schools of England, by which the upper boys are authorised to exact certain services from the lower boys. The system is explicitly recognised by the masters, and the services demanded are regulated only by the traditions of each particular school; some of them are of a menial character, while others are connected with the common school games. F. no doubt arose from the two circumstances, formerly almost universal in England—that all the boys were permanent boarders, and that the staff of masters was too limited to exercise supervision out of working hours. The first of these circumstances naturally engendered a private organization among the boys, which the force of tradition has stereotyped, while the latter induced a semi-public sanction. Among day-boys the relation of master and servant could never have been instituted, and under ushers it would not have been allowed to take deep root. The advantages asserted of the system are that the fags are rendered handy, independent, and obedient, that an equality of condition is enforced upon all, and that bullying is indirectly suppressed. The evil is that the smaller boys are harassed by perpetual forced employment, which is often capricious, though seldom degrading. Freeman, in his *Growth of the English Constitution*, asserts that F. is a remnant of the old Teutonic custom of *commendation*, by which a free man became the 'man,' or obedient follower of a chief. A somewhat similar system, under the name of 'the Garring Law,' grew up in Heriot's Hospital, Edinburgh, in the middle of the last century.

Fahr′enheit, Gabriel Daniel, a German physicist, born at Danzig, 14th May, 1686, spent most of his life as a glassblower in England, and later in Holland, where he died, 16th September, 1736. About 1720 he improved the thermometer by substituting mercury for spirits of wine. (See THERMOMETER.) In the *Philosophical Transactions* for 1724 there are five papers by him, on the boiling and freezing of water, on specific gravity, and on a barometer of new construction.

Faid′herbe, Louis Léon César, a French general, born at Lille, 3rd June, 1818, served in Algeria, and as Governor of Senegal; commanded the *Armée du Nord* in the Franco-German war, and was beaten, greatly through the want of artillery, at St. Quentin, 17th January, 1871. He joined Gambetta's party, and was elected by the central canton of Lille to the National Assembly in 1871, but retired into private life on the success of the Thiers Government. In 1879 he was made a Senator. Besides proving himself an able soldier, F. wrote valuable scientific articles, a *Notice sur la Colonie du Sénégal* (1859) *Campagne de l'Armée du Nord* (1871). F. died 28th September, 1889.

Faïence′, or **Fayence,** an old French term formerly applied to all kinds of glazed earthenware, now restricted to fine kinds of pottery, with a soft, opaque paste, and glazed.

Failli, a term in heraldry, signifying a failure or break in an ordinary, and specially applied to a chevron divided into several pieces, as in accompanying diagram.



Failli.

Faill′y, Pierre Louis Charles Achille de, a French general, born at Rozoy-sur-Serre, Aisne, 21st January, 1810. He served in Algeria, distinguished himself in the Crimean war, and in 1867 won unenviable notoriety as the conqueror of Mentana. He held a command in the Franco-German war, and was captured at Sedan. F. was severely censured for incapacity by his countrymen, and was not reinstalled in command. Died in November, 1892.

Fai′néants Rois (Fr. 'do-nothing kings'), the name given to the Merwing kings, who nominally held the Frankish throne from the battle of Testry in 687 to the accession of the Karoling dynasty in 752. During this period the regal authority was wielded by the mayors of the palace. See FRANCE, HISTORY OF.

Fain′ting, or **Syn′cope** (Gr. *sun* and *koptō*, 'I cut, strike, smite'), is a state in which the circulation of the blood is suddenly arrested or much diminished in force and volume, causing a deadly pallor and loss of consciousness and power. F. is thus a state of suspended animation, varying in duration, and sometimes ending in death. F. usually takes place in the upright position, but not always, and the first symptoms are sudden pallor and falling down in a swoon. There are no spasms, as in hysteria, epilepsy, and convulsive affections; and no pulsations or respiratory movements, as in catalepsy. F. most frequently occurs to those of a highly nervous temperament. Those of very delicate constitution, or who may have suffered from exhaustive diseases or disease of the heart, are liable to attacks of F. from very slight exciting causes, such as the close atmosphere of a room or a start. The symptoms of F. and collapse, or shock, are similar, but the latter are much more serious, and are usually associated with accidents or surgical operations. *Treatment:*—The patient should be laid on the back, with the head and shoulders very slightly elevated; tight articles of dress should be loosened; and a current of cold air directed to the face and neck. Cold water dashed on the face, and ammonia or aromatic vinegar applied to the nostrils are highly useful in exciting the nervous system. The first symptoms of returning consciousness are twitchings of the muscles of the face, followed by a deep-drawn sigh. Artificial respiration, induced by compressing the ribs and allowing them to expand, as in natural breathing, rouses the respiratory movements. Friction over the region of the heart is also useful, and galvanism sometimes succeeds when all other means fail.

Fair, a privileged market regularly convened at a particular place on certain periods of the year. The word is probably derived from the Lat. *feriæ*, holidays, or days exempt from labour, which, after the establishment of Christianity, included days set apart for religious festivals in honour of the saints. On such occasions large numbers of people assembled round the monasteries. These gatherings became the origin of fairs, which were held on feast-days and Sundays. The German word *messe* signifies F. as well as Mass, a further indication of the relation between the Church and fairs. Numerous fairs are held at stated periods in various towns of the United Kingdom, chiefly for the sale of horses, cattle, and agricultural produce. Railways, and improved means of inland communication generally, have rendered many unnecessary, and diverted most from their original purpose to mere gatherings for merrymaking. Some had, indeed, become such great public nuisances, scenes of riot and dissipation, that their abolition was secured by the Fairs Act, enacted in May, 1871, which gave the Home Secretary power to abolish on the magistrates representing that the fairs were unnecessary and injurious and on the owner consenting. Bartholomew F., in London, established in the 12th c., ceased to exist in 1855; for two centuries it was a gross carnival. Throughout Europe and Asia, however, many fairs are still devoted to legitimate trade. Those of Leipzig and Nijni-Novgorod are the principal. At Leipzig annual fairs are now held at Easter and Michaelmas. Enormous trade is carried on, and the imports of the *Zollverein* and foreign manufactured goods steadily increase every year. Merchants from all parts of the world attend. The German book-trade, of which Leipzig is the great emporium, holds a half-yearly F. The annual F. of Nijni-Novgorod, sometimes called Macarieva, is the largest in the world. It begins early in July, and lasts over two months. Traders from all parts of Europe, Central Asia, and even China, frequent it. The F. is visited by over one million persons; the value of its imports amount to 180,000,000 roubles, and eight-ninths of that sum are actually realised by sales. Other Russian and Siberian towns have periodical fairs, and at Frankfurt-on-the-Main, Brunswick, Frankfurt-on-the-Oder, Vienna, Cassel, Breslau, Lyon, St. Germain, &c., considerable trade is similarly transacted. Among the English fairs may be mentioned the Horncastle Horse F., the Nottingham Goose F., the Birmingham Onion F., Ipswich Lamb F., Gloucester Cheese F., &c.

Fair′bairn, A. M., The Rev., M.A., D.D., was born in 1838, near Edinburgh, was educated at Edinburgh, Glasgow, and Berlin Universities, and in 1860 became minister at Bathgate, Linlithgow. He was appointed Principal of Airedale College, Bradford, in 1877, was elected Chairman of the Congregational Union of England and Wales in 1883, and three years later became Principal of Mansfield College, Oxford. Besides editing the Hibbert Lectures of Dr. Hatch and contributing to the *Contemporary Review*, he has written *Studies in the Philosophy of Religion and History*, *Studies in the Life of Christ*, *Christ in Modern Theology*, and *Christ in the Centuries*.

Fairbairn, Sir William, LL.D., F.R.S., an eminent engineer, was born at Kelso, Roxburghshire, Scotland, 19th February, 1789. After receiving an elementary education at the parish school of Mallochy in Rossshire, he became apprenticed to the trade of engine-wright at Percymain Colliery, North Shields. In 1817 F. was able to begin business for himself in Manchester as a machine-maker, and speedily won success and reputation. He is chiefly notable for being among the first to build iron ships, for substituting iron for wood in the shafting of cotton-mills, and for developing Stephenson's theory of tubular bridges, of which he successfully erected a large number. F. wrote various interesting papers, on such subjects as the tenacity of boiler plates, in the *Transactions* of the Royal Society and of the Philosophical Society of Manchester; and among his more important works are *Iron, its History and Manufactures* (1863), *Mills and Millwork* (1864-65), and *Iron Shipbuilding*. F., who during his later years had many honours bestowed upon him, such as the dignity of LL.D. of Glasgow, Fellow of the Royal Society, and corresponding Member of the Institute of France, held the office of president of the British Association for the Advancement of Science in 1861 and 1862, and in 1869 was made a baronet. He died 18th August, 1874. See Smiles's *Lives of Engineers*.

Fair′fax, Edward, son of Sir Thomas F. of Denton, Yorkshire, was born in the reign of Elizabeth. He spent a studious tranquil life near Denton, and died about 1632. His translation of Tasso's *Gerusalemme Liberata*, first published in 1600, under the title of *Godfrey of Bulloigne*, preserves the octave rhyme and much of the music and voluptuous splendour of the original; and notwithstanding occasional obscurity and undue license of fancy, remains an English classic and one of the best translations in our language. The edition published by Charles Knight has a brief memoir of the translator. F. also wrote eclogues, &c., now lost, and a treatise on *Demonology*. See Leigh Hunt's *Essay on F.'s Tasso*.

Fairfax, Thomas, Lord, an English general, son of Ferdinand, Lord F., was born at Denton, Yorkshire, in January, 1611. He served under Lord Vere in Holland, and when the civil war began in 1642, was made a general of cavalry in the army of the Parliament. In 1644 he defeated the Royalists under Bellasis, and commanded the right wing in the battle of Marston Moor. He succeeded Essex as leader of the Parliamentary forces, having Cromwell as his lieutenant-general, and commanded at the victory of Naseby in 1645. Henceforth, as Cromwell rose in power, F.'s influence lessened, though he was nominally commander-in-chief until 1650, when he resigned on being ordered to set out against the Scots, who had declared for the king. He then spent several years in retirement in Yorkshire, took part with Monk against Lambert in 1659, was elected member for Yorkshire in 1660, was one of the committee for promoting the Restoration, and died 12th February, 1671. F. wrote *Short Memorials of Thomas Lord F.* (1699), and several works in prose and verse.

Fair Head (Scand. *farr*, 'a sheep'), otherwise **Benmore Head** (*i.e.*, 'great hill head'), a promontory on the coast of Antrim, Ireland, 3 miles S. by E. of the island of Rathlin, and rising perpendicularly from the sea 636 feet. Geologically it belongs to the coal-measures, but columnar greenstone forms its upper portion.

Fai′ries, or **Elves.** Several derivations of the word *fairy* are suggested, among others the Celtic *faer*, 'to charm'; Old. Eng. *fere*, 'a companion,' from *faran*, 'to go'; and the Persian *peri*, pronounced in Arabic *feri*. The true root is probably the Lat. *fatum*, whence through the mediæval *fatare*, 'to enchant,' the Fr. *faer*, *feer*, from which came *faerie*, signifying first illusion, then the land of illusion, fairyland, and lastly an inhabitant of fairyland. Elf, on the other hand, is of Teutonic origin. It is the Old Eng. *ælf*, entering into the composition of many proper names, as Ælfred; the Ger. *elfe*, the Sw. *elf*, the Norse *alf*, and is perhaps connected with the Lat. *alb*-us, 'white,' in allusion to their ghostly appearance. F. are imaginary beings of supernatural but limited power, and generally of tiny stature, a belief in whom has been common to almost all countries of Europe. They include beings of very different aspects and qualities. In particular the F. of romance differ from the F. of popular superstition. The former somewhat resemble the Greek nymphs, appear generally as damsels of angelic loveliness, and seduce knights into enchanted isles and palaces. The land of faerie was supposed to be sometimes underground, sometimes amid wildernesses, and sometimes in the ocean. It possessed brilliant but illusory splendours, and mortals were occasionally decoyed thither and detained for many years. Fairy mythology varies with different nations. The *peri* of the Persians, which correspond to the good *jinn* of the Arabs, resemble the *fays* of European romance, being of human stature and exquisite loveliness. They live mostly in the air, and wage war with the *deevs*, or evil spirits. The Scandinavian *alfar*, or elves, were supposed to be partly kind and beautiful, partly malicious, and 'blacker than pitch'; while the *duergar*, or dwarfs, were expert in metallurgy and in forging magical weapons. The English F. are more playful and innocent than those of Scotland and Germany, and appear as graceful, sportive pigmies, fond of dancing at night in the woods, and of sharing in household duties. The English sprite *Robin Goodfellow* corresponds to the German *Knecht Ruprecht*, the Scotch *Brownie*, and the French *Esprit Folet*, or *Gobelin* (goblin). He assumes various forms, misleads travellers, and is constantly playing tricks on mortals. He will sweep the house, and thresh corn at midnight, but if in return a bowl of cream be not set out for him, ill-luck will befall the negligent housekeepers. He is the same as Shakespeare's *Puck* (Old Eng. *pouke*, 'an evil spirit'), and probably as Jonson's *Puck Hairy*. The Cornish *pixies* —according to Keightley a diminutive from *Puck*—are supposed to be the souls of unbaptized children. They dwell in the mines, and, as Will-o'-the-Wisps, mislead travellers, whence the term 'pixy-led.' The Scottish F. closely resemble the English. They were said to be small and handsome, to wear green dresses, to ride in splendid processions on Hallowe'en, and to indulge in moonlight revelry, marking the spots where they danced by circles of vivid green called *Fairy Rings* (q.v.). They were fickle and mischievous, kidnapping children to offer as yearly tribute to Satan, stealing the soul from the human body and replacing it by the soul of a fairy, and sometimes carrying away grown-up persons to fairyland. On this last belief are founded the ballad of *Tamlane* (see Scott's *Minstrelsy of the Border*), and Hogg's fine poem of *Kilmeny*. There is an element of sadness and fanciful weirdness in the Scottish tales of F. alien to the kindred English superstitions; thus, the *kelpie*, a wicked Scottish water-spirit, is unknown in the English rivers. The Gaelic F.—called *daoine shi* (dheenè shee), 'men of peace'—were said to inhabit turrets invisible by day but brilliantly illuminated at night. They enticed mortals into their abodes, and if these visitors partook of a fairy banquet, they forfeited the right to return to their fellow-men. According to tradition the Irish F. are the less wicked of the fallen angels, who were permitted to remain on earth. They have various names, apparently derived from *shia*, 'a spirit.' Among them are *pooka*, corresponding to the English *Puck*, who takes the form of a wild colt and indulges in evil frolics; *leprechaun*, a miserly spirit in the form of an old man; the *merrow*, or sea-maid, and the *banshee*, or guardian-spirit of a particular family. The F. of English poetry are different from the F. of popular superstition. Chaucer's F. are partly classic, partly Gothic, having Pluto and Proserpine for king and queen; Spenser's are idealized mortals; and the lovely diminutive spirits of Shakespeare's *Midsummer Night's Dream* are original creations, ruled by Oberon and Titania, who were unknown in the vulgar fairy superstitions. Oberon is *Le Petit Roy Oberon* who figures so conspicuously in mediæval fiction, and holds an intermediate place between the fays of romance and the elves of the north. He is the German Elberich, which the French softened into Oberon. Titania seems a derivative from Titan, since Diana, whom Ovid (*Metamorphoses*, iii. 173) styles Titania, was at one time regarded as a ruler of the F. The name of the tiny queen is thus derived from a word implying colossal stature and strength. Queen Mab, who in a certain degree has usurped the place of Titania, derives her name from the Welsh *mab*, 'a child.' There are frequent allusions to the F. in the Elizabethans, but, next to Shakespeare, Drayton, in *Nymphidia* and the *Poet's Elysium*, has been the most successful poet of fairyland. Fairy-tales became very popular in the last half of the 17th c. The *Contes de ma Mère l'Oye* (1697) of Perrault produced numerous imitations. Among recent authors of fairy-tales Hans Andersen stands unrivalled. See Keightley's *Fairy Mythology* (Bohn, Lond. 1860); Scott's *Essay on the F. of Popular Superstition*, in the *Minstrelsy of the Border*; Grimm's *Haus- und Kindermärchen*; and

Andrew Lang's collection of bright and interesting fairy-tales.

Fair Isle (Scand. *farr*, 'a sheep'), an island midway between the Orkney and Shetland groups, 29 miles S. by W. of Sumburgh Head, fully 3 miles long and nearly 2 broad, rising into three lofty promontories (one of which, 'Sheep Craig,' gives name to the isle), and accessible only at one point on the N.E. After the defeat of the Spanish Armada in 1588, its admiral, the Duke of Medina Sidonia, retreating northwards, was wrecked on F. I. The inhabitants live mainly by fishing. Pop. reg. dist. 223.

Fairy Rings, the name popularly given to green spots marked out in pasture lands, from the belief that they represented the meeting-place of fairies and elves. According to Roget, the occurrence of F. R. is explained by the exhaustion of the soil. The dark-green grass of the F. R. has been traced to the growth of fungi which have spread outwards. As the soil becomes deteriorated, the fungi spread themselves further and further outwards, in the form of successive and concentric circles. The succeeding grass crop which grows therein becomes necessarily more luxuriant than the surrounding grass, the soil having been enriched by the decay of the fungi. Way states that fungi which form F. R. (such as *Agaricus oreades* and *A. graveolens*) contain a large quantity of phosphoric acid and potash, which of course tend to enrich the soil.

Fairy Shrimp, a genus of *Crustacea* (q.v.) belonging to a different order from that (*Decapoda*) in which the true shrimps are included—viz., to the order *Phyllopoda* (q.v.). They are so named from their delicate clear appearance. They occur in ponds, &c., in England and elsewhere. Their average length is about 1 inch, yet so clear are their bodies that they can scarcely be detected as they swim back-downwards. They have numerous feet, which are leaf-like in form.

Faith, in the widest sense of the word, is assent to the truth, or the persuasion of the mind that a thing is true. Thus the primary element of it is trust, as the primary idea of truth is that which is trustworthy; and it might be defined as a rational trust beyond the limits of knowledge, but founded upon it. It is often defined as if it were a special organ for the perception of a special kind of truth, but improperly so, although the complex state of mind involved in the act is, of course, different according to the nature of the object of F., and of the evidence on which it is founded. The ordinary definitions of F. may be divided into three classes:—Those founded (1) on its subjective nature; (2) on its object; (3) on its evidence. I. In the first class, F. has been defined as 'a persuasion of the truth stronger than opinion and weaker than knowledge'; otherwise, according to Locke, 'an assent of the mind to propositions which are probably, but not certainly, true'; or, according to Kant, 'the admission of a thing to be true on grounds sufficient subjectively, insufficient objectively.' Secondly, it is said to be a *voluntary* conviction or persuasion of the truth; which definition, however, admits of a number of meanings according to the sense attached to 'voluntary.' Thus it may mean that F. is not merely a speculative assent, but includes feeling; or, that F. does not depend on the nature of the object or the evidence, but on our choice to believe or disbelieve. II. Under the second class, F. is defined as the persuasion of the truth of things not seen. Here, again, 'sight' may be taken in three senses:—(1) Literally; we are said to know a thing which we have seen with our eyes, and to believe in the existence of things of whose existence we are certain without having seen them. (2) As mental perception; and we are said to believe on testimony what we might afterwards see or know by demonstration. (3) 'Things not seen' may mean all things not present to the mind; and we are said to know only the actual and the present, while what is mediately known, *e.g.*, by memory, is only believed to be. III. Under the third class, F. is defined to be (1) A conviction or persuasion of truth founded on feeling, not because of critical or philosophical research or of argument, but determined by inclination and inward necessity. (2) F. is a persuasion of the truth founded on testimony, and the F. of the Christian is the persuasion of the truth of the facts and doctrines recorded in the Scriptures on the testimony of God.

Having defined F., theologians further divide it into different kinds:—1. Speculative or dead F. is the F. of those who believe the Bible to be the Word of God, receive all it teaches, and are perfectly orthodox, while yet they may be leading an immoral life. 2. Temporary F. is that temporary impression, more or less deep and lasting, produced by the gospel—*e.g.*, in the apprehension of death—and which is due to those influences of the Spirit of God common to all men. 3. Saving F. is that which makes us the sons of God, and secures eternal life, and is founded 'not on the external or the moral evidence of the truth, but on the testimony of the Spirit with and by the truth of the renewed soul.' See Hodge's *Systematic Theology*.

Faith, Rule of, means a standard by which Christians are to be guided in what they believe in religious matters. The phrase originated with the early Christian fathers, but had a different meaning in the Greek and in the Latin Churches. In the latter, as, *e.g.*, in the writings of Irenæus, Tertullian, Novatian, and Jerome, R. of F. was, in fact, but a name for the Apostles' Creed, which was so called 'because it was the known standard of faith, by which orthodoxy and heresy were judged.' If a man adhered to this rule, he was considered orthodox; but if he deviated from it in any point, he was esteemed a heretic, one who had deserted the common faith and separated from the communion of the Church. In the Greek Church, on the other hand, as, *e.g.*, in the writings of Clement of Alexandria, the R. of F. meant an exegetical tradition or principle, by which the true meaning of Scripture was educed.

In modern times, all are agreed as to the meaning of R. of F. as regards its application, but there is a difference of opinion between Protestants and Roman Catholics as to what constitutes the standard. All Protestants hold that 'the Word of God, as contained in the Scriptures of the Old and New Testaments, is the only infallible rule of faith and practice.' According to Roman Catholics the R. of F. includes Tradition as well as the Scriptures, because 'some doctrines which all Christians are bound to believe are only imperfectly revealed in the Scriptures, others only obscurely intimated, and others not therein contained at all.' With regard to the Scriptures themselves, the Church of Rome differs from Protestants in admitting into the canon certain books which Protestants do not admit to be inspired, namely, the Apocrypha (q.v.). Further, while Protestants hold that the Bible is intelligible by all under the teaching of the Holy Spirit, and that therefore all are entitled and bound to search the Scriptures and judge for themselves what is the true meaning thereof, the Church of Rome teaches that the Bible cannot be properly understood by the people without a visible, present, and infallible interpreter, which interpreter exists in the Church, and the people are therefore bound to believe whatever the Church believes to be the true doctrine. With regard to Tradition, which the Church of Rome also holds to constitute a part of the R. of F., it teaches that many things were taught by Christ and his apostles which were not recorded in the New Testament, but which have been faithfully preserved and transmitted by the Church, and are now to be found, for the most part, in the works of the fathers, decisions of councils, ecclesiastical constitutions, and rescripts of popes. See Davidson's *Sacred Hermeneutics*, Bingham's *Ecclesiast. Antiquities*, Hodge's *Systematic Theology*.

Faithfull, Emily, born in 1835, at Headley Rectory, Surrey, took an active part, at an early stage of the movement, in the improvement of the condition of working-women. In 1860 under her was founded a printing office, with machinery and works, in which women were employed as compositors. For some years E. F. edited the *Victoria Magazine*, which was printed and published at this establishment, and in 1868 brought out a novel, called *Change upon Change*. She lectured in America in 1872-73, and on her return continued her good work among the toilers of her sex.

In 1889 a civil list pension of £50 was awarded her. Died in 1895.

Fai'thorne, Faithorn, or **Faythorne, William,** an English engraver, was born in London about 1625, took up arms for Charles I. in the civil war, was imprisoned, and afterwards went to France, where he seems to have come under the professional influence of Philippe de Champagne and of Nanteuil, and considerably modified his style as an artist. Returning to England in 1650, he entered upon a thriving business as a print-seller and engraver. Among his best portraits are those of Cromwell, Milton, Dryden, Hobbes, Prince Rupert, and Queen Anne (when Princess of Denmark). F., who wrote in 1662 an essay on *The Art of Graveing and Etching*, died May, 1691.

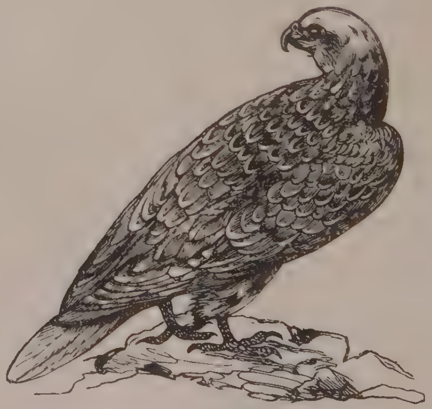
Fakir', a name derived from the Arabic *faquír*, 'poor,' and applied, especially in India, to religious mendicants who wander through the country, and are universally respected for their sanctity and self-mortification. It does not appear that their austerities have any necessary connection with their particular faith; but they are rather to be derived from the singular spirit of devotion and indifference to pain which has characterized the religions of the East from the earliest times. They bear a close resemblance to the hermits of primitive Christianity, and also to the mendicant friars of later history. In India they are divided into classes, named either from their founders, or from a peculiarity of habit or doctrine. Some are accustomed to inflict the severest wounds upon themselves, or to endure discomfort or even actual pain from such practices as, holding an arm extended till it becomes immovable, being suspended head downwards from the branch of a tree, or being buried up to the chin in the ground without any protection to the head from sun, cold, rain, or insects; and this without complaint or expression indicative of a desire to escape from their bodily miseries. They travel from one end of the peninsula to another, and have been known to penetrate as far as Europe. In Persia and Turkey this class of holy men is represented by the dervishes. Their counterparts among the Hindus are termed Sanyasses and Byragees. According to the last census there were in India 2,717,861 persons who were classed as Fakirs, devotees, &c.

Fakirs performing penance.

Falaise' (Fr. 'the cliff-town,' from Scand. *fell* or *felsen*, 'a rock'), a town in the department of Calvados, France, built on a natural terrace close by a rocky height, 23 miles S.E. of Caen. Remains of its ancient walls, and of the castle in which William the Conqueror was born, still exist. Its churches, and many of its houses, recall vividly the Middle Ages. The chief industry, the trade in leather and furs, has been carried on for centuries. Pop. town 8313; arrond. 48,489.

Castle of Falaise.

Fal'con, the name applied to various genera and species of Raptorial birds, included in the family *Falconidæ* (q.v.). In the typical genus *Falco*, the bill is strong and toothed at its tip. The cere is small, and the nostrils are round, having a central tubercle. The wings have their second and third quills longest, the first and second being notched near the tip. The feathers of the tarsi hang over the knee. The toes are long and powerful, and the talons strong. These birds are among the most typical of the *Raptores*. They exhibit the special structure of that group, and exemplify the bold, wary nature common to the eagles and other forms. The best-known falcons are the Jer or Gyr F., the Peregrine F., the Hobby, the Lanner, the Merlin, the Kestrel, the Notched F., &c. The name F. is given to various members of the kite sub-family (*Milvinæ*). Thus, the Crook-billed F. and Cayenne F. belong to this sub-family. The American Red-throated



Gyr-Falcon.

F. belongs to the sub-family *Polyborinæ*, and the Rough-legged F. to the *Buteoninæ* or Buzzards.

Falco'ne, Aniell'o or **Angelo,** an Italian painter, was born at Naples in 1600, took part in Masaniello's insurrection, afterwards visited Paris, and died at Naples in 1665. Salvator Rosa was one of his pupils. His fame as a painter of battle-pieces was at one time so great as to earn him the title, in Italy, of 'Oracle of Battles.' His paintings are spirited and natural in design, and brilliant without being glaring in colour. See Lanzi's *Storia della Pittura*, vol. ii.

Fal'coner, William, an English poet, born at Edinburgh, 11th February, 1732; entered the merchant service; and when eighteen became second mate of a vessel which was wrecked (1750) off Cape Colonna, F. and two others alone being saved. This disastrous voyage is the subject of F.'s *Shipwreck*. Through the influence of the Duke of York, to whom the *Shipwreck* (1762) was dedicated, F. joined the navy in 1763, and was lost at sea, when purser of the *Aurora* frigate, in 1769. The *Shipwreck* has passages of vigorous and pathetic description, but is essentially commonplace in structure and idea; while the contrast between F.'s frequent nautical technicalities and the names and conversation of his characters, who seem borrowed from a Queen Anne pastoral, jars upon the reader, and lessens the interest. F. wrote several verses of circumstance deservedly forgotten; *The Demagogue* (1765), an attack on Wilkes and Churchill; and a *Universal Marine Dictionary* (1769). The once popular song, *Cease, rude Boreas*, has also been attributed to him. See the Memoir by Stanier Clarke prefixed to his edition of the *Shipwreck* (1804), and that by Mitford in the Aldine edition of F.'s *Poetical Works*.

Fal'conet, a small cannon in use during the 15th and 16th centuries, which discharged a ball weighing about 1¼ lb.

Fal'conet, Étienne Maurice, born at Paris in 1716, became a pupil of Lemoine, and for his statue of Milo of Crotona was elected an Academician at Paris in 1745. On the invitation of the Empress Catharine II. he proceeded to St. Petersburg, where he spent twelve years over a colossal bronze equestrian statue of Peter the Great, which is considered admirable and his best work. He returned to France in 1778, wrote a commentary of Pliny's sculpture and painting, and died at Paris in 1791.

Falcon'idæ, a large and well-known family of Raptorial birds, the members of which are distinguished by the fact that the bill has a partial cere, and is of compressed form, having the keel curved from the cere to the tip. The wings are long and pointed, and the tail broad. The tarsi are varied and of strong make, the claws being curved and sharp. The head and neck are feathered, and the eyes appear sunk and overarched by the brow. This family includes several well-marked sub-families. Chief of these are the *Aquilinæ* or Eagles (q.v.), the *Polyborinæ* (including the Caracaras and Brazilian kites), the *Buteoninæ* or buzzards, the *Milvinæ* or kites, the *Falconinæ* or falcons proper, and the *Accipitrinæ* or sparrow-hawks, &c. The F. are found in all parts of the world.

Fal'conry or **Hawk'ing,** the art of training Falcons (q.v.) and birds of Raptorial kind to pursue other birds in flight and capture them. The practice of F. dates from a remote period. It was probably derived from the East, and was most in vogue in England during the Middle Ages. The birds chiefly pursued as game were the heron, partridge, lark, pigeon, wild-duck, &c. The falcons used in the sport were the Peregrine (q.v.) and Gyr-Falcon (q.v.); but the Goshawk (q.v.) and Sparrow-Hawk (q.v.), birds of less powerful flight than the two former species, were also employed. The female birds, as a rule, were most valued by the falconer. They seemed to possess powers of endurance, agility, and cunning wanting in the males. The species which was most in favour was the peregrine falcon, which, when taken early from the nest and trained to the sport, excelled the other species in dexterity, and in the readiness with which it lent itself to the exercise. The course of training undergone by these birds was of a very complete and lengthy character. The falconer preferred to take the bird from the nest, but his art was, in lieu of nestlings, also practised on older birds. The young or nestling was named the *eyess*, and on being taken from the nest was carefully tended by the falconer, and was lodged in some outhouse, being fed on flesh of various kinds. Becoming thus familiarised with man, the *eyess* grew tamer. The food was generally attached to a *lure*—an apparatus consisting of a bunch of feathers, a cord, and tassel. The object of thus feeding the falcon was to accustom it to recognise the lure, and to associate it with its food; this association afterwards serving to recall and entice the bird to the falconer when its chase was unsuccessful. Another form of lure was that known as the *tabur stycke*, consisting of a short stick on which the semblance of a bird was borne; and a third form of lure was named the *drawer*. As the bird's powers of flight became developed, the lure was used to entice her back to hand after permitting her to fly abroad. The operation which was most important in the falcon's training is that known as *hooding*. This consisted in placing on the bird's head a close-fitting leather cap, made so as to cover the eyes, but to allow the protrusion of the beak. This procedure often repeated had the effect of making the bird tame and docile. The bird thus hooded was set on a 'block' of wood, and was secured thereto by an apparatus of *bells* and *jesses*; the former being two hollow metal globes attached by *bewits* or leather straps to the legs of the bird; whilst the jesses were leather bands 5 or 6 inches in length, and fixed to each leg below the bells. The jesses, in turn, were attached to another strap—the *leash*—by means of *varvels*, or two rings of silver, on which the owner's name was engraved. The apparatus thus described ultimately became permanent parts of the falcon's harness; and in addition to these structures, a long cord, named the *creance*, was tied to the leash, and served to afford further and wider scope to the movements of the bird in training. It was also trained to sit or perch itself steadily on the hand of its master or mistress. The falcon was further taught to circle and hover round the falconer, the lure being made use of to this end. The bird mostly pursued of old was the heron. The prey or *quarry* was attacked in its homeward flight against the wind. The falcons being unhooded, were cast off, and sought a greater elevation than the prey, on which they successively *stooped* or *swooped* down. If the first missed its aim, the second hawk *stooped* in like manner, the heron being soon seized. The falconer drew off the hawks from the prey after all three had descended, luring them by means of live pigeons and other birds. The heron was rarely killed outright, but was frequently liberated, being first marked with the name of the falcon's owner. It often proved a powerful adversary while on the ground, striking at the falcons with its powerful beak, and sometimes transfixing them. The Merlin (q.v.) is chiefly used for the capture of larks and other small birds, and the goshawk may be employed to secure pheasants, and even rabbits and hares. A special terminology, of which some examples have been given, characterized the sport. The most celebrated training-place for falconers was the village of Falconswaerd, near Bois-le-Duc, in Holland. Several old and a few modern treatises exist on F.; the best-known of the latter is Freeman and Salvin's *Falconry*. Within recent years there has been an attempt to revive the ancient pastime of H.

Faler'ii, an Etruscan city, W. of the Tiber, and N. of Mount Soracte. It first appears in Roman history (B.C. 437) as the enemy of Rome, and after the fall of Veii it was besieged by the Romans under Camillus, whose treatment of the treacherous schoolmaster is a familiar fable. The friendly relations then established with Rome were broken on several occasions, and finally (B.C. 241) the inhabitants (called *Falisci*) were expelled from their old city and founded a new one, on whose site the 'Colonia Falisca' was subsequently established by the triumvirs. In the Middle Ages another city, named *Civita Castellana*, appeared on the site of the old F.

Faler'nian Wine occupied the second rank among the ancient wines of Italy. It was produced in a district of Campania, stretching from the Massican Hills to the river

Vulturnus, and known as the *Falernus Ager*. The best variety was the *Faustianum*. Owing to neglect, the vineyards ceased to produce good crops, and before the 6th c. they had been grubbed up and the soil was cultivated for other purposes.

Falie′ri, an ancient Venetian family, several members of which held high offices in the state, and one of whom took part in the election of the first doge in 697. The most notable was **Marino Faliero**. He was born about 1284, and at the siege of Zara in 1346 defeated 80,000 Hungarians, at the same time checking the besieged. Appointed commander of the fleet, he took Capo d'Istria, and afterwards, while absent as ambassador at Rome, was chosen doge in 1354. In the following year, enraged because the Council of Forty passed what he thought too slight a sentence on a nobleman, Michele Steno, who had libelled the doge's young wife, F. conspired to overthrow the republic and win the sovereignty. The plot was betrayed, and the chief conspirators were executed. F. was beheaded, 17th April, 1355, on the stone staircase where the doges took the oath after election. F. seems to have been brave, violent, and unforgiving. He was a personal friend of Petrarch, who mentions him in his letters. Among the pictures of the doges in the hall of the Grand Council is a space veiled and inscribed 'Hic est locus Marini Faleiro, decapitati pro criminibus.' See Byron's *Marino F.*, Marino Sanuto's *Vite de' Duchi de Venezia*, and H. Greenhough Smith's *The Romance of History*.

Fal′kirk (perhaps 'the kirk on the *Vallum*' or wall of Agricola; the Gaelic name is *Eglais-bhrac*, 'the speckled kirk'), a town of Stirlingshire, Scotland, 22 miles E.N.E. of Glasgow, and 25 W. by N. of Edinburgh. It is in the immediate vicinity of extensive ironworks, of which the best known are the Carron, which have given name to a peculiar kind of ironmongery, and to a piece of ordnance known as a carronade, because both are made at Carron. Several fire-brick, tile, and chemical works are in the neighbourhood. F. has also famous trysts or cattle-fairs, known by its name. Two battles have occurred in the neighbourhood, the first in 1298 between the troops of Edward I. and the Scotch under Wallace, in which the latter was completely defeated; and the second between the royal forces and those of the Chevalier, Prince Charles Edward Stuart, in 1746, in which the former were repulsed. F. became a royal burgh in 1646. Along with Airdrie, Hamilton, Lanark, and Linlithgow, it sends one member to Parliament. Pop. civ. par. 30,731; entire town 19,769; and parl. burgh 16,620.

Falk′land, an ancient burgh of Fifeshire, Scotland, 10 miles S.W. of Cupar, its charter dating from 1458. F. Palace, a famous royal residence, has given distinction to the place. It is mentioned by Sir David Lyndsay in his *Complaynt of the Papingo* as the 'forteress of Fyfe.' James IV. lived here, and on his death his widow, Henry VIII.'s sister, was imprisoned within the Palace for a time. James V. died here in 1542. In 1650 Charles II. resided here for a few days. Hand-loom weaving is the chief employment. Pop. civ. par. 2470; town 1045; and royal burgh 959.

Falkland Islands, otherwise the **Malouines′** or the **Malvi′nas**, an archipelago in the S. Atlantic belonging to Britain, and lying 300 miles E. of Magellan's Strait. They consist of two large islands, E. and W. F., and of about 200 smaller, with an area of 6500 sq. miles, and a pop. of 1789, of whom 1666 are natives. They were discovered in 1593 by Richard Hawkins, but it is only since 1833 that they have formed a British settlement, though they have been a British possession since 1771. Previously they had belonged in succession to France and Spain. These islands are principally valuable from their numerous commodious harbours. The pasturage is good, and the surrounding seas teem with fish; seals also abound. Port Stanley, in E. F., is the seat of the government, which consists of a Governor, assisted by an Executive and a Legislative Council. Neither military nor naval forces are maintained here. The chief exports are sheep, frozen mutton, wool, tallow, hides and skins. Sheep, cattle, and horses are reared here; of the first-named there are close on 700,000.

Falkland, Lucius Cary, Viscount, was born at Burford, Oxfordshire, in 1610. His father, Henry Cary, Viscount F., filled for a time the post of deputy-lieutenant in Ireland, and F. was educated at Trinity College, Dublin, and St. John's College, Cambridge. Inheriting from his grandfather an estate worth £2000 a year, he devoted himself to learned research, and was on terms of friendship with such men as Selden and Chillingworth. In 1640 he entered the House of Commons as member for Newport in the Isle of Wight, and at first took an active part on the side of Hampden and Pym, and against the illegalities of the king and his tools. Ultimately, however, he separated from the popular party. After a vain attempt at mediation between King and Parliament, he espoused, though with sad forebodings, the side of the former in the civil war, fought gallantly at Edgehill, and fell in the first battle of Newbury, 20th September, 1643. He was an author both in prose and verse, his best-known work being a *Discourse on the Infallibility of the Church of Rome*. Green, in his *Short History of the English People*, p. 525, finely describes him as 'the centre of a circle which embraced the most liberal thinkers of his day, a keen reasoner and able speaker, whose convictions still went with the Parliament, while his wavering and impulsive temper, his love of the Church, his passionate longings for peace, his sympathy for the fallen, led him to struggle for a king whom he distrusted, and to die in a cause that was not his own.' See Forster's *Historical and Biographical Essays*.

Fall, The, is the name given by theologians to the sin committed by our first parents in disobeying the command of God and eating of the forbidden fruit in the garden of Eden, as described in the third chapter of Genesis. The details of that narrative, which are familiar to every one, have always been interpreted by theologians with a greater or less departure from the literal sense. Thus the ordinary interpretation is that the serpent was only a figurative designation of Satan, or actually Satan in disguise, or, at least, that the serpent, if real, was employed by Satan as his organ or instrument. According to this view, the effects of the disobedience recorded in the narrative were merely subordinate expressions of the divine displeasure, and consequences of that which was the real and primary effect, namely, spiritual death or absolute ruin analogous to that of the fallen angels; so that the F. is the very basis of the whole system of Christian theology, necessitating, as it does, the Atonement, which indeed is obscurely predicted in the words of God to the serpent:—'It (the seed of the woman) shall bruise thy head, and thou shalt bruise his heel.' Others, however, regard the serpent of the narrative as a real animal, but the narrative itself as a fable or allegory intended to explain philosophically the origin of evil, physical and moral, in which allegory the tree of Life represents spirituality, the tree of Knowledge sensuality, the serpent being the symbol of pleasure. According to this view, which has been held by some of the learned from the earliest times, *e.g.*, Philo, Clement of Alexandria, Origen, Eusebius, Augustine, &c., the allegory teaches 'that as soon as man's mind, through the weakness and treachery of his senses, became captivated and seduced by the allurements of lust and pleasure, he was driven by God out of Paradise, that is, lost and forfeited the happiness and prosperity which he had enjoyed in his innocence.' For the theological bearings of the F., see ORIGINAL SIN.

Traditions of a F. from a state of original innocence and happiness are to be found among every nation possessing a cosmogony and theogony. According to the Hindus, the first man was tempted by the Supreme Being, whose special symbol was the serpent, by means of a blossom dropped from heaven of the sacred Indian fig. Instigated by his wife, who had derived her being from him, the man determined to possess the blossom, with the expectation that it would make him immortal, and on gathering it actually believed himself to be so; but on the appearance of the deity the pair were banished from the Paradise in which they were. The Persian account, contained in the Zend-Avesta, is as follows:—'The first couple lived originally in purity and innocence. Perpetual happiness was promised to them by Ormuzd, the creator of every good gift, if they persevered in their virtue. But an evil demon was sent to them by Ahriman, the representative of everything noxious and sinful. He appeared unexpectedly in the form of a serpent, and gave them the fruit of a wonderful tree, Hom, which imparted immortality, and had the power of restoring the dead to life. Thus evil inclinations entered their hearts; all their moral excellences were destroyed. Ahriman himself appeared under the form of the same reptile, and completed the work of seduction. They acknowledged him instead of Ormuzd as the creator of everything good, and the consequence was that they forfeited for ever the eternal happiness for which they were destined.' A likeness has been remarked between the Greek myth of the garden of the Hesperides—in which was a tree with golden apples, guarded by a speaking dragon, the possession of which conferred immortality—and the story in Genesis, for which also some of the designs might stand as illustrations which appear on the ancient Greek gems and Etruscan pottery. To account for the similarity existing among all these traditions one school of divines supposes them all to have been derived from the Hebrew Scriptures, the oldest literature in existence; another school holds the theory that the Jews derived their literature on the early history of the human race from the Babylonians and Persians during their captivity in Babylon. The latter view has moreover received apparent confirmation from the discoveries of Chaldæan literature made by G. Smith. On the terra-cotta tablets dug from the ruins of Assyrian cities by himself and others he has discovered accounts of the creation, F., deluge, &c., corresponding almost exactly, as far as the narrative on the tablets yet found goes, with those in Genesis, except that they are fuller. See Kalisch's *Commentary on Genesis*; C. Middleton's *Works*; G. Smith's *Chaldæan Account of Genesis*.

Fall'acy (Lat. *fallacia*) is the technical name given in logic to an error which arises not in observation by the senses, but in reasoning, or in the interpretation of what is directly seen. The line between fact and inference, between the original sense-impression and the form and colour which it receives from the mind, is no doubt hard to trace. A great many unapparent details are filled in unconsciously, and therefore the leading rule of all scientific inquiry is to remove, or minimise, or allow for the errors of observation. It is a F. to omit observation altogether, or to unduly limit its range; but every F. assumes a fact truly ascertained, which the mind then proceeds to distort. Fallacies might, therefore, be classified according to the particular kind of reasoning, inductive or deductive, in which they occur. In books on formal logic, where alone syllogistic reasoning is (at least properly) treated, they are classified according to the canon of consistency violated. Elsewhere, as in Bentham's *Book of Fallacies*, or Bastiat's *Sophismes Économiques*, the leading errors on a particular subject are collected and analysed. But before we reach fallacies of inference or reasoning, there is (1) A class of natural prejudices, called by Mill 'fallacies of simple inspection,' which are held by the mind as self-evident, *i.e.*, without conscious reference to evidence. The strength of these prejudices often depends on the feelings as a remote predisposing cause, but the form of intellectual error is much the same in all cases, viz., that the course of nature must correspond to the current of human thought. Under this class come most cases of omens, unlucky days or names, &c. Similar fallacies, however, may be found in philosophy and in cultivated opinion—*e.g.*, things we cannot think of apart must exist together, and things which we cannot think of together cannot coexist; every clear idea must correspond with an object—a principle at the root of the systems of Descartes, Spinoza, and Leibnitz; a thing can act only where it is; nature always works by the simplest means; the belief in the separate existence of abstract qualities or class names; the principle of sufficient reason, according to which nature does a certain thing because man can see no reason why she should not; the idea (held by Bacon) that there must be only *one* cause of the sensible qualities of objects; or that entertained by many metaphysicians, that the conditions of the phenomena must, or probably will, *resemble* the phenomena itself, exemplified in the medical doctrine of signatures, that the virtue of every substance is pointed out by some external character. (2) Another important class of fallacies is called by Mill 'fallacies of observation,' which consist in either *non-observation* or *mal-observation*. The mind is moved by the marvellous, and is also biassed by preconceived opinion or the desire to establish a particular conclusion. Hence comes a disposition not to observe, as in the famous Copernican dispute about the stone falling from the ship-mast. Or where a particular instance is examined, material circumstances may be overlooked, *e.g.*, the phlogistic theory, in which the gaseous products of combustion were overlooked. Mal-observation arises for the most part from the tendency, above alluded to, to confuse perception with inference, or sensation with judgment. (3) Fallacies of *generalisation*, in which inferences are drawn from the order of things in the known to that in the unknown universe, *e.g.*, the attempts made to analyze into one things generically distinct, as heat, light, and sensation into motion; the 'induction by enumeration,' or *per enum. simplicem*, of the ancients. A more special form is that called in formal logic *post hoc ergo propter hoc*, where a true cause is inferred from casual conjunction, as in the line of political reasoning which justifies existing institutions from the contemporaneous prosperity of the commonwealth. Common language is saturated with metaphor, especially with subtle exchanges of meaning between the bodily and the spiritual, and it is difficult to state a proposition on any complex subject without tacitly suggesting several very questionable trains of thought. (4) Fallacies of *ratiocination*, or what are generally given in works on formal logic. These include wrong conversion of universal affirmative and of hypothetical propositions. It is constantly supposed that, because the premises cannot be true if the conclusion is false, therefore the premises cannot be false if the conclusion is true. In the opposition of propositions, too, it is often forgotten that contrary propositions, though they cannot both be true, may both be false. The ordinary syllogistic fallacies all consist in having more than three terms, either expressly or by undistributed middle or *illicit process* of extremes. Frequently the premises are changed in argument, as in the scholastic *a dicto secundum quid ad dictum simpliciter*, an absolute rule is substituted for one qualified. Examples of this are the mercantile theory in economics (which left out of view in its conclusion the purchasing power of money), and the argument that tithes fell on the landlord because, *under the tithe system*, the owner of tithed land received less than the owner of tithe-free land. (5) Fallacies of *confusion*, which include all those fallacies that consist not so much in mistaking the force of evidence, as in an indistinct notion of what the evidence is. The chief is the F. of an ambiguous middle, where the middle term of a syllogism is ambiguous, or one of the syllogistic terms is taken in one sense in the premises, and in another sense in the conclusion. Etymology in this way becomes a prolific source of erroneous reasoning. In the F. of composition and division something is established separately concerning each *single* member of a certain class, and then the same is inferred of the whole *collectively*. The *petitio principii*, or reasoning in a circle, occurs where the premise is the same as the conclusion, or can be proved from it alone. It is quite common, when discussion does not run to first principles, to prove A by B, though B really depends on A for proof. The conclusion, abstractly stated, often serves for a premise, and the words nature and essence are very useful in this connection, and what Bentham calls 'question-begging appellatives,' *e.g.*, innovation. The *ignoratio elenchi* consists in the establishment of an irrelevant conclusion, a particular for a universal, or some proposition which excites the feelings. See the treatises on logic by Whately, Mill, De Morgan, and Sir William Hamilton.

Fall'en Angels. It appears from certain passages of Scripture that some of the angels 'kept not their first estate' (Jude 6), but 'sinned' and were 'cast down to hell' (2 Pet. ii. 4). The Apocalypse, with greater minuteness, tells that the archangel Michael and his angels made war against the dragon (Satan) and his angels, and prevailed, and the dragon was cast out, and his angels were cast out with him (xii. 7-9). These F. A. are thus the Demons (q.v.) who are so ready to obey the behests of their master the Devil in afflicting mankind, although St. Jude and St. Peter speak of their being bound in chains till the judgment day. It also appears from Eph. i. 21, vi. 12 (*cf.* iii. 10, Col. i. 16, 1 Pet. iii. 22), that the same grades existed among them as among those who had not fallen. As to the nature of the sin which led to their fall various opinions have been held. Some have thought it was lust, founded on Gen. vi. 2; others envy; but it is generally held to have been pride, from 1 Tim. iii. 6.

It is asserted by some, however, that all this doctrine of the Devil and his angels was derived by the Jews from the dualistic ideas of the Babylonians and Persians during their Babylonian exile (see DEVIL), and that the allusions to the F. A. in the New Testament are derived from the Book of Enoch (q.v.), in which the following passage occurs:—'To Michael also the Lord said, Go, and announce his crime to Samyaza and to the others who are with him, who have been associated with women. . . Bind them for seventy generations underneath the earth . . . until the judgment which will last for ever be completed. Then shall they be taken away into the lowest depths of the fire in torments, and in confinement shall they be shut up for ever' (x. 15, 16). Be that as it may, the Babylonians had fuller traditions than the Jews about the fall of the dragon and his angels, as appears from Chaldæan literature discovered comparatively recently. See G. Smith's *Chaldæan Account of Genesis; Book of Enoch.*

Fallmeray'er, Philipp Jakob, a German historian and traveller, was born of poor parents at Tschötsch, near Brixen, in Tyrol, 10th December, 1791. He studied at the universities of Salzburg and Landshut, devoting himself chiefly to history and philology. After serving in the Bavarian forces against Napoleon he was made a master in the gymnasium at Augsburg, and afterwards held the chair of philology at Landshut. From 1831 to 1834 he travelled in Egypt, Palestine, Syria, and Greece; and in 1840, and again in 1847, visited the East. He was elected to the Frankfurt Assembly, but shortly retired from public life. He died at Munich, 26th April, 1860. His *Gesammelte Werke* were edited by Thomas in 3 vols. (Leipz. 1861).

Fallo'pius or **Falloppio, Gabrie'llo,** a famous anatomist, was born at Modena about 1523. He studied science in various universities throughout Europe, and in 1551 became professor of anatomy at Pisa. He died in 1562. F. was one of the earliest restorers of anatomy, but several discoveries claimed by him have been traced to Greek and Arabic physicians—*e.g.*, the two tubes called the *Fallopian tubes* were not discovered by him, having been accurately described by Herophilus and Rufus of Ephesus more than 300 years B.C. See the collected edition of his works, entitled *Opera genuina omnia, tam practica quam theoretica* (Ven. 1584; Frankf. 1600).

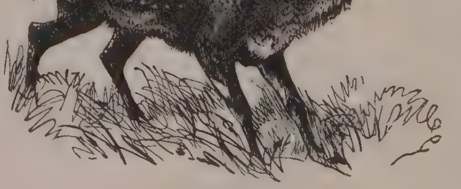
Fallopius, Aqueduct of, a canal in the fibrous portion of the temporal, which transmits the facial nerve. It passes outwards and backwards over the labyrinth of the Ear (q.v.), and terminates at the stylo-mastoid foramen. On the anterior and upper surface of the bone there is a small foramen named the *hiatus Fallopii*, which transmits the large superficial petrosal nerve.

Falloux, Frédéric Alfred Pierre, Vicomte de, a French writer and statesman, was born at Angers in May, 1811. His family, as a reward for loyalty, was ennobled at the Restoration, and he himself showed his legitimism in two works—the history of Louis XVI. and the history of Pope Pius V.—published in 1840 and 1844 respectively. In 1846 he was elected the representative of Maine-et-Loire, and in 1848 favoured the formation of a republic. On Louis Napoleon becoming President he was appointed Minister of Public Instruction, having previously reported in favour of doing away with the national workshops. (See article ATELIERS NATIONAUX). In 1849 he retired from office, became a member of the French Academy in 1857, and occupied himself with literature till his death in 1886.

Fall'ow (Old Eng. *fealo*, a pale or reddish yellow; *cf.* Ger. *falb* and *fahl*, allied to Lat. *fulv*-us), a term in agriculture applied to land left bare of any crop for a season to free it from weeds, and to improve the mechanical condition of the soil. The practice of fallowing is one of very ancient origin, having been inculcated in the Mosaic law, which commanded that the ground should rest every seventh year. It was well known to the ancient Romans, by whom fallowing was introduced into England; but it was not till about the beginning of the 18th c. that the practice was begun in Scottish agriculture. Originally all kinds of land were fallowed indiscriminately; but the introduction of green crops, such as potatoes and turnips, had the effect of greatly limiting the area of land to which the system was applied. Now what is termed 'bare or summer F.' is only applied to very stiff retentive clay soils such as are found in the 'carse' land of Scotland, the fen clays of Huntingdon and Cambridgeshire, and the weald clay of Kent and Sussex in England. On the lighter soils the periodical cultivation of green crops effects the same object, and is known as 'green-crop F.' Land under bare F. is ploughed up immediately on the removal of the crop, and so exposed to the rains, frosts, and atmospheric influences of the winter. In spring it is again ploughed across, and on very stiff soils it may receive as many as six or eight ploughings, besides scarifying and harrowing throughout the season. The soil so treated is thoroughly exposed to the oxidizing influences of the atmosphere, and to the action of the carbonic acid contained in the air, as well as that dissolved in every shower of rain. While the land is thereby rendered more mellow and friable, the mineral substances which enter into the constitution of cultivated plants are fitted for assimilation, and injurious weeds are at the same time thoroughly eradicated. Of the 56,771,728 acres constituting the total area of Great Britain, there were in 1893 514,558 of bare fallow or uncropped arable land, and in 1894 the amount had been reduced to 375,701; while of the 20,706,258 acres constituting the total area of Ireland, there were in 1893 22,038, and in 1894 19,639 as bare fallow or uncropped arable land.

Fallow Chat. See WHEATEAR.

Fallow Deer, a species of *Cervidæ* or Deer (q.v.) nearly allied to the Stag (q.v.), but distinguished by its spotted coat, its smaller size, and the spreading palmated horns. The colour of the F. D. is a reddish brown spotted with white, and usually exhibiting a few whitish lines on the body. In winter it assumes a darker tint. The average height is about 3 feet at the shoulders. The food consists of grasses of various kinds. The original habitat of the F. D. is unknown. Tradition points to S. Europe or W. Asia as its probable home; but it is rarely, if ever, met with save in a domesticated state.



Fallow Deer.

F. D. are largely kept in parks and grounds. They are very docile, and readily tamed, the herd being governed by a 'master deer.' The flesh affords good venison, and from the skin leather is manufactured; while the shavings of the horns are used in making ammonia—hence popularly named 'hartshorn.' The females are hornless. The young are named *fawns*, the females *does*, and the males *bucks*.

Fall River, a city of Bristol county, Massachusetts, U.S., at the mouth of the Taunton River, on Mount Hope bay, 48 miles S. of Boston. It has calico printworks, woollen factories, cotton mills, large ironworks, and a bleaching business. It has also deep-water navigation, and is a port of steam-boat communication with New York. It possesses a free library, two public parks, daily and weekly newspapers, &c. F. R., which was founded in 1659, was incorporated as a town in 1803, and as a city in 1854.—*Fall River*, which gives name to the town, is a small stream that joins the Taunton River not far from its mouth. It is of great utility for its water-power. In its last half-mile it descends about 130 feet, its banks being lined with extensive mills.

Fal'mouth, a town of Cornwall, England, at the mouth of the Fal, and formerly a station for the packet-boats to the S. of Europe and the W. Indies, 92 miles S.W. of Exeter and 266 W.S.W. of London. It is connected with Plymouth by railway. The harbour, which is of unusual depth and capacity, was formerly defended on the E. and W. respectively by St. Mawes and Pendennis castles, built by Henry VIII. and strengthened by Elizabeth. The chief exports are tin, copper, granite, and fish (pilchards, oysters, &c.); the chief imports are timber, grain, flour, wine, hemp, fruit, and guano. The mun. bor. of F., that of Penryn, the parish of F., parts of the parishes of St. Gluvias, Budock, and Mylor, and the village of Flushing, return one member to Parliament. Pop. reg. subdist. 14,076; civ. par. 6925; mun. bor. 4737.

False Bay, a capacious inlet of the Southern Ocean in Cape Colony, S. Africa, the S.W. boundary of which is formed by the Cape of Good Hope. It is about 22 miles long, and as many broad. The northern part of F. B. is called Simon's Bay and, being naturally well protected and affording good anchorage, has been chosen as the station of the British fleet in S. African waters. Several forts and batteries increase the security of the harbour in case of war. Usually a fleet of 15 men-of-war is stationed here and along the W. coast.

False'hood, Le'gal, is defined to be a fraudulent imitation or suppression of truth to the injury of any one. *Forgery* and *swindling* are the main branches of the crime. See these articles; also FRAUD.

False Impris'onment consists in the unlawful detention of the person. All forcible confinement, even in a street, is by the law regarded as imprisonment. Legal restraint of the person must be by warrant of a court of law or legal officer, or by special power warranted by statute or common law, such as the obligation on every man who sees an act of felony committed to arrest the felon. (See APPREHEND.) F. I., however, may arise from executing a legal process at an illegal time, as by arresting in a civil process on Sunday. The imprisonment being committed under error is no excuse. An action for damages sustained by the party confined for loss of time and liberty lies with him against the wrongdoer. The corresponding Scotch law term is Wrongous Imprisonment (q.v.). In England the safeguard of the subject is his power to require a court of law to issue in his favour a writ of Habeas Corpus (q.v.) *ad subjiciendum*.

False Point, a harbour at the mouth of the Mahanadi River, in the district of Cuttack, province of Bengal, British India, 196 miles S. of Calcutta. In 1860 it was first formed into a port, though a lighthouse had been previously erected and buoys laid down; it now ranks as the best harbour between the Hoogley and Bombay. Ships cannot proceed up the river, but native boats now bring down produce from the town of Cuttack and Orissa through the Kendrapara Canal, and a small steamer serves between the harbour and Cuttack. Over 150 vessels, representing a tonnage of 200,000 clear the port, and the trade, which consists chiefly of rice and oil-seeds, is now estimated at £300,000, whereas thirty years ago it barely reached £10,000. The place is now less unhealthy than it used to be. The Orissa famine of 1866 first brought the capabilities of F. P. prominently to the front and since then connecting canals have been made and it has been recognised as the best entrepot for the province.

False Pretences, Obtaining Money by. To constitute this offence there must be a specific fraudulent misrepresentation of matter of fact by which property is obtained. If a man purchase goods, promising to pay for them next day or on some other specified day, should he fail to do so the failure is merely in an engagement. But if he obtain the goods in exchange for a cheque on a banker, stating falsely that he has funds in hands of the banker to meet the cheque, he commits the crime in question. But in a case in which a man induced a banker to pay his cheque by drawing a bill on one on whom he had no right to draw, the act was adjudged not to be a false pretence because he only obtained credit. It would have been otherwise had he obtained money on the bill. The distinction is a fine one, and obtaining credit by fraud is now punishable under the Bankruptcy Acts. Statutes 24 & 25 Vict. c. 96 and 27 & 28 Vict. c. 47 consolidated previous legislation on the subject, and made the offence a misdemeanour and placed the punishment at five years' penal servitude or two years' imprisonment. A minor obtaining money or goods by pretending to be of age may be punished as a common cheat. Under the Acts, any one fraudulently inducing another to sign his name or to execute any document is guilty of felony, and liable to three years' penal servitude. Bills of exchange and all negotiable securities are included under this provision.

In Scotland the crime in question is punishable under common law. See FRAUD, SWINDLING.

False Return, Legal, renders the officer who makes it liable in damage.

False Swearing. See PERJURY, AFFIRMATION, DECLARATION. Under the English Bankruptcy Acts, if the bankrupt make a false declaration, he is guilty of perjury. Under the Scotch Act, any one under oath is liable to prosecution at the instance of the Lord Advocate, or of the trustee in the sequestration, with concurrence of the Lord Advocate.

Falsett'o, a high register possessed by many male voices. It is seldom agreeable in itself, or used in serious concerted music.

False Verdict may arise from improper behaviour of the jury among themselves, or of the plaintiff towards them, by which their verdict is influenced, from misdirection of the judge, or from exorbitant award of damage. Formerly a writ of attaint could be issued at the application of the injured party against the jury; if they erred on a point of law and according to the judge's direction no steps could be taken against them. Now, the verdict is set aside and a new trial granted. But if two juries return the same or a similar verdict, a third trial is seldom conceded. The universal rule now is that a juryman cannot on any ground be punished for his verdict.

False Weights and Measures. Possession of these for purpose of trade is in England punishable under common law. The penalty is fine or imprisonment. In Scotland the users of false weights knowing them to be below the standard they profess to be (which will be presumed against the users) are by statute liable to punishment by penal servitude or imprisonment.

Fal'sifying Rec'ords. Any one forging or fraudulently altering, &c., any original document in legal process or any copy of it used or intended to be used in evidence in any court (named in section 27 of statute 24 & 25 Vict. c. 98) is liable to be punished with penal servitude for any term not exceeding seven years and not less than three, or with imprisonment for a term not exceeding two years. And any official, whose business it is to furnish certified copies of documents, wilfully certifying a false copy is guilty of felony, and is liable to the punishment of penal servitude for three to seven years or of imprisonment for two years. See Statute 24 & 25 Vict. c. 98.

Falstaf, Fastolff, or **Falstolf, Sir John,** a famous English soldier, was born in Norfolk in 1377. He took a prominent part in the battle of Agincourt (1415) and in subsequent military matters in France. After the death of Henry V. he was appointed governor of Maine and Anjou and died in 1459.

Fal'ster, a Danish island in the Baltic, 2½ miles S. of Zealand, and included in the amt of Maribo. It is flat, low, and rather unhealthy, but yields much corn and timber, and is celebrated for its fruits. Nykjöbing, the capital (pop. 3645), is on the Guldborgsund, and has a cathedral, castle, and some trade. F. became a royal domain in the 16th c., and was the chief residence of several Danish queens, of whom the last was Charlotte Amalie, 1700-14. Area 182 sq. miles; pop. 32,656.

Fa'lun, or **Fah'lun** (otherwise *Gamla Kopparberget*, 'the old copper-mine'), the capital of the 'län' Kopparberg, Sweden, on the N. shore of Lake Runn, 120 miles N.W. of Stockholm by railway. It has long been famous for its copper-mines, which are now, however, much less profitable than of yore. The mines were formerly the most extensive of the kind in Sweden, and indeed in the world. About the middle of the 17th c. the yield was 3000 tons. The smoke from the neighbouring copper furnaces has given the town a dingy appearance. F. has also a mining-school and museum, cotton and flax mills, besides manufactures of cow-hair cloth, leather, tobacco, nails, &c. The fumes have destroyed the vegetation on the surrounding hills, yet the inhabitants do not appear to have suffered in their health. It is said that this adulteration of the atmosphere acted as a protection in these parts during the cholera visitations to Sweden. Pop. 7982.

Fa'ma (Lat.; Gr. *Phēmē*, or *Ossa*) was the personification of rumour or report. She is called by various ancient poets the messenger of Zeus, the daughter of Hope, and the daughter of Terra. According to Ovid her abode is composed of sounding brass and many passages lead thereto.

Famil'iar Spir'its is a name in which three different shades of meaning may be traced, or perhaps there have been three stages in the development of the idea expressed. 1. F. S. were originally the shades or ghosts of deceased persons brought up by magical arts from the abode of the dead, which, according to all ancient ideas, was in the bowels of the earth, in order that they might give information about future or doubtful things. This is necromancy pure and simple, and is well seen in the episode of the witch of Endor, to whom Saul said, 'Divine unto me by *a* familiar spirit, and bring me up whom I shall name unto thee' (1 Sam. xxviii. 8). The term familiar spirit has the same meaning in Isa. viii. 19, where the prophet asks, '[Why inquire] at the dead concerning the living?' The shade of Samuel appears to have been seen by the witch; generally, however, the F. S. appeared to speak out of the ground: *cf.* Isa. xxix. 4, 'Thy voice shall be as of a familiar spirit, out of the ground.' 2. Again F. S. were demons (in the original sense of disembodied spirits not necessarily evil) who took up their abode in the bodies of the magicians, who revealed matters communicated to them by the F. S. The persons so possessed were called by the Greeks *engastrimuthoi* ('ventriloquists'), doubtless because designing men often imposed on people by means of the faculty of ventriloquism, and made sounds appear to come from their belly or breast, as well as from the ground. Isa. viii. 19 ('those that chirp and whisper') alludes to their imitating the chirping of bats. It is the name given in the LXX. to those having F. S., distinguishing them, as in Deut. xviii. 11, from necromancers, although, on the other hand, the term is also applied to the witch of Endor (1 Sam. xxviii. 7). They were also called *Puthones*, which is the term used in Acts xvi. 16—'a spirit of Python.' 3. The third stage in the development of the idea was when demons came to be regarded by the Christian Church as altogether evil. Tertullian, in his *Apology for the Christians*, describes them as being 'everywhere in a single moment; the whole world is as one place to them; all that is done over the whole extent of it, it is as easy for them to know as to report. . . . The purposes of God, too, they took up of old from the lips of the prophets, even as they spoke them; and they gather them still from their works when they hear them read aloud. Thus getting, too, from this source some imitations of the future, they set themselves up as rivals of the true God, while they steal his divinations.' See DEMONS, NECROMANCY, and WITCHCRAFT.

Familiars. See INQUISITION.

Fam'ily. The word F. is derived from the Latin *familia*, and this from the Oscan *famal*, 'a servant,' or *faama*, 'a house.' This last corresponds to the Sanskrit *dhâman* (*cf.* Lat. *domus*), 'house,' from the radical *dhâ*, 'to place.' At Rome the primitive meaning of *familia* was the number of slaves or servants belonging to a person or a public office; then all those, whether masters or slaves, living under the same roof; lastly, all those connected by blood, whether living together or not. Its general meaning now is those persons connected by blood who live together, *i.e.*, father, mother, and children. But it has numerous other meanings. It is applied to the establishment of a cardinal, to the human race, to the children apart from the parents, to a political dynasty, to a religious order, to a group of organisms in botany or zoology, to a group of substances in chemistry, of allied words in philology, or of surfaces or curves in geometry having analytical or other properties in common. The legal conception of F., implying various reciprocal obligations and duties between parents and children, has been the subject of many theories. By one, the children became the property of the parents; by another, there was a tacit convention between parent and child; by a third, burdens were placed on the parents as a punishment for having sinned in bringing into existence creatures incapable of supporting themselves. Board, nourishment, education, are among the obvious positive obligations of parents; they, in turn, have a claim for support upon their children in case of old age and destitution. The limits and pecuniary amount of these obligations are of course varied by different municipal laws. The character of a nation, and the general laws which govern society, depend to a large extent on the kind of families of which society is composed. Originally, the domestic was a much more powerful and comprehensive form of association than it is now. In the primitive clan or tribe there are many features which suggest the F. relation. In Greece and Rome we find a close association of servants with the blood-relations. The inner life of the Roman F. deserves a few words. The powers of the head of a F. were three—*potestas*, *manus* and *mancipium*. The first was either *potestas dominica* over slaves, or *potestas patria* over children; these two were different. *Manus* or marital power placed the wife on the footing of *filiafamilias*. The father had a legal power of selling (*mancipare*) his children into bondage; a *mancipium* was a *filiusfamilias* sold as a bondsman to another *paterfamilias*, to whom he stood in the position of a slave, though otherwise a free citizen, the exercise of political functions being probably suspended. The original power of the father was indeed that of life and death. But this disappeared long before Hadrian and Constantine (A.D. 319) included killing by a father under the crime of parricide. Trajan compelled a father to emancipate a son he had treated with inhumanity. The primitive option of a parent to nurture or to expose was also taken away, and is formally prohibited by a law of Valentinian (A.D. 374). In the same way a law of Diocletian and Maximian declares the sale, donation, and pledging of children to be unlawful. The surrender of a child to satisfy a claim of damages based on the child's wrong-doing lingered in the law, but even this was prohibited by Justinian. Yet in extreme poverty parents might sell children at birth-time (*sanguinolenti*). In polygamous countries a different set of conditions is presented, in which the influence of father and mother is entirely separate; while in Transylvania, Servia, and other Slavic countries in the S.E. of Europe, households of fifty and sixty are still found presided over by the house-father.

Family, a division of the animal and plant world used in classification. The F. is a group which embraces a number of more or less nearly-allied genera (see GENUS). Thus, the

F. *Felidæ* (q.v.), forming one of the subdivisions of the great Carnivorous order of *Mammalia*, includes the principal genus *Felis* and allied genera, represented by such nearly-related animals as the lions, tigers, cats, lynxes, &c. The F. in turn forms one of the subdivisions of the higher 'order.' In some cases, where the animals to be classified are not numerous, the F. may be omitted altogether, the genera in such a case being directly included in the Order (q.v.).

Family of Love, a religious sect founded about the middle of the 16th c. by Henry Nicholas, a Münster Anabaptist, who, after making several converts in Holland, crossed to England, where his doctrines won considerable favour among the ignorant. He held himself to be greater than Moses or Christ, for while Moses preached hope, and Christ faith, he preached love. He made religion identical with love, independent of dogma; through love men could be absorbed in God, and even things forbidden were enjoyable by the pure. These teachings resulted in coarse license, and in 1580 Queen Elizabeth caused the sect to be scattered and their books burned. In 1604 they sought permission from James I. to answer the attacks made on them, and tried to ingratiate themselves with the king by slandering the Puritans, but their request was refused, and the sect gradually died out through the frequent exposure of their practices. See Roger's *Displaying of an Horrible Secte of Grosse and Wicked Heretiques naming themselves the F. of L.* (Lond. 1579); Mosheim's *Ecclesiastical History*, ch. xvi.; and Collier's *Ecclesiastical History of England*.

Fan ('that which *blows*'; Old Eng. *fann*; *cf.* Ger. *wanne*, Fr. *van*, from Lat. *vannus*; the Fr. *éventail* is from *éventer*, 'to raise a wind'), an ornamental object used principally by ladies to cool their faces by agitating the air. The modern European F. usually consists of a decorated mount attached to a stick, composed of two master-pieces and slender radiating ribs, in such a manner that the fan may be folded or spread out at pleasure. The mount may be formed either of silk, paper, vellum, lace, or other thin and light material; and the stick, of ivory, bone, mother-of-pearl, wood, tortoiseshell, &c. The F. had its origin in the East, and among the civilised nations of antiquity it was regarded as an emblem of majesty and power. Rigid feather-plume fans with long handles were used by both sexes among the Greeks and Romans; and from the painted pottery preserved from remote ages we know that the opulent had servants to wave fans over them, as is customary in Oriental countries at the present time. The accompanying representation of Cupid fanning his mother is taken from an ancient piece of sculpture. The F. in one form or other is now common to all countries. Prior to the 15th c. the folding F. was unknown in Europe; but even then it had long been in use among the Japanese and Chinese, the latter people having adopted it from their more skilful and ingenious neighbours. From China it was brought to Europe by the Portuguese; and in the 16th c. it was common to Portugal, Spain, Italy, and France. In the time of Henry VIII. English ladies generally carried a feather F. suspended to the girdle, and till after the period of the Restoration folding fans were scarcely known in England. Some early English fans were provided with very long handles, so long, indeed, that ladies walked with them. They seem to have served to chastise the unruly and disobedient. In Beaumont and Fletcher's *Wit at Several Weapons*, occurs

> 'Wer't not better
> Your head were broken with the handle of a fan?

and in 1 *Henry IV.* ii. 3, Hotspur says, 'I could brain him with his lady's fan.' One of the most exquisitely humorous of Addison's papers in the *Spectator* deals with the manipulation of the F. The Chinese fabricate cheap folding fans with palm-leaf or with painted silk or paper mounts for export. Fans of inferior quality are made at Vienna, London, and in parts of France and Belgium. In Spain a F. may be bought for a farthing; at a bull-fight exhibition every person buys one. Paris has no rival in the production of the highly artistic F. The *éventailliste*, or F.-maker, commands the services of eminent artists for designs, and only employs the most skilful workmen to carry them into effect. F.-making attained great excellence in the reign of Louis XIV., and many of the fans then produced were so costly that they were simply expanded for ostentation and not for utility. Fans belonging to the epoch of *le Grande Monarque* are much prized and eagerly sought after for private collections. The language of the F., in which most ladies of last century were deeply read, has now almost died out. In Spanish-speaking countries, however, the F. is still an instrument of diplomacy and intrigue, and by it a coquette can convey to her admirer her train of thought.

Fan.

A special form of instrument for producing currents of air, used in certain industrial operations, is designated a F. See Fanners.

Fanar'iots or **Phanariotes,** a name given at first to the inhabitants of the Fanar or Greek quarter of Constantinople, so called from its beacon (Gr. *phanarion*). These Greeks, after the capture of Constantinople by the Turks, made themselves, by their adroitness and business talents, very useful as secretaries to Turkish ministers and dignitaries. Towards the close of the 17th c. all the dragomans were chosen solely from their ranks, and this greatly swelling their influence, they induced the Porte to choose the hospodars or governors of Wallachia and Moldavia from them exclusively. These hospodars were followed to their provinces by hosts of F., who held various offices, and wrung wealth from the provincials by the most unprincipled rapacity. The F. no longer exist as a distinct class. See Finlay's *History of the Greek Revolution*.

Fandan'go, a lively Spanish national dance, in triple time, executed to the accompaniment of the guitar, the dancers beating time with castanets. It is most popular in the country, especially so in Andalusia. Several attempts have been made by the Church to suppress the custom, and all in vain, for the dance maintains its place as a chief amusement among the villagers as much as amongst the townspeople.

Fan'euil Hall, in Boston, Massachusetts, consisting of a market-house below with a town-hall and other rooms above, was built and given to the town by Peter Faneuil in 1742. It was frequently used for public assemblies during the War of Independence, and was hence known as 'the cradle of liberty.' It is still used as a public hall, and has several good paintings. It was destroyed by fire in 1761, and in 1763 was rebuilt by the town, and has since then been enlarged.

Fan'fare, a French term denoting a flourish of trumpets or other brass instruments. The music is of Moorish origin, and passed from Spain to France and other countries, including those of the New World. A derivative from F. is *fanfaron*, meaning a braggart, probably from the noise he makes, while his braggadocia is called *fanfaronnade*.

Fanfish, or **Sailfish,** the name given to a species of Teleostean fishes belonging to the family *Xiphiidæ* or swordfishes. The name is derived from the great height and size of the dorsal fin, which the fish appears to raise or depress at will. The ventral fins are very small, and the tail is deeply forked, its lobes being of equal size. The F. inhabits tropical seas, and is common round the coasts of Ceylon.

Fang (Old Eng. *fang*, 'that which *takes* or *seizes*,' from *fon*, a contraction of *fangan*, 'to seize;' *cf.* Ger. *fangen*, Dutch, *vangen*, Dan. *fange*). A thief captured while carrying stolen goods is, in Scottish legal phraseology, 'taken with the F.' As a noun it still survives in standard English, as in the 'fang' of a wild beast; while in Scotland people still speak of a well having lost its 'fang.' It was used as a verb by the Elizabethans; thus Webster says, 'He's in the law's clutches; you see he's *fanged*.'

Fann'ers, a deriv. from Fan (q.v.), a form of blowing apparatus used in agriculture for winnowing the chaff from the grain of corn. It consists essentially of a revolving fan with four or five arms or vanes, mounted within a box or case. The fan draws in air through openings at the side of the case, and throwing it forcibly forward against the mixed grain and chaff fed into the apparatus, drives the light chaff out at an opening at the opposite end of the case, the grain falling down and being delivered by spouts at the sides. The heavier and plumper grains fall nearest the fan, while lighter grains are carried further on, and may be delivered by a separate spout. It is thus possible to separate the grain fed into the hopper into three or four qualities, besides freeing it from the chaff. F. constitutes an essential part of a threshing-machine, and farmers usually are supplied with a separate barn-F. The finishing F., or duster, is a simpler apparatus used for re-winnowing grain, or, as its name indicates, for dusting or cleaning grain which may have lain any time in the granary. The F. was invented by Andrew Cavers, a farmer in Roxburghshire, in the early part of the 18th c. The principle of the F. is adopted in many important metallurgical operations for creating a powerful blast of air and to ventilate mines, stoke-holes of steamers, &c.

Fanning Island, an island of coral formation in the Pacific Ocean, 3° 50′ N. lat. and 159° W. long., which bears a good supply of coco-nut trees. It was annexed by the British Government in 1892. Sea fowl and turtle abound.

Fa'no, an Italian watering-place in the province of Urbino e Pesaro, 30 miles N.W. of Ancona by railway. It stands a mile N. of the mouth of the Metauro, in a fertile plain, and is well built and girt with walls. It has a cathedral and several fine churches, in which there are many grand paintings, frescoes, and marbles, among others Guido's 'Annunciation,' and several works by Guercino and Domenichino. The principal manufacture is of silk. The commerce has greatly declined, and the port has been largely silted up. The chief classic relic is an arch of white marble raised in honour of Augustus. F. is the anc. *Fanum Fortunæ*, so called from the temple to Fortune built here by the Romans after the battle of the Metaurus. Pop. 22,008.

Fan-Palm, a popular name (suggested by the form of the leaves or fronds) given to various species of Palms (q.v.) belonging to the genera *Mauritia*, *Hyphæna*, *Livistonia*, &c. The F.-P. of Europe and the palmetto of N. America are examples.

Fan'shawe, Sir Richard, a diplomatist and poet, was born at Ware Park, Hertfordshire, in 1608. He studied at Cambridge, entered the Inner Temple, and was sent to Madrid by Charles I. in 1635 as secretary to the embassy. F. espoused the royal cause in the civil war, was taken prisoner at Worcester (1651), and on being freed, joined Charles II. at Breda. He was sent after the Restoration as ambassador to Lisbon, where he negotiated the marriage of Charles II. with the princess Catharine, and to Madrid, where he died, 16th June, 1666. F. translated Guarini's *Pastor Fido* (1647), Camoens' *Lusiad* (1655), Horace's *Odes*, and the fourth book of the *Æneid*. He wrote also original verse, *A Short Discourse on the Long Wars of Rome*, and a Latin version of Fletcher's *Faithful Shepherdess*. He was an elegant and spirited translator. His letters were published in 1701.

Fans, The, a race on the equatorial coast of W. Africa, chiefly on the Gabeon or Gabun river, of a copper-brown colour and slight build. They had revolting cannibal practices, and are said to have bartered their dead with each other. They wore dresses of bark, stained themselves with red wood, and held wild orgies at every full moon. Their traditions assert that they came from the N.E., and they seem to be the 'Yagas' of the old Portuguese writers. Since the French have taken possession of the country the habits and customs of the people have greatly changed, and at the present day the Fans are in no way worse than any of their neighbours either in respect of a tendency to cannibalism, or any other abomination, which is soon suppressed on the approach of the European.

Fan'tail, the name given to several species of Insessorial birds belonging to the section *Dentirostres* of that order, and to the family of the *Muscicapidæ* or fly-catchers. Certain varieties of Pigeons (q.v.) are so called from the spreading nature of the tail-feathers. The white-shafted fantail of Australia is a well-known species. The bill in this genus has long basal bristles, the nostrils being partly hidden by plumes; the first wing-quills are short, the fourth and fifth being longest. The tail is broad, and the tarsi are broadly scaled. The colour of the species just mentioned is a dusky olive-black on the upper parts, a white streak existing above and below the eye. The throat, edges of the wing-coverts, tips and shafts of the tail-feathers (excepting the two middle feathers) are white; and the tail-feathers when expanded form a fan-like structure. The average length of the bird is about five inches.

Fanta'sia, in music a composition in free form, like the Capriccio (q.v.). In modern music the F. is often an enlargement and embellishment of some popular air; or of melodies from an opera, arranged for performance as an instrumental solo.

Fan'ti or **Fantee,** a country of W. Africa, on the Guinea coast, lies between the rivers Sakuru on the E., and Kaku on the W., and is separated from Ashanti on the N. by dense forests. It is a rich strip of coast-land, yielding much gold-dust, and supporting a numerous people. The Fantis are closely allied in race to the Ashantis, who conquered them and greatly destroyed their country in 1807. See Brackenbury and Wilson, *Fanti and Ashanti*.

Fan-Tracery, a beautiful form of vaulting, invented by English architects in the 15th c. It is used in Late Perpendicular work, and is found only in England. The ribs which compose it spring from the capitals of the shafts with a uniform outward curve, and the spaces between these diverging ribs are filled by a rich tracery of foils and cusps. Fine examples of F.-T. are to be seen at Peterborough; King's College, Cambridge; Ely; St. George's Chapel, Windsor; Henry VII.'s Chapel at Westminster; and in the cloisters at Gloucester. F.-T. was often used over tombs, in cloisters, chantry chapels, and other small buildings.

Far'aday, Michael, D.C.L., F.R.S., an illustrious English physicist, was born near London, 22nd September, 1791. The son of poor parents, he received the most elementary education, and was apprenticed in 1805 to a bookbinder. Here he used well his opportunities for acquiring knowledge; and his reading, together with evening lectures by Tatum, which he sometimes attended, gave his mind a strong bent towards physical and especially electrical subjects. While working as a journeyman bookbinder he obtained the patronage of Sir Humphry Davy, and became his assistant at the Royal Institution in 1813. He subsequently travelled with Davy on the Continent, and soon after his return, in 1815, made his first published contribution to science, an analysis of some caustic lime from Tuscany. In 1820 his attention was directed to Œrsted's discovery of the action of a current upon a magnet, and his *History of the Progress of Electro-Magnetism* (1821) prepared him for his later celebrated researches in this and allied branches of physics. In 1823 he liquefied chlorine, and in 1824 was elected a Fellow of the Royal Society. Of his chemical papers which appeared in the *Philosophical Transactions* about this time, that relating to the discovery of benzol deserves special notice. He succeeded Davy as lecturer at the Royal Institution in 1827, and was appointed Professor of Chemistry there in 1833. In 1831 he had returned to his electrical researches, and made his great discovery of magneto-electric induction—the generation of electric currents in conductors moving relatively to a magnet or other current. This led to a series of investigations to establish the 'identity of electricities,' and later, in 1833, to the hitherto but little understood subject of electrolysis, his papers on which evince at once his high experimental skill and his profound mental acumen. From 1836 to 1838 frictional electricity engaged his attention, the outcome of his researches being the discovery of the specific inductive capacity of insulators or *dielectrics*, a discovery of the highest importance in submarine telegraphy.

In 1841 he established the 'magnetisation of light,' or the rotation which a plane polarized ray of light undergoes in a magnetic field. Then followed his researches in diamagnetism, and his investigations on the magnetism of gases and atmospheric magnetism. In 1835, at the suggestion of Lord Melbourne, he received from Government a pension of £500, and in 1858 the Queen allotted him a residence in Hampton Court, where he died, 25th August, 1867. F. was a man of simple and unaffected tastes, of open and unassuming character, and of deep personal piety. In physical science he is unquestionably the greatest experimentalist that England, perhaps the world, has ever seen. His principal works are *Experimental Researches on Electricity*, *Lectures on Various Forces of Matter*, and *Lectures on the Chemical History of a Candle.* See *Life of F.* by Tyndall (1869), and by Bence Jones (1870).

Farai'zi, a name derived from the Arabic *farz*, 'a command,' and applied in India, and especially in Bengal, to the reformed sect of Mohammedans who resemble the Wahabis of Arabia and as *followers of the divine ordinances of God*, although Sunnis, they reject *tradition*, and hold the Koran to be the full and complete guide to spiritual life. About the year 1827, a pilgrim from Mecca, on returning to his native village in the district of Furreedpore (Faridpur), near Dacca, taught the new faith to his neighbours. It is supposed that the majority of the Mussulmans in Eastern Bengal, who there outnumber the Hindus, now belong to the F. sect. In 1831 the propagandism gave rise to serious riots, and again in 1870 the villagers of the Gangetic delta were found to be carrying on intrigues with the armed rebels on the frontier of the Punjab; but at the present time there is no reason to doubt the loyalty of this portion of the Indian community. Most of the F. are agriculturists and are morally strict, earnestly religious, and careful to promote the welfare of the sect. But they are very bigoted and take so little pains to conceal their contempt for persons of other religious opinions, that their behaviour is ever a source of disquietude which sometimes culminates in regular outbreaks between them and the persons whom they offend; in fact they occupy very much the same position in this respect on the E. of India as the Moplahs do on the W.

Farce (from the Ital. *farsa*, Lat. *farcire*, 'to stuff,' or from the Provençal *farsum*, 'a ragout or mixture,' like the Lat. *satura*), a form of the drama which seeks to provoke mirth by dialogue and incident more ludicrous and less natural and refined than is admissible in comedy. The Greek *satyric plays* were essentially farces. *Saturæ*, or farces combining conversation with music and dancing, and *fabulæ Atellanæ*, or farces of Campanian origin, were the most popular of the Roman dramatic entertainments, and, even under the Cæsars, gave publicity to political feeling in their ribald, vigorous dialogue. In the Middle Ages, *jeux*, or profane dramatic performances, were common, and from these arose the farces of the *clercs de la Basoche*—a society founded in Paris in 1303. (See BASOCHES.) These early French farces were short, seldom exceeding 500 lines, mostly indecent, and without the stinging wit of the *fabliaux*. Coarse and frequently impromptu farces prevailed on the French stage until Molière founded genuine French comedy. In Italy the term *farsa* was applied to comic plays, which seem to have been modified from the ancient *fabulæ*, and which were greatly developed at the end of the 14th c. by Sannagarro. In mediæval Germany *farce* denoted a song chanted during divine service. In England farces appear distinct from comedy about the beginning of the 18th c. Perhaps the most notable name in English farcical literature is that of Samuel Foote (q.v.).

Far'cy, a disease of horses, closely associated with Glanders (q.v.), and distinguished by the inflammation and swelling of the lymphatic or absorbent vessels of either or both hind-limbs. The inflammatory process extends to the formation of ulcers, and of swellings known as 'F.-buds.' The treatment for the local affection is cauterization with the hot iron; but constitutional remedies—such as the internal administration of copper and iodine—with good feeding and dry bedding, are also demanded. The poison producing these diseases is capable of being transmitted from the horse to the human subject, from one human being to another, and also to the horse and ass. It may be absorbed both by the cutaneous and mucous tissues, and thus infect the blood. The attention of the profession was first called to this disease in man by Muscroft in the *Edinburgh Medical and Surgical Journal* (1821).

Fardel-Bound, an old veterinary term for obstruction of the third stomach—the 'manyplies'—of cattle, generally caused by tough or indigestible food, such as leaves, moist clover, or grass, and the like. The results of this affection are inflammation of the stomach, together with paralysis from its distension. The skin is hot, and feverish symptoms also prevail, whilst rumination is necessarily interfered with. The remedies to be adopted for the relief of this complaint consist in free purgation and injections; probably the latter are safest in the generality of cases. The food must be light, and consist chiefly of soft mashes. The stimulants needed in severe cases may consist of ale with ginger.

Fare'ham ('the dwelling at the ferry'), a market-town of the county of Southampton or Hampshire, England, on F. Creek, at the N.W. angle of Portsmouth Harbour, 5 miles N.N.W. of Spithead by railway, with manufactures of bricks, leather, shirt-collars, whiting, tobacco-pipes and pottery. Vessels of good tonnage come close to F., which has an active trade. Vessels of small burthen are built here. Pop. parl. div. of county 66,014; reg. sub-dist. 12,222; and civ. par. 7934.

Far'el, Guillaume, 'the pioneer of the Reformation in Switzerland and France,' was born at the hamlet of Farels, near Gap, Dauphiny, in 1489. His parents, who were Romanist, destined him for the army; but in 1500 he betook himself to Paris University, where he became a devoted disciple of Lefèvre d'Étaples, and gained a chair in the college of Cardinal de la Moine. Lefèvre's advanced views calling down the wrath of the Sorbonne, he and F. had to quit Paris for Meaux, then a stronghold of Lutheranism, where F. began to denounce the Catholic Church. In 1524 F. sustained at Basel thirteen theses on the chief points of controversy between the Catholics and Reformers, and about this time won the friendship of Haller and Zwingli. Thenceforth he gave himself up to the conversion of Switzerland, making the canton Bern the centre of his missionary labours, preaching with tireless and fervid zeal, and running great dangers from his rash and uncompromising iconoclasm. After the issuing of the Edict of the Reformation by the municipality of Geneva in 1535, F. laboured along with Calvin to organize there the new Protestant Church, a difficult task from the excesses of the *Libertins*, or Reformers, who refused to obey any authorities in matters of religion. After allaying (1542) the disorders rife among the Protestants of Neufchâtel, and preaching at Metz, Montigny, and Gorge—where he was nearly killed in a skirmish—F. was sent in 1557 with Beza to seek the intervention of the German Reformed princes in behalf of the Vaudois, and after his return to Switzerland married a young girl, much to Calvin's displeasure. In 1561 he was imprisoned at Gap, but escaped by a basket lowered from the ramparts. Shortly after making a last visit to Calvin, who was then dying, F. ended his days at Neufchâtel, 13th September, 1565. F. was not a systematic theologian, nor even a judicious ecclesiastic, but he was an admirable preacher, fluent, impressive, ardent, and as a missionary was the chief agent in the conversion of Switzerland. Among his numerous works, which, however, give no idea of his mastery of language, are *Themata Quædam Latine et Germanice Proposita* (1528), *De Oratione Dominica* (1524), and many epistles and treatises, many of which are inserted in Ruchat's *Hist. de la Réforme en Suisse.*

Farewell, Cape, the southern extremity of Greenland, is dangerous to navigators from the masses of ice in its neighbourhood, which are constantly being forced by currents setting in from the N.E. round into Davis Straits. Trading vessels, as a rule, set their course at least 100 miles distant from this part of the coast.

Fari'a Y Sousa or **Souza, Manoel,** a Portuguese critic, poet, and historian, was born 18th March, 1590. His father's name was Amador Perez de Erro, but when, after a successful university career, he entered upon diplomatic life, he took the name of his mother. From 1631 till within a few years of his death, which took place 3rd June, 1649, he held the post of secretary to the Spanish embassy at Rome. F. is best known for his poems, consisting chiefly of eclogues, madrigals, and sonnets, written both in Portuguese and in Spanish; his treatises on poetry, which caused Lope de Vega to style him the first critic of the age, and of which his great commentary on the *Lusiad* (Mad. 1639) is the best; and his historical works, treating of Portugal and its dependencies. His *Imperio de China*, edited by Father Semmedo, and translated into French and Italian, is still recognised as one of the best of the elder authorities on the subject.—**Manoel Severim de F.,** a Portuguese historian and antiquary, born at Lisbon 1581, died at Evora, 16th September, 1655. He wrote *Noticias de Portugal* (Evor. 1624; 3rd ed. Lisb. 1791), and was reckoned one of the best numismatists of his age.

Fari'na, a name frequently applied to the flour or the starch of cereals or of other starchy plants, such as the cassava, arrowroot, &c. It is derived from the Latin *far*, meaning spelt wheat. In commercial circles the term F. is restricted to the starch obtained from potatoes, which is very extensively consumed as an adulterant of the more expensive starches, such as arrowroot, tapioca, &c., and of butter and other articles of food. It is also prepared as an article of food under the name of French sago, and it is largely employed as the basis of starch sugar, which, under the name of saccharine, is much used by brewers. Its chief consumption, however, is as a thickener in calico-printing, for which it is also prepared by torrefaction as dextrin or British gum. Fossil F. is an infusorial earth, the *berg-mehl* of the Swedes and Laplanders.

Farina Trit'ici, the grain of wheat, *Triticum vulgare*, ground and sifted, is used in medicine for the preparation of *Cataplasma fermenti*. When made into a paste with honey, it forms an excellent application for boils.

Farinelli, Carlo, whose proper name was Carlo Broschi, was born at Naples, in 1705, and became a celebrated Italian soprano singer. He visited London in 1734-35 and achieved a great success. Two years later he was invited by the Queen to the Court at Madrid, in the hope of dissipating the nervous condition of health of Philip V. In this he was entirely successful, and became a great favourite of the king, to whom he acted as attendant, and in that capacity obtained great influence, which he continued to hold during the following reign of Ferdinand VI. He appears to have been a most benevolent and upright man. In 1759, soon after the accession of Charles III., he fell into disgrace and was compelled to leave Spain. He retired to Bologna, where he died in 1782.

Faringdon, a well-built clean little town in Berkshire, within the Vale of the White Horse, about 36 miles to the N.W. of Reading. It dates back to the time of the Saxon Kings, and in 925 Eadward the Elder died here. There was a castle here, the site of which was made over by King John to the Cistercian brotherhood. The parish church of All Saints, which has been within recent years restored, is a fine example of Gothic architecture, and contains some ancient monuments. Bacon and corn are the chief products of the surrounding district. During the Civil War Faringdon House was besieged, and its defenders offered a stout resistance. Pop. reg. sub-dist. 5703; and ecc. par. 2988.

Fari'ni, Car'lo Lui'gi, an Italian politician and author, was born at Russi in the Romagna, 22nd October, 1822. He studied medicine at Bologna, and became known as a writer of scientific treatises, but being connected with the Liberal movement of 1841-43, had to quit the Papal territory, and resided successively at Marseille, Paris, Florence, and Turin. On Pius IX. granting an amnesty, F. established himself as a physician at Osimo, but shortly afterwards, entering on a political career, became under-secretary of state, and was sent in 1848 on a confidential mission to the camp of Carlo Alberto. He held aloof from the Roman Republic of 1849, and his services being rejected by the Church party after the French occupied Rome, he betook himself to Piedmont, where his moderate but liberal views secured him the royal favour. He was made minister of public education, knighted, elected to the Piedmontese National Assembly, and in 1859 named dictator of the duchy of Modena. He rendered important services in uniting central Italy to Piedmont, was appointed minister of state and royal secretary, refused in 1862 to join the Ratazzi ministry, became president of the cabinet, retired in 1863, and died at Genoa, 1st August, 1866. He wrote *Storia dello Stato Romano dal Anno* 1814 *al* 1850, a valuable historic work, which has gone through several editions; *Storia d'Italia*, a continuation of Botta's history of Italy; and letters to Gladstone, &c. F. was one of the most sagacious of Italian statesmen, and Italy is greatly indebted to him for her present stable government.

Farm (Old Eng. *feorm* and *feorme*, originally 'food;' next, the 'rent' (paid in kind) of land; finally, the 'rented land' itself), a portion of land or tract of country occupied as one undertaking for the cultivation of crops, or for the rearing and maintaining of cattle, sheep, and other creatures useful to man. Farming, viewed in its widest sense, is the greatest, as it is the primal and fundamental, industry of the human race. On its operations, to a great extent, depend not only the feeding, but the clothing of mankind, and most of the plants which are cultivated, and of the animals said to be domesticated, are so as a result of farming operations. Taking a narrower and technical view of farming, it embraces only those lands on which cereal, pasture, and green crops are cultivated, and sheep and cattle reared. Gardening and the cultivation of many products of human industry are embraced under other heads.

In Great Britain farms are classed under two heads—(1) arable farms, and (2) natural pasture and hill farms. Arable farms again are subdivided into (1) ordinary arable or grain-producing farms, (2) stock farms, and (3) dairy farms. These subdivisions are not sharply distinguished from each other, and they merely indicate the prevailing feature in the agricultural industry of any special locality or F., such features being generally controlled by circumstances of soil, situation, and climate. Thus on a F. in the great wheat-producing districts, a certain proportion of stock is fattened, and dairy produce is prepared, although its staple may be grain. The stock F. is principally devoted to the rearing and fattening of cattle for the fat market, and crops and field operations are all directed with a view to that chief object. In the case of a dairy F. the ultimate object of the farmer is the obtaining of milk for sale or for the manufacture of butter and cheese, and stock is selected and crops grown suitably for such objects. Natural pastures and uncultivated hill land are extensively laid out as sheep farms or sheep walks; and a F. of this description usually embraces a great area.

The size of farms is entirely regulated by convenience; but there is an increasing tendency to form farms of great extent. The scientific development of agricultural operations, and the introduction of expensive, yet economical, labour-saving appliances, render it necessary for a first-class F. to be one of considerable size, that it may yield a sufficient return for the capital sunk in appliances connected with its working. A great revolution in rural affairs has therefore taken place within recent times; the cottier and small farmer have declined, and small holdings have been combined to form large farms, which must be worked by persons having command of considerable capital. The modern farmer must also be possessed of a wide range of scientific and practical knowledge, of considerable mechanical skill, and much business aptitude. In England, Scotland, and Wales, of 32,629,855 acres returned in 1894 as being under cultivation, 4,643,000 are stated to be farmed by owners, as against 4,672,000 farmed by owners in 1893 out of 32,643,709 returned as cultivated. Concerning the laws which regulate the occupancy of land, see LAND LAWS, LANDLORD AND TENANT, and HYPOTHEC.

Farm Buildings. The various offices and structures required for the working of a farm are collectively known in England as the homestead, and in Scotland they are called the steading. The accommodation necessary varies in size and arrangement, according to the extent of the farm it serves, and the nature of the chief products cultivated. Thus on a dairy farm the cow byre and dairy offices are the chief features, and on a stock farm prominence must be given to the feeding byres and arrangements for preparing food. As the health of his live-stock is an object of supreme importance to the farmer, F. B. ought to be placed in situations securing, as far as possible, abundant water supply, good drainage, freedom from damp, and a sheltered yet airy situation. The arrangement of F. B. is a matter of much practical importance, and the various parts should be so compacted that operations dependent on each other, or following in consecutive order, should be performed in immediate proximity; and the saving of all unnecessary labour, as well as the prompt and rapid execution of work, ought always to be kept prominently in view. The position of the threshing mill and barn will generally be found to be the key to the arrangement of the whole range of F. B., as many of the most laborious duties of a farm, such as the feeding and littering of the live-stock are intimately connected with that department. It is usually found that F. B. of moderate extent come together most conveniently in the form of three sides of a square or parallelogram. The space lying between the projecting sides is either roofed over or left as an open court, and used as a yard for young cattle during the winter (if unroofed, with a covered shed attached), and as a repository for the manure from the stables and byres at its side. The ordinary F. B. comprise a threshing-mill, granary and straw-barn, stables, stock and dairy byres, court and covered sheds for young cattle, calves' house, piggery, poultry house, sheds for storing turnips, boiler and food-preparing house, implement house, and cart-shed. The dairy is usually attached to the farmhouse, at once as a matter of convenience, and because that department must, as far as possible, be removed from all noxious smells. The farmer's house and labourers' cottages also form an essential part of F. B., but the arrangement and size of these are regulated by the principles of ordinary domestic architecture.

Farm Servants. See WAGES.

Far'mer, Richard, D.D., an English scholar and archæologist, was born at Leicester, 28th August, 1735. Educated at Emmanuel College, Cambridge, where he graduated in 1760, he was first appointed curate of Swavesey, near Cambridge, became Master of Emmanuel in 1775, and librarian to the university, and was successively canon of Lichfield, Canterbury, and St. Paul's. He died 8th September, 1797. The following year his library, especially rich in works of Old English literature, was sold for £2210. F. collected copious materials for the history of Leicester, which he put into the hands of his friend Nichols. His sole work is his *Essay on the Learning of Shakespeare* (1776), reprinted by Steevens (1793), by Reed (1803), and by Harris (1812). In this he showed that Shakespeare's knowledge of the ancients was obtained from translations.

Farmers-General (Fr. *fermiers-généraux*) were persons who, under the *ancien régime* in France, obtained, for a fixed money payment, the right to collect one or more of the public taxes. This was the most expensive and least productive system of collection. Such rights, originally given to court favourites, were first exposed to public auction by Sully. After Colbert had detected the frauds of the individual collectors, a company or *ferme-générale* was formed in 1728, which, interrupted for a short time under the administration of Silhouette in 1759, continued in business till Necker's time, when it consisted of forty-four persons paying a rent of 186 millions of livres, and making an estimated profit of only two millions. The multiform and arbitrary nature of French taxation, and the quasi-official and yet practically irresponsible position of the F.-G. and their agents, led to great oppression. The French 'imposts' consisted in the first place of the '*taille roturière*,' at first a purely feudal contribution, but which the king, pressed by the expense of a standing army, gradually extended to the domains of his nobles. From 1,500,000 livres, in 1445, it rose under Henri IV. to fourteen millions, under Louis XIV. to thirty-five millions, under Louis XVI. to ninety-one millions. The *taillon* and the *crue* were additions to the *taille*. In 1710 Louis XIV. imposed a *dixième* on the revenues of the lands of nobles and churchmen, as well as of *roturiers*. Another *vingtième* was added for the war of American independence. In 1695 appeared the *capitation*, which affected the *roturier* class, the nobles, and public officers unequally, but from which the clergy were exempt. The *dîme*, estimated by Necker at 133 millions, went to the Church, but relieved the state of obligations towards the Church. Every five years the Church gave the king the *don gratuit*, about 3,600,000 livres. The *corvée* was a tax of eight days' labour, with cart and horse, on the public roads; its value was twenty millions. *Maîtrise* and *jurande* were taxes upon trade corporations and professions, which in 1788 produced 4,500,000 livres; and *vingtième d'industrie et de commerce* was a special tax on manufactured products and merchandise. The latter, along with all products whatever, were subject to the indirect tax or *aides*, which included *droits de sortie* or *traite foraine;* the tax on the extraction and sale of salt, which from 1345 was called *gabelle;* and certain dues on the sale of food, and the entry of wine into towns. As Charles VII. had dispensed with the consent of the States-General in imposing the *taille*, so François I. dispensed with their consent to the *aides* and *gabelle*. Certain of the *aides*, amounting in value to fifty-nine millions, were collected by the *régie générale des aides*, and were called *droits réunis*. The *ferme-générale* extended to the *gabelle*, which alone amounted to seventy-four millions, of which fifty-four reached the treasury; the monopoly introduced by Colbert for tobacco; the *droit d'entrée* on imported goods, originally one-thirtieth, imposed in 1581; the customs proper, internal and external. There was a third system of succession duties and feudal exactions, which were collected by the *régie des domaines*. The eighty *pays d'élection* formed twenty-four *généralités* for the purposes of collection, the gross amount being divided among the *généralités* by a *brevet-général*, but the further division among towns and parishes was at the pleasure of the *intendant*, and among different lands and persons by no fixed system of valuation. The *pays d'états* (such as Languedoc, Provence, Burgundy, Artois) had a much juster system, worked by *livres cadastrals*, or valued rent, and called *affouagement* (or 'hearth-tax'). In the *pays d'élection*, also, Necker's system of collection was to give three or five or six '*deniers pour livre*' to the various grades of officers, while the *pays d'état* put the collections up to auction in each province. The former were also called *pays de grande gabelle*, from the rate of salt-tax they paid; the latter, *petite gabelle*, or *franches* or *redimés*. The authorities on this important subject are Necker's *Administration des Finances*, Clamagéran's *Histoire de l'Impôt*, Laferièrre's *Histoire du Droit Français*.

Farne or **Ferne Isles**, or the **Staples**, a group of small islands from 2 to 5 miles off the coast of Northumberland, and S.E. of Lindisfarne. Several are merely rocks hidden at high water. On one is a priory named after St. Cuthbert (q.v.), who spent the last two years of his life here. They render navigation very dangerous. There are two beacons 30 feet high on two of the islets. Here Grace Darling (q.v.) effected the heroic rescue of nine people from the wreck of the *Forfarshire* in 1838. Pop. 15.

Farne'se, the name of a noble Roman family, dating from the 13th c., but first made important by **Alessandro F.**, who in 1534 became Pope Paul III.—His natural son, **Pietro Luigi**, who figures in the Life of Benvenuto Cellini, was about the worst man of his time. He got from his father the duchy of Castro as a fief of the Holy See, and Novara, an imperial fief, and the dukedom of Parma and Piacenza, subject to a payment of 8000 ducats to the pope. This division of papal property among popes' children was often practised. The new *gonfaloniere*, after a life of vice and tyranny, was murdered 10th September, 1547, by

Gonzaga, the governor of Milan, and others. His son, **Ottavio** (born in 1520), recovered from Philip II. possession of Piacenza, which had been occupied by Milanese troops. His friendship for Henri II. of France was suspected by the emperor and the pope, and he owed much of his security to his wife Margaret, governor of the Low Countries, the natural daughter of Charles V. He died in 1587.—**Alessandro,** son of Ottavio, known as *the* Duke of Parma, became one of the great captains of the age. He was with Don John of Austria at Lepanto (1571), and in 1578 defeated the Flemish 'Beggars' at Gembloux. Wonderful stories are told of his *sang-froid*, or rather love of danger, at the sieges in the Low Countries—Oudenarde, Antwerp, &c. As governor of the Spanish Netherlands he fought long and bitterly with the Prince of Orange. Philip II. gave him the command of the force gathered at Dunkirk for the invasion of England in 1588, and in 1590 sent him to the relief of Paris, besieged by Henri of Navarre. Ill supported by the Catholic League, he was forced to yield to the superior force of the Huguenot prince, and died 3rd December, 1592, at Arras, of a wound received before Rouen.—His son, **Ranuzio I.** (born 1569, died 1622), lived on the worst terms with the other Italian princes, especially Gonzaga of Mantua. He built the beautiful theatre of Parma.—His son, **Odoardo** (born 28th April, 1612, died 12th September, 1646), having pledged the duchy of Castro in the *Mont de Piété*, formed an alliance with France in 1633, which protected him against Pope Urban VIII., wishing to forfeit Castro for the Barberini, his relatives. Muratori describes Odoardo as a brilliant and satirical talker, and of a splendid fashion of living.—**Ranuzio II.**, son of Odoardo, was born in 1630, and succeeded his father in 1646. He was ruled by a Provençal tutor and a Pavian tailor of a musical turn. In consequence, he lost the duchy of Castro to Innocent X. He died 11th December, 1694, and was succeeded by his son **Francesco,** who was born 19th May, 1678. During the reign of the latter occurred the Treaty of the Hague, by which it was agreed that Parma and Piacenza should become male fiefs of the empire; and that, when the succession opened, they should go to the eldest son of Elizabeth F., Queen of Spain, daughter of Odoardo, and his male issue, whom failing, to her other sons and their male issue. The undoubted legal claim of Innocent XIII. to the reversion of the duchies was coolly set aside. Francesco died 26th February, 1727, and was succeeded by his brother **Antonio.** In him the hereditary corpulence of the family reached its utmost extent. He died 20th January, 1731, and having no children, left the duchies by will to Don Carlos, the son of his aunt, Elizabeth of Spain. The name has been given to two palaces in Rome—one built by Pope Paul III., and adorned with some fine works of art; the other, known as the *Farnesina*, containing frescoes by Raphael—to a group of statuary representing 'Dirce Bound to the Horns of a Bull,' and to a Hercules copied by Glykon from an original by Lysippus.

Farn'ham ('the dwelling among the ferns'), a town in Surrey, England, on the Wey, 36 miles S.W. of London, with an interesting old castle, founded in 1136 by Henry of Winchester, brother of King Stephen, which has more than once been rebuilt or enlarged, and is a possession of the bishops of Winchester. The chief trade is in hops, which are noted for their excellent quality. William Cobbett was a native of F. and was buried in the churchyard. At a distance of 6 miles lies the camp of Aldershot. The old abbey of Waverley, a Cistercian foundation, was built in 1128 on a spot within two miles of F., and the ruins are still to be seen. Pop. reg. sub-dist. 15,383; and civ. par. 12,376.

Farn'worth, a town of Lancashire, 12 miles S.E. of Liverpool, on the river Irwell. It has a chapel of the 15th c., a free grammar-school, and manufactures of watches, cottons, and iron tools. F. is the birthplace of Bishop Bancroft (1544). Pop. reg. sub-dists. 31,751 (Bolton) and 33,765 (Prescot); and civ. par. 23,758.

Fa'ro (Gr. *pharos*, 'a lighthouse'), a town in the province of Algarve in the S. of Portugal, at the mouth of the Fermoso, 122 miles S.S.E. of Lisbon. It is a bishop's see, is well built, walled, and has a college, cathedral, and several hospitals. The harbour is small but safe, sheltered by islands, and defended by a fort. F. has a large fishery. The trade in fresh and dried fruit, wine, anchovies, sumach, and cork is carried on chiefly with England. Pop. 10,017.

Faröe Isles (Dan. *Faareyjar*, 'sheep islands'), a group of twenty-two basaltic islands in the N. Atlantic, 185 miles N.W. of the Shetlands, in lat. 61° 20′-62° 20′ N., and long. 6°-8° W. Area, 514 sq. miles; pop. 12,782. They are conical mountainous masses, some 2000 feet high, rising more or less abruptly from the sea, and are separated from each other by strong rapid currents. The precipitous shores, rendered dangerous by whirlpools, are broken by many deep inlets, which form secure havens. Stromö, the chief of the group, contains the capital, Thorshavn (pop. 1208), and is 8 miles broad and 27 long. Eight of the group are uninhabited islets. The shallow soil of all the islands affords rich pasture for the sheep and cattle, but there are no trees larger than a juniper or stunted willow. Although often visited by tempests, the climate of the F. I. is comparatively mild, allowing the cultivation of barley, rape, parsnips, carrots, and potatoes. The snow only lies on the ground for about eight days in winter. There are 583 species of plants, of which 270 are flower-bearing. A seam of good Miocene coal has been worked on Suderö, and coal, peat, copper, jasper, and opal have been found in some of the islands. The seas abound with fish, and the rocky coasts are haunted by myriads of seafowl, the capture of which is one of the perilous industries of the islanders. Among the exports, which pass chiefly to Denmark, are salted mutton, skins, tallow, eider-down, goose-quills, and feathers. The F. I. were discovered and peopled by Norwegians in the 9th c., but have been Danish since 1380. A dialect of Old Norse is still spoken, but Danish is used in the churches, schools, courts, &c. The islands, of which the largest are Stromö, Suderö, Osterö, Sandö, and Wagö, send a representative to the Danish *Rigsdag*.

Far'quhar, George, son of a poor clergyman, was born at Londonderry in 1678. He studied at Trinity College, Dublin; at eighteen joined the stage, and shortly afterwards the Earl of Orrery's regiment in Ireland. Like Wycherley and Vanbrugh, he became a captain. His first comedy, *Love and a Bottle*, was brought out successfully at London in 1698. Duped into marrying a pretended heiress, he fell into poverty, and died in April, 1707, 'leaving nothing,' he said, 'but two helpless girls.' His other plays are *The Constant Couple*, *Sir Harry Wildair*, *The Inconstant* (modelled on Fletcher's *Wild Goose Chase*), *The Stage-Coach*, *The Twin Rivals* (1705), *The Recruiting Officer* (1706), and his best piece *The Beaux Stratagem* (1707). F.'s plays are not imaginative and romantic. They are sprightly, natural transcripts of the life of his times. He will not rank with even the secondary Elizabethans, but his place is high among the Restoration dramatists. Inferior to Congreve in dazzling wit, he excels him in humour and invention. His plays are less gross, his characters more genial and lovable, than Wycherley's, Congreve's, or Vanbrugh's. The best edition of F. is Leigh Hunt's in Routledge's *Old Dramatists*. See Hazlitt's *Comic Writers* and Ward's *English Dramatic Literature*, vol. ii.

Farr, William, M.D., F.R.S., D.C.L., was born at Kenley, Shropshire, in 1807, studied at the universities of Paris and London, practised medicine at London, and edited the *Medical Annual* and *British Annals of Medicine*. He was made compiler of abstracts in the Registrar-General's office in 1838, was afterwards for many years head of the statistical department in that office, and was sent by Government to various international statistical congresses. He was corresponding member of the French Institute in 1872, and died 14th April, 1883.

Farr'agut, David Glasgoë, a gallant and highly popular admiral of the American navy, was born near Knoxville, Tennessee, 5th July, 1801. He entered the navy at the age of eleven, was lieutenant at twenty-one, and in 1833 commanded the *Natchez* on the Brazil station. In 1851 he was made assistant-inspector of ordnance, and in 1854 was appointed to construct a navy-yard in California. In January, 1862, he commanded a naval expedition to the Gulf of Mexico, and on the 28th of April received the surrender of New Orleans. Ascending the Mississippi, he took Natchez, but failed before Vicksburg. Withdrawing to Pensacola for repairs, he was made Rear-Admiral of the Navy, and in March, 1863, he sailed up the Mississippi, ran the Confederate batteries of Fort Hudson, and aided General Grant in his attack upon Vicksburg, which surrendered 9th July, 1863. In August, 1864, after a fierce conflict between his fleet and the Confederate forts and vessels of Mobile, he captured the forts and city. F. was raised to the rank of vice-admiral in 1864, and to that of admiral in 1866. Died 14th August, 1870.

Farr'ar, Very Rev. Frederic W., D.D., F.R.S., son of a clergyman, was born at Bombay in 1831, and studied at King's College, London, and Trinity College, Cambridge, of which he was made a Fellow in 1856, obtaining the Chancellor's prize for English verse. He was appointed assistant-master at Harrow in 1855, master of Marlborough School in 1869, chaplain-in-ordinary to the Queen in 1873, canon of Westminster and rector of St. Margaret's in 1876, archdeacon of Westminster in 1883, and chaplain to the Speaker in 1890. F. has been a prolific author. Among his works are *Eric, or Little by Little*, and *Julian Home*, successful tales; *The Fall of Man* (1865); *The Life of Christ* (1874); *Life and Epistles of St. Paul* (1882); *Lives of the Fathers* (1888); *Sketches of Church History* (1889); *Darkness and Dawn* (1891); *The Voice from Sinai* (1892); and *The Life of Christ as Represented in Art* (1894). As a preacher he is famous for his eloquence, and as a reformer he has shown great energy in the direction of *temperance*. In 1895 he was appointed Dean of Canterbury.

Farren, Eliza, an English actress, was born in 1759, and made her début in London in 1777. Besides being a clever and graceful artiste, she possessed great beauty and personal attractions. On 1st May, 1797, she became the wife of the 12th Earl of Derby, and died in April, 1829.

Farr'ier (Old Fr. *ferrier*, from Lat. *ferrum*, 'iron'), a name given to the early representatives of the veterinary surgeon, who to their ordinary occupations as blacksmiths and horse-shoers added that of prescribing for the ailments of domestic animals. In many country districts the F. is still extant. It is needless to remark that his ideas on veterinary matters are marked by much prejudice and ignorance, not, however, unmingled with the rough and ready knowledge obtained by observation.

Farriers, Army, the name given to members of the cavalry regiments, artillery, engineers, and army service corps, who assist the veterinary regimental surgeons, and act as horse-shoers. They rank with and receive the pay of sergeants, and have certain allowances arising out of their occupation. Classes are held (1st June to 31st July) at the Aldershot Veterinary School, which are attended by officers, farriers, shoeing-smiths, and men (in training for the last-named position) of these mentioned corps, and by officers of the Indian Staff Corps, and certificates are granted to those who pass the qualifying examination.

Fars or **Fars'istan** ('Fars' is the native form of the classic *Pers*-ia), a province in the S. of Persia, bounded W. by Khuzistan, N. by Irak, E. by Kirman and Laristan, and S. by the Persian Gulf. Area, 53,125 sq. miles; pop. about 1,364,000. F. comprises the Dashtistan, a sandy, thinly-peopled plain fringing the Persian Gulf, and an upland district, formed by offshoots from the Yagros range, which rise in steep terraces, and are severed by long fertile plains abounding in rich pasture. Around Shiraz there are delightful woody valleys almost destitute of inhabitants, but the E. consists of arid sandy tracts. The chief rivers are the Band Amir or Araxes, the Nabon, and the upper waters of the Tab. F. contains the salt lakes of Nivis and Mahaln. The chief products are fruit, opium, tobacco, cochineal, attar of roses, dates, saffron, hemp, cotton, silk, sulphur, and lead; cutlery, arms, glasswork, cotton cloths, and wine are manufactured. Many sheep, horses, cattle, camels, and asses are reared in the province. The principal towns are Jahrum, Darabgird, Fasa, Firazabad, Kazirun, and Shiraz. F. is famous for its antiquities, of which the most notable are the ruins of Persepolis, Pasarga, and Shakpur. F. belonged to Cyrus the Great before the rise of the Persian Empire.

Farsan' Archipelago, a group of islands in the S.E. of the Red Sea, off the coast of Asiryemen. Only two are of any extent—F. Kebeer, 31 miles long, and F. Seggeer, 18 miles. Sharp, outstretching reefs render them dangerous to shipping.

Far'thing (Old Eng. *feorthung* and *feorthling*, 'the fourth part of anything') now denotes a copper coin, the fourth part of a penny. The term is sometimes applied to articles or circumstances of contemptible value, *e.g.*, a farthing rushlight.

Far'thingale (in 16th c. *verdingale*; from Fr. *verdugalle*, or *vertugade*, a corruption of *vertu-garde*, 'guard of modesty'), a large hooped petticoat worn in the 16th c. See CRINOLINE.

Fa'sa, a town in the province of Fars, Persia, 77 miles E.S.E. of Shiraz. It has manufactures of silk, wool, and cotton. The pop. has been estimated at 18,000. The *district* of F. is 45 miles long by 9 to 15 broad, and, shut in by mountains, is generally known as the *Garm Sar*, or 'warm region.' It produces rice, Indian corn, millet, cotton, and fine tobacco, and contains thirty-three villages.

Fasa'no, a town of S. Italy, in the province of Bari delle Puglie, on the high road from Bari to Brindisi, near the coast, and 33 miles S.E. of Bari. It is famous for its olive plantations. On the coast near F. is the ruined *Egnazia*. Pop. 18,583.

Fas'ces (from the same root as the English 'bind') were a bundle of birch (sometimes elm) rods, with an axe stuck in the midst, the iron of which projected from them. They were carried by officers called lictors before the superior magistrates of regal, republican, and imperial Rome, as a sign of their power of scourging and of capital punishment. When an inferior met a superior magistrate, he ordered his lictors to lower their F., as a mark of respect; and, in the same manner, the consuls at the public assemblies acknowledged the sovereignty of the people.

Fasces.

Fas'cia. These are strong membranes formed of connective tissue which cover the muscles, send septæ or partitions in between them so as to give them support, and in many cases give points of origin to muscular fibres. They are smooth, glistening, and opalescent in appearance to the naked eye. When a portion is teased out and examined under the microscope, they are found to be composed of delicate fibres of connective or white fibrous tissue firmly matted together.

Fascicula'ria, a well-known genus of *Polyzoa* (q.v.) found in a fossil state in rocks of Tertiary age. This genus (of which *F. cerebriformis* of the Miocene rocks is a familiar species) presents a singular structure from the cœnœcium or connecting medium of the *Polyzoon* being more or less spherical in form, and composed of vertical plates arranged not unlike the convolutions of the human brain.

Fascination by Serpents. See SERPENTS, FASCINATION BY.

Fascines' (Lat. *fascis*, 'a bundle of twigs'), bundles of brushwood, generally about 9 inches in diameter, and from 6 to 12 feet long, used in war to fill up a ditch, &c. In civil engineering F. are used to protect the banks of rivers, &c.

Fasci'ola, the name of the genus of *Trematoda* (*Scolecida*) to which the Flukes (q.v.) belong. *F. hepaticum* is the scientific name for the common liver fluke, formerly known as *Distoma hepaticum*.

Fasciola'ria, a genus of Gasteropodous mollusca represented by the tulip whelk and allied species. These shells belong to the family of the *Muricidæ* or Whelks (q.v.).

Fash'ion (Fr. *façon*, 'a mode,' from the Lat. *facio*, 'I make'), literally a particular manner of making anything, is a term applied to a prevalent mode of dressing, speaking, and acting, and even to literary styles and to opinions current in society. F. may thus be an index of deep changes, a result of peculiar social conditions, or the passing reflection of the idlest whim. Thus the broad contrast between the flowing, richly-coloured robes of the East and the dress of Europeans is due to difference of climate and manners of life, while the constant variations of dress in Europe arise mainly from caprice. F. in dress seems to have fluctuated far less in ancient than in modern times. In classic Greece there was comparatively slight variety in costume, and in the arrangement of the filleted or unfettered hair. Plautus, however, tells us that the Roman matrons often altered the materials and shape of their garments. In England there have been several broadly marked fashions of dress. The early English settlers in Britain wore ringed armour and square helmets in war, woollen tunics, short cloaks, and drawers in peace. Their hair was long, and they practised tattooing, though it was forbidden by an edict in 785 until the Norman conquest. The Normans introduced brighter and more costly dresses. Short mantles and long tunics, of brilliant silks and velvets, lined with furs, flowered with gold, and often stiff with jewels, were worn by the nobles, and peaked-toe shoes (*ocreæ rostratæ*) were common. The most minute and faithful picture of English mediæval fashions is to be found in Chaucer's Prologue to the *Canterbury Tales*. In the 16th c. French fashions spread into England, Germany, and Italy. In England during Elizabeth's reign the costume of the wealthy was remarkable for splendid colour and lavish and often fantastic ornament. Men wore slashed doublets of silk, velvet, or damask, jewelled and embroidered with gold and silver, trunk-hose of grotesque width, and cloaks, sometimes short, sometimes trailing on the ground, of red, white, violet, black, green, &c. The female apparel was specially marked by the high linen ruff, and huge Farthingale (q.v.). The reign of Charles I. is the age when English costume was most becoming and picturesque. Van Dyck's portraits have made us familiar with the cavalier dress—the crimson doublet or gold-worked buff coat, the broad plumed Flemish hat, the rich lace collar, the long fringed breeches, the cloak, baldric, and Spanish rapier. The female dress became very graceful, the ruff and farthingale being disused. In Charles II.'s time the King Charles costume was spoiled by extravagant additions, such as petticoat breeches and perukes. The dress of the ladies lost its tasteful simplicity, as is seen by comparing Lely's with Van Dyck's paintings. The 18th c. in England was the age of the Louis XIV. dress, the age of powdered wigs, blue or scarlet coats, embroidered waistcoats, knee-buckles, and high-heeled shoes. In this century it was at one time the F. to carry the hat under the arm instead of on the head, to place black patches on the face, and to stiffen the coat skirts with wire. Fans, canes, and snuff-boxes were incessantly manipulated, a F. which evoked the raillery of Addison and Pope. After the French Revolution more sober costumes were adopted. F. in dress has at times gone to such excess as to call forth royal interference. Thus in England about the middle of the 16th c. there was such a mania for square-toed shoes, that an edict was passed forbidding anyone to wear shoes above six inches broad at the toes. Queen Elizabeth, we are told, placed 'certain grave citizens' at the London gates to cut all ruffs above a 'nayle of a yeard' deep, and to break all rapiers above a yard long. Charles V. of France forbade the wearing of short and tight breeches, which had become a public scandal. There are fashions in literature as well as in dress and social etiquette. After the Renaissance it was the F. to write Ciceronian prose; Euphuism (q.v.) was a literary F. for a time prevalent in England; during one age the sonnet, during another the epic, has been the favourite form of poetry, each successful author inducing others to imitate his theme and manner by the example of his success and influence of his authority. Anagrams, *bouts-rimés*, and similar follies arose from a literary F. now happily decayed. See Planché's *British Costume*, La Bruyère (*Sur les Mœurs*), and Hazlitt's essay on F.

Fash'oda (formerly *Denab*), town and fort on the Upper Nile, lies in the Shilluk country, 380 miles S. of Khartum, in lat. 10° N. Before the Egyptians retired from the Sudan, they maintained a garrison here and exacted a poll-tax from all boats passing up or down the river, which necessitated a delay of some days. Little is known of the place before 1869, and nothing has been reported since the appearance of the Mahdi.

Fastern's, Fasten, or **Fasting Even**, an old Scotch and English name for Shrove Tuesday (q. v.).

Fasti (Lat. *fas*, 'divine law,' or *fari*, 'to speak'; hence *dies fasti* are *lawful days, i.e.*, on which business might lawfully be transacted before the prætor, or days on which judgment could be pronounced—court days) were arranged by the Romans in two divisions:—1. *Fasti sacri* or *kalendares*. These were tables closely resembling a modern almanac, and contained the lore with respect to the days of the year, &c., which for nearly four centuries and a half after the foundation of Rome was retained by the priests, but was then disclosed by Cn. Flavius, who had obtained access to the pontifical books. They contained the months and days of the year, with the nones, ides, market-days, lawful days, unlawful days, the different festivals, &c.; astronomical observations on the rising and setting of the fixed stars, and the commencement of the seasons; and notices of great victories, dedications of temples, &c. Specimens of these F. on stone and marble have been discovered from time to time, the most remarkable being that known as the *Kalendarium Prænestinum*, laid bare in 1770. The F. is the title of a well-known poem of Ovid, which treats of the festivals, &c., according to the order of the Julian Calendar. 2. *Fasti annales* or *historici*. From the resemblance in arrangement of the early historical records to the *F. Kalendares*, the name F. was extended to the registers of consuls, dictators, censors, &c., and generally to the chronicles of the events of each year. The *F. Capitolini*, excavated from the Forum in 1547, arranged by Cardinal Alessandro Farnese, and deposited in the Capitol, are regarded as a most important specimen of this class.

Fast'ing ('fast,' Old. Eng. *faest*, means lit. a 'keeping' away from food, and is the same word as the adj. fast = 'firm,' as in hold-*fast*, stead-*fast*) is a practice based upon the instincts of human nature, and common to all religions. As the effect of deep sorrow is to take away all desire for food, F. has always been regarded as a natural expression of sorrow for sin; and as a formal religious practice the object of it would be to afflict and humble the soul by withholding from the body its ordinary nourishment. 'Afflicting the soul' is the phrase used for it in the Bible (Lev. xvi. 29, 31), evidently as a familiar shortened expression for the fuller phrase of Ps. xxxv. 13, lxix. 10. Having, like asceticism generally, its original home in Asia, it was much practised by the ancient Hindus, Chinese, and Persians, and to a less extent by the Jews; it entered into the religious rites of the Egyptians, Greeks, and Romans, and descended to the Christian Church.

I. *Among the Jews.*—The only fast enjoined upon the Jews as a nation by the law of Moses was on the great day of atonement. Whosoever failed to keep that day with F. was to be cut off from among his people (Lev. xxiii. 29). But there are numerous instances recorded of individuals voluntarily imposing fasts upon themselves in seasons of penitential sorrow, as David (2 Sam. xii. 16), and Ahab (1 Kings xxi. 27); and the vow of Num. xxx. probably referred chiefly to F. A number of other individual cases recorded, as Hannah (1 Sam. i. 7), Jonathan (1 Sam. xx. 34), David (2 Sam. i. 12, iii. 35), had no special connection with religion, but were prompted by sheer grief. Even national fasts were imposed on special occasions, as when the Israelites were defeated by the rebel Benjamites (Judges xx. 26), at Mizpah on the restoration of the ark (1 Sam. vii. 6), under Ahab (1 Kings xxi. 12), and under Jehoshaphat (2 Chron. xx. 3). After the Temple was destroyed, and the people carried into captivity and prevented from worshipping God by means of sacrifices, they attempted to make up for this by an increased observance of fasts, as expressed in a prayer in the Talmud—'Lord of the universe! thou knowest that when the Temple existed, the man that sinned brought a sacrifice, and though only the fat and blood were offered, yet he was forgiven. Now that I fast, and my own fat and blood are consumed, let it please thee to accept this sacrifice . . . as if offered upon thine altar, and be merciful unto me.' The following fasts took their rise during the post-exilian period, and are observed by the Jews to the present day for the reasons assigned. 1. Annual national fasts: 1st, The fast held on the 17th of Tamuz, the fourth month, because on this day (1) the Golden Calf was made, (2) Moses broke the Tables of the Law (Exod. xxiv., *cf.* xxxii.), (3) the daily sacrifices ceased for want of cattle when the city was besieged, and (4) Jerusalem was stormed by Nebuchadnezzar (Zech. viii. 19; Jer. lii. 6). 2nd, The fast held on the 9th of Ab, the fifth month, because on this day (1) God decreed that those who left Egypt should not enter Canaan (Num. xiv. 27-35), (2) the first Temple was destroyed by Nebuchadnezzar, and the second by Titus, (3) the city of Bethar was taken by Adrian, and 580,000 Jews massacred, and (4) the site of Jerusalem was ploughed up, as predicted by Micah (Jer. xxvi. 18; Zech. vii. 3, 5, viii. 19). 3rd, The fast held on the 3rd of Tishri, the seventh month, because on that day Gedaliah and other Jews were murdered at Mizpah (2 Kings xxv. 25; Jer. xli. 1-7; Zech. vii. 5, viii. 19). 4th, The fast held on the 10th of Tebeth, the tenth month, because on that day Nebuchadnezzar began the siege of Jerusalem (2 Kings xxv. 1; Zech. viii. 19). 5th, The fast of Esther, held on the 13th of Adar, the twelfth month (Esther iv. 16, 17, ix. 31). 6th, The first-born sons' fast, held on the day before the Passover (Exod. xii.). 2. Weekly fasts were kept every Monday and Thursday between the Feast of the Passover and that of Tabernacles, and between that which followed (Lev. xxiii. 36; Num. xxix. 35-37) and the Feast of the Dedication, because Moses went up to Mount Sinai to receive the second Tables of the Law on a Thursday and came down on a Monday, *cf.* Luke xviii. 12.

II. *In the Christian Church.*—Although our Lord condemned the Jewish manner of keeping their fasts (Matt. vi. 16), and did not impose F. regularly on his disciples (Matt. ix. 14), he yet speaks of it along with prayer as a source of spiritual strength (Matt. xvii. 21), indicates that it would be beneficial to his disciples after his removal from them (Matt. ix. 15), and even practised it himself on a memorable occasion (Matt. iv.). It was practised and recommended by the apostles (Acts xiii. 3, xiv. 23; 1 Cor. vii. 5). From a very early time F. was a part of the discipline of the catechumens, preparing them for baptism, and it soon came to be regarded as also necessary before partaking of the Eucharist. This could not be, so long as the latter was connected with the Agapæ (q.v.), but in the 4th c. Basil, Chrysostom, &c., insisted on the guilt of giving the Holy Communion to persons not F. The bi-weekly Jewish fasts described above were soon received into the Church, Monday and Thursday, however, being changed to Wednesday and Friday in commemoration of the betrayal and sufferings of Christ. These fasts, which were observed every week except between Easter and Pentecost, did not last all day, but only till three o'clock, and hence were called *stations*, as if watches of the soldiers of Christ, and *half-fasts*. By the 3rd c. fasts came to be much practised as a safeguard against demons. But while the number of them increased, laxity in the observance of them also increased; for whereas at first F. meant entire abstinence from food, by the 4th c. many thought it sufficient to abstain from flesh and wine, which afterwards came to be the general understanding in the Western Church. The first four of the Jewish post-exilian fasts enumerated above were also introduced into the Church, according to tradition by Callistus, Bishop of Rome, about 223. To un-Judaise them they were connected with the four seasons (Lat. *jejunia quatuor temporum*, corrupted into Ember Fasts), being fixed by the Council of Mainz in the time of Karl the Great to the first week in March, the second week in June, the third week in September, and the week immediately preceding Christmas Day. More sacred than all the rest was the fast preceding Easter (see LENT), although up to the 4th c. it was left optional, and the exact length of it was not finally fixed till the 6th c., or, according to some, the 8th c. About the middle of the 5th c. a new fast was instituted in France and soon adopted elsewhere, under the name of the Litany or Rogation Days (q.v.), being the three days before Ascension Day. Besides these, and the Vigils (q.v.) or eves of holy-days, there were many other fasts having merely a local or partial observance. From the 6th c. F. began to be imposed as a mode of penance. In the *Penitentiary* of Theodore, Archbishop of Canterbury (668), three fasts of forty days each—before Easter, before the Nativity, and after Pentecost—are appointed to be held every year as special seasons of confession and penance. The fasts appointed to be observed by the Book of Common Prayer of the Anglican Church are Lent, the Ember days, the Rogation days, all Fridays except Christmas Day, and the vigils before certain festivals. See Blunt's *Dictionary of Doctrinal and Historical Theology*; Smith's *Dictionary of Christian Antiquities*; Bingham's *Ecclesiastical Antiquities*.

Fat is a tissue found in many parts of the body, and is composed of a meshwork of fine connected tissue, in which lie embedded cells called *F. cells*. These are round or oval if lying apart, but if they happen to be packed closely together, they may acquire an angular form. Their average size is from $\frac{1}{300}$ inch to $\frac{1}{600}$ inch in diameter. Each consists of a delicate transparent envelope of an albuminous substance, surrounding a single drop of fluid fatty matter. Young F. cells have a nucleus, but this becomes obscured, and may entirely disappear in old F. cells. Fatty tissue is sometimes termed adipose tissue. It is copiously supplied with blood-vessels.

Chemical Composition.—The F. of the human body is a mixture of margarine and oleine, which are in turn formed of a base, glycerine, combined with the respective fatty acids, margaric and stearic acids. The F. of oxen and sheep contains, in addition, another substance called stearin. During life it is in the liquid state, but it solidifies after death.

Uses of fat.—(1) It serves as a soft, elastic, and light packing for the various vacuities which are in the body. (2) It facilitates motion by diffusing pressure, and it also protects delicate organs from pressure. (3) It gives a smoothness to the contour of the body, specially observable in the graceful lines of the human female. (4) Being a bad conductor of heat, it prevents heat from escaping from the body, and thus assists in maintaining the equable temperature of the body. (5) Consisting largely of carbon and hydrogen, by its combustion in the lungs or in the tissues, it is a great source of animal heat, being converted, by union of its elements with oxygen, into carbonic acid and water. (6) It assists largely in the general nutrition of the body, almost every tissue containing more or less of this substance.

Source of fat.—F. is derived in the body from three sources—(1) from F. introduced as such in the food; (2) from hydrocarbons, such as starch and sugar, which are converted into F.; and (3) from a special kind of retrograde metamorphosis, or splitting up of the albuminous tissues.

Fa'talism (from *fatum*, what is spoken and therefore irrevocable) is, according to Leibnitz, of three kinds. There is the F. of Mahomet, which supposes that if the effect were predetermined it happened without the cause—*Kismet*, 'it is fated'; 'ye cannot will, unless the Lord willeth.' Next comes the F. of the Stoics, which taught men to be quiescent, for they were powerless to resist the course of things. There is a third F. held by Christians, which admits a certain destiny of things regulated by the providence of God. 1. Pure F., based on the Greek idea *eimarmenē*, 'what is allotted,' or *moira*, 'the awarded lot' (which is perhaps seen in the Homeric *aisa*, *aei ousa*), or on the Chaldæan idea of astrological fate, undoubtedly means that our actions do not depend on our desires or volitions, and that a higher power bends us to its will, against which it is vain to struggle (*ineluctabile fatum*). The reasoning of the Turk under impending calamity is (or was)—'If this is fated to happen, I cannot prevent it; if not to happen, why should I exert myself.' 2. The description of Leibnitz is unfair to the Stoics. Chrysippus undoubtedly held that the human will is always determined by motives, but he did not even maintain the modified form of F. according to which our character is made *for* us, and not *by* us, so that we should in vain attempt to alter it, and are therefore not responsible for our actions. There is in this, of course, a portion of truth, viz., the law of heredity, which has frequently given a powerful interest to psychological romance, and which is occasionally illustrated in actual life. But the position of the Stoics was practically the reverse of this. They laid stress on a man's power to transform and discipline his own mind, controlling or suppressing some emotions, generating others, forming new intellectual associations. They recognised the unchangeable laws of life, and endeavoured to bring the character into harmony with the Kosmos. It was the man of ill-regulated life who came into conflict with the overruling force—*Ducunt volentem fata, nolentem trahunt.* 3. It is an interesting question whether Christians are fatalists to any extent. The verdict of psychology is simple enough; the normal healthy human character is amenable to moral discipline, and we can improve it if we desire. But apparently the volitions tending to improve character are theoretically as capable of prediction as others. This view is entirely consistent with the Christian doctrine of the fore-knowledge of God, and with the predestination of the body of Christ. Nevertheless the Church has frequently condemned views of individual predestination. Many theologians contend that while free-will was lost by the fall, the bondage of the will to sin does not preclude absolute individual responsibility; although it is also maintained that nothing can be done without grace. But whatever may be said of Christian theology, it cannot be doubted that the preaching of the Christian religion has been one of the greatest anti-fatalistic influences in the world.

Fata Morga'na, the name of a sorceress in the Romance poetry of Italy, who showed her magic power by raising up visionary spectacles in the air; hence the name given in Italy to a mirage seen in the Strait of Messina—images of men, ships, houses, &c., showing themselves both in the air and the water.

Fateh-Ali-Shah, King of Persia, was born in 1762 and ascended the throne in 1798. Four years later, war broke out between Russia and Persia, owing to the former's aggressive policy in the direction of Georgia, and continued during eleven years. At length, in 1813 a treaty was signed between the powers under which the Shah ceded Georgia to Russia. In 1826 further disputes arose about the demarcation of the frontier and a war of two years resulted in the defeat of the Persians. F.-A.-S. died in 1834.

Fates. See PARCÆ.

Fa'ther. See PARENT AND CHILD, FAMILY, AND PATRIA POTESTAS.

Father Lasher, a species of Teleostean fishes, belonging to the Gurnard family (*Triglidæ*), and to the sub-family *Cottinæ* or Bullheads (q.v.). In this genus the head is very broad and flat. No scales exist. The dorsal fins are of moderate size, and no palatine teeth are developed. The F. L. has its head armed with long sharp spines. It is common on our coasts, and is frequently found amongst rocks and tangle at low water. Its average length is 10 inches; its upper parts are brown coloured, and its under parts white. Both are marbled with darker colours, and the fins especially are so marked. The F. L. is also known by the names 'long-spined cottus' and 'lucky proach.'

Fathers, Christian, or **Fathers of the Church**, is a title given to the ancient Christian writers who belonged to the communion of the Church. The name of *Apostolic Fathers* (q.v.) is given to those of the 1st c. who, according to tradition, were disciples of the apostles. Various limits of time down to which the name ought to be applied have been adopted—any time from the 3rd c. to the 7th c. A common division is to make the Patristic period end with the 6th c., and the Hierarchical begin with the 7th c. In its widest application the period extends to and includes St. Bernard in the 12th c., after which theologians receive the name of Scholastics. Not less various have been the estimates formed of the importance and value of their writings. As a rule, that estimate has been higher in the Roman Catholic Church than in the Protestant Churches. This is connected with the Roman Catholic doctrine regarding the Rule of Faith (q.v.), in which Tradition—at once the *interpreter* and the *supplement* of Scripture—plays so important a part. As the same authority is held to be due to the former as to the latter, it follows that the writings of the F., in which this tradition is chiefly contained, are inspired and infallible as well as Scripture. At the same time several Roman Catholic writers, when they started with the theory that doctrines were to be settled not by individuals, but by councils or the Church, have pointed out with remarkable candour the defects of the F. Protestants, who hold the Holy Scriptures to be the only infallible rule of faith and practice, in seeking to refute the Roman Catholic doctrine regarding tradition, went to the opposite extreme in their treatment of the F.: in seeking to drag to the light all the errors and faults of their writings, they naturally overlooked all that was valuable in them. Thus, although Daillé in his *De Vero Usu Patrum* (1631), the first thorough Protestant work that appeared on the subject, did not fail to point out their merits, the opinion generally adopted, at least by Calvinistic Protestants, was as one-sided as that of the Roman Catholics; and the prejudice against the F. which has been handed down among them, until quite recent times, as unreasonable as the adoration of the Church of Rome, for it was deemed right to despise, ridicule, and reject the whole body of their writings. It has been otherwise in the Church of England, which in her Church polity did not go so far as the Calvinistic Churches in opposition to Romanism, and in her doctrine did not so closely follow Augustine, who differed widely from the other F. She has always entertained great reverence for them, and the exaltation of them was a marked characteristic of the Tractarian revival.

Looked at without prejudice, the F. appear to be neither without great faults nor great excellences. Judged by the standards of the present day, they were very deficient. They were superstitious and credulous in a high degree. Only a few could be called learned, and as a body they were ill qualified to be interpreters of Scripture, being ignorant of the original languages, and too fond of allegorizing. On the other hand, they were laborious and diligent, devotedly attached to the religion they professed, and zealous and courageous beyond all praise in its defence. To judge them fairly, they must be viewed in the light of their own time; and, taken for neither more nor less than what they are, their writings are of incalculable value for tracing the development of doctrine and practice in the early Church. Among the more famous of the F. may be mentioned (1st c.) Clemens Romanus, Polycarp, Papias; (2nd c.) Justin Martyr, Irenæus, Clemens Alexandrinus, Tertullian; (3rd c.) Origen, Hippolytus, Cyprian; (4th c.) Eusebius Pamphili, Athanasius, Basil, Chrysostom, Gregory Nazianzen, Ephraem Syrus, Hilary, Lactantius, Ambrose, Jerome, Augustine; (5th c.) Cyril of Alexandria, Theoderet, Theodore of Mopsuestia, Pope Leo I., Orosius; (6th c.) Procopius, Gregory the Great, Gregory of Tours, Gildas, Isidore, all of whom receive separate treatment. See Donaldson's *Christian Literature and Doctrine*, Davidson's *Sacred Hermeneutics*, Mosheim's *Church History*.

Fath'om (Old Eng. *faethm*; comp. Dutch *vadem*, Ger. *fadem*; perhaps connected with Lat. *spatium*, 'a space'), a measure of length in nautical surveying and in mining, 2 yards or 6 feet, *i.e.*, about the distance between the finger-tips of a man of average size when his arms are extended horizontally. It is also used metaphorically to express the reach of a man's capacity, 'I cannot fathom it' being equivalent to 'I cannot comprehend it.'

Fatima or **Fatimah**, a daughter of Mohammed and a wealthy widow, Chadidja by name, whom he first served as camel-driver and afterwards married, while he was under thirty years old. At an early age F. was married to her cousin, Ali, who was surnamed 'The Lion of God,' and stoutly supported his father-in-law after he assumed the character of a religious teacher. F. was much beloved by her father. She passed away a few months after his death.

Fat'imides, or **Fat'imites,** a dynasty of caliphs who ruled Egypt and the N. of Africa from the 10th to the end of the 12th c. They were so called from their founder, Obeidallah Almahdi, who declared that he was descended from Fatima, daughter of Mohammed, and wife of Ali, an assertion which most Arab historians disbelieve. Obeidallah, with the help of the Berbers, dethroned the last of the Aglabites, who governed at Tunis, and made himself ruler of N. Africa from the Atlantic to the borders of Egypt. Moez, the fourth caliph, subdued Egypt and founded Cairo. His fleets defeated the Spaniards, and his armies conquered Palestine and part of Syria. Hakem, the sixth caliph, was a fanatic, who proclaimed himself a god, and is still worshipped by the Druses. He persecuted the Christians with fierce bigotry, and was assassinated in 1021. In the reign of Mostanser, the eighth of the F., the Turks were driven back from Egypt. Mostali, the ninth caliph, was defeated by the Crusaders under Godfrey de Bouillon at Ascalon. During the reigns of his successors, the power of the F. dwindled away, until in 1169 the dynasty ended in Aladhed-Sidinallah, the fourteenth of the F., who was dethroned by Saladin, the founder of the Ayubite sultanate. See Mill's *History of Mohammedanism.*

Fats. The F. form an abundant group of compounds occurring both in the animal and vegetable kingdoms. In animals the secretion of fat takes place most abundantly immediately below the skin, and in the neighbourhood of the omentum and kidneys; in vegetables principally in the seed and fruit. All F. contain the elements carbon, hydrogen, and oxygen, united in various proportions. Together with many oils, they are characterized by the action which ensues when they are treated with superheated steam and caustic alkalies. By the first of these agents they are resolved into glycerine and a fatty acid; by the second, into glycerine and a salt of the fatty acid, or *soap*. F. are indeed the ethers of glycerine, and are lighter than water, in which liquid they are insoluble. They may be dissolved in ether, bisulphide of carbon, turpentine, &c. They melt when they are heated, their fusing point increasing with the proportion of carbon they contain. When strongly heated they are decomposed into acroleine, various hydrocarbons, &c. The most important of the animal F. is stearine, and of vegetable F. palmitine. They are employed in the manufacture of soap, glycerine, and candles, and in medicine in the preparation of ointments.

Fatt'y Acids. See OILS.

Fatty Degenera'tion is attended by a continually increasing accumulation of fat replacing the minute elements of tissue in different organs, and is essentially a sign of weakness or of death of the part, the elements of the tissues which perish being replaced by fat-granules. F. D. is quite distinct from accumulations of fat which do not replace other elements of tissue. Examples of F. D. may be seen in the minute elements of the muscular tissue, especially of the heart; in the acini of the liver, the blood-vessels, &c. Nearly all cell structures may undergo F. D., except, perhaps, red blood corpuscles, and the elements of nerve tissue. Yellow softening of the brain, however, is described as a form of F. D. *Arcus Senilis* (q.v.) is due to F. D. of the substance of the cornea, and is regarded as symptomatic of similar degeneration in other parts of the body. There is no kind of tissue, healthy or morbid, which may not undergo F. D., and it consequently gives rise to a great variety of local diseases. F. D. of the heart, or of the larger vessels, or of those passing through important organs, such as the brain, generally terminates in sudden death by rupture, followed by syncope.

Fatu'ity. See INSANITY.

Fat'uous, in law. A F. person is one who is not of right mind and is altogether foolish. A F. person, or an idiot, is legally incapable (see CAPACITY, LEGAL) of managing his affairs. See IDIOTS and LUNATICS.

Fau'ces, the Latin name of the throat, or opening between the mouth and the pharynx.

Fau'cher, Léon, a French statesman, was born at Limoges, 8th September, 1803, and first emerged into notice after the Revolution of 1830, when he began to write for the Liberal opposition papers. He had already given his attention to economics, proposing a southern union to counterbalance the German *Zollverein*, and arguing for common work in prisons, and the separation of town and country convicts for different kinds of work. In 1845 he published his valuable *Études sur l'Angleterre* (chiefly of the industrial centres), which did much to spread free-trade principles in France. In 1846 he entered the Chamber of Deputies, and spoke on the currency and on the reform of the customs tariff. In the Revolution of 1848 he occupied an independent position, criticizing the paper-money and other financial proposals of the Provisional Government, arguing against the limitation of the hours of labour, and suggesting that the masses in the national workshops, '*nourris par la patrie*,' being dangerous in Paris, should be sent to work on the railways. As Vice-President of the new Legislative Assembly he strongly opposed the tendency to sentimental, paternal government; he was always the unsparing critic of the Socialist budget. F., who believed in the possibility of a parliamentary government under the presidency of Napoleon, was for six months minister, but retired when the *plébiscite* by universal suffrage was proposed. He died at Marseille, 14th December, 1854. See his *Mélanges d'Économie Politique et de Finance* (Par. 1856), published by his friend Wolowski.

Fau'cit, Helen, an English actress, born in 1816, made a successful *début* as Julia in the *Hunchback*, at Covent Garden, London, in 1836. She soon rose to the summit of her profession, became a member of Macready's companies at Covent Garden and Drury Lane, and won wide repute for her refined, powerful rendering of Juliet, Beatrice, Imogen, Rosalind, Lady Macbeth, and other Shakespearian characters, and as the heroine in various pieces by Lytton, Browning, and Westland Marston. Her representation of Antigone was a remarkable success, and called forth an eloquent tribute from De Quincey. After her marriage with Sir Theodore Martin, in 1851, this gifted actress continued to appear at intervals on the stage, but only for charities, &c. The charming work, *On some of Shakespeare's Female Characters*, was published by her in 1885, and in this she sets forth, as studies, the characters of Beatrice, Desdemona, Imogen, Juliet, Ophelia, Portia, and Rosalind.

Fault, in geology, is a fracture, accompanied by a displacement, which breaks the continuity of the strata, altering the relative levels of contiguous portions.

Fault, in law. If the quality of a commodity sold prove inferior to what was represented, the buyer may reject it. Even if the buyer saw the goods, a *latent* F. may entitle him to reject them, and should they perish in consequence of it, he will be relieved from payment, or entitled to recover the price. But if the F. or deficiency of a commodity seen by the buyer is manifest, the rule is *Caveat emptor*, *i.e.*, the risk is the buyer's. Challenge on ground of F. must be without unnecessary delay.

Faun, or **Faun'us** ('the favourer,' from *faveo*, 'I favour'), in the mythic history of Italy was the third king of the Laurentes, and was noted for his devotion to hunting, cattle-breeding, and agriculture. He came to be worshipped both as a rural and as a prophetic divinity. His festival (the *Faunalia*) was celebrated on the 5th of December. F. was also the dream-god, hence he and his wife, Fauna, were known respectively as *Fatuus* and *Fatua*, the foretellers of destiny. His appearances under the images of fauns, half man, half goat, correspond with the satyrs of Greece; hence F. was identified with the Arcadian Pan after the myths of the Greeks had emigrated into Italy.

Faun'a, the name applied to indicate the entire *animal* population of any given continent, country, or region. The term is used in opposition to that of *flora*, applied to the *plant-life* of any district. The name F. is derived from the Roman fauns or satyrs, who were supposed to protect wild animals.

Fau'riel, Claude, a French scholar and critic, was born at St. Étienne, Loire, 21st October, 1772. After acting as private secretary to Fouché from 1799 to 1802, he devoted himself to literature, and became one of the most profound and widely accomplished scholars of modern France. In 1830 he was appointed Professor of Foreign Languages at Paris; and there for fourteen years he delivered most ingenious and learned lectures on comparative philology, the sources of French and Italian, the Spanish drama, Servian poetry, &c. F. died at Paris, 15th July, 1844. His great work is his *Histoire de la Gaule Méridionale sous la Domination des Conquérants Germains* (Par. 1836). It is a masterpiece of learned research and brilliant art. Another admirable production is *Histoire de la Poésie Provençale* (Par. 1846), in which he traces the origin of many of the chivalric ideas of honour, love, and gallantry in ancient poems of the Christians fighting with the Moors, or of the Aquitanians struggling against the Karoling kings. Another part forms a work on Dante and the Italian language (1854).

Fausse-Braye, a low rampart raised round a fortified place, now disused in fortification.

Fausse-Rivière ('false river'), a lake in Louisiana, U.S. of America, formerly a channel of the Mississippi; hence probably the origin of the name.

Faust. The F. legend, a favourite subject in European literature, arose during the struggles of Christianity with magic. Its main incident, the sale of a human soul to the devil, can be traced to the 6th c. tale of *Theophilus* by Eutychianus, which was translated by Germans and Scandinavians, occurs in Hroswitha and in the *Aurea Legenda*, and was popularised in the 13th c. by Rutebeuf's *Miracle de Théophile*. Hans Sachs has a similar story. In the 16th c. this legend of selling a soul was attached to the name of F. It has been said that the monks connected the tale with F. the printer in revenge for the injuries which his art caused their lucrative trade of book-copying; but the true protagonist of the modern version of the legend seems to have been a Georg or Johann F., perhaps the printer's son, *professor of magic* at Cracow University early in the 16th c. He was a reputed necromancer, known to Melanchthon, who relates tales of his *diablerie*. The Polish legend of Twardowski, the printer of Cracow, who sold himself to Satan, seems to have grown from a confusion of F. of Cracow with F. the printer. The first version of the old legend, thus associated with the name F., was given in the *Volksbuch* of Spiess (1587), and on it Christopher Marlowe based his *Tragical History of Dr. Faustus*. In the narrative of Spiess and Widmann (1599), Helen of Greece is bestowed by Mephistopheles upon F. in place of a legitimate wife, but Margaret has not appeared. In Scheible's *Das Kloster* (1728) we meet with 'a beautiful but poor girl,' whom F. is prevented by supernatural interference from marrying, and who in succeeding versions gradually rises in importance, and finally becomes the Margaret of Goethe. Attempts have been made to find a common origin for the legends of F. and Don Juan (q.v.), and C. Grabbe, a German dramatist, wrote a play in which both F. and Don Juan appear. The story is still popular in Germany. The most notable poems upon it are Klinger's *F.'s Leben* and Goethe's masterpiece. Lessing wrote a drama on the F. legend, which, with the exception of a fragment, is unfortunately lost. Goethe's *F.*, having been turned into a libretto by Barbier and Carré, received an operatic form from Gounod. The plot of Calderon's *Magico Prodigioso* is similar to the F. legend, as is an old French play, *Mystère du Chevalier qui donna sa Femme au Diable* (1505), and, in a less degree, Byron's *Deformed Transformed*. **Johann F.** or **Fust,** a goldsmith of Mainz, who, along with Gutenberg, Schöffer, and Coster, is accredited with the invention of printing by movable metal types. In 1450 he entered into partnership in the business of printing with Gutenberg (q.v.), whom he sued in 1455 for 2020 florins, which he had lent him—a loan which some maintain to be the only furtherance F. gave the new art. Decision being given against Gutenberg, F. acquired his printing apparatus, and, aided by Schöffer (q.v.), carried on the business prosperously until the sack of Mainz in 1462. F. died of the plague at Paris in 1466.

Fausti'na, Annia Galeria, married Antoninus Pius several years before the death of Hadrian, and when he became emperor, A.D. 138, received the title of Augusta. She died A.D. 141.—**Annia F.,** daughter of the preceding, married Marcus Aurelius about A.D. 145, and died 175. Both mother and daughter are noted for their infidelity to their husbands, and for the honours which their husbands, faithful to the unfaithful, heaped upon them before and after their decease. Attempts have been recently made to construct a more favourable reading of the character of the wife of Marcus Aurelius.

Fausti'nus I., a negro emperor of Haiti, originally Faustinus Soulouque, was born at Santo Domingo, 1789, served in various humble capacities, rose to the rank of captain in the army, and was eventually elected president of the republic in 1847. He caused a frightful massacre of mulattoes at Port-au-Prince, 16th April, 1848, and in the following year proclaimed himself emperor, continuing to reign till forced to abdicate by the revolution of 1859. He died 6th August, 1867.

Fava'ra, a town of Sicily, 4 miles E. of Girgenti, and near the left bank of the Hypsas, a tributary of the Acragas. A fine castle of the 14th c. is the most remarkable building. There are sulphur pits in the neighbourhood. F. has some trade in sulphur, olives, and other fruits. Pop. 16,842.

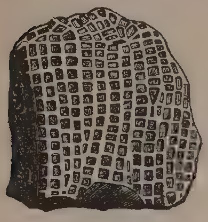
Fav'art, Charles Simon, born in Paris, 13th November, 1710, may be called the author of the *opéra comique* of the 18th c. He aroused the jealousy of the French and Italian comedians, and for some time carried on his theatre in the Flemish camp of Marshal Saxe. Madame F. was the first actress who had the courage to abandon the absurd *bergère de Watteau* dress on the stage, and to begin the reform of costume. The collected works of F. and his wife appeared as the *Théâtre de M. et Madame F.* (Par. 1763-72). F., who composed about sixty comediettas of merit, died 12th May, 1792. His son was an actor of some merit, and his grandson, **Antoine Pierre Charles F.** (born 1784), was also a dramatic author, a painter, and diplomatist, and with Dumolard issued the *Mémoires et Correspondence* of his grandfather (1809). An adopted daughter of Antoine, **Marie F.** (born in 1833), became famous as an actress in comedy.

Fa'versham, a seaport of Kent, opposite Sheppey Island, on a stream flowing into the E. Swale, and 47 miles E.S.E. of London. It consists mainly of four streets, which form a cross, with the market-place in the centre. The trade is principally in coal, timber, corn, hops, and fruit. There are also breweries, brickworks, and large powder-mills. The oyster fisheries, however, are the chief industry. F. is the old English *Fifresham*, where King Æthelstan held a witenagemot in 930. King Stephen built and endowed an abbey here in which he, his wife, and his son, Eustace, were buried. F. is said to be the scene of St. Crispin's apprenticeship. Pop. parl. div. of county 69,345; mun. bor. 10,478; reg. sub-dist. 14,925; and civ. par. 10,660.

Favigna'na (anc. *Ægusa*), an island 6 miles off the N.W. coast of Sicily, forming one of the Trapani Islands, the ancient *Ægates*. It is 6 miles long by 2 broad, is well watered, has rich pastures, and several quarries, and produces wool and excellent wine. The tunny and anchovy fisheries are extensive. Its chief towns are F. and San Giacomo, of which the former is the larger, having a pop. of 5846.

Fav'osites (Lat. *favus*, 'a honeycomb'), a genus of

Sclerodermic Corals (q.v.) found in a fossil state in the Silurian, Devonian, and Carboniferous rocks, but also represented by living species. They belong to the Tabulate division, and the family *Favositidæ* is recognised by having both septa and corallites distinct, with little or no connecting substance or cœnenchyma.



Favosites.

Favospon'gia, a well-known genus of Fossil Sponges (q.v.) occurring in the Upper Silurian rocks. This genus belonged to the section *Calcarea*, or that of the calcareous or limy sponges.

Fa'vre, Jules Claude Gabriel, born at Lyon, 21st March, 1809, of a mercantile family, came to the Paris bar about the time of the Revolution of 1830, and soon made a reputation by his striking appearances in some of the great political trials. He was an extreme Radical, very independent in character, and a powerful and ready, though somewhat bitter, speaker. After the Revolution of 1848 he held the office of Minister of the Interior, and drafted Ledru Rollin's election despatch to the local officials, which, though not unusual in French politics, was especially offensive in the case of a ministry pledged to the abstract rights of the people. On the President's election he passed into opposition, and spoke in favour of the freedom of the press and against the Roman expedition and the law of deportation. He refused to take the oath required by Napoleon after the *coup d'état*, and resumed his work at the bar. In 1858 he defended the political criminal Orsini, and subsequently entered the *Corps Législatif*, where he always spoke on the extreme Left, supporting the Austrian war of 1859 and condemning the Mexican expedition. At the Paris elections of 1869 he was run close by Rochefort, the editor of *La Lanterne*. In September, 1870, F. became Minister of War, and attempted at Ferrières to negotiate an armistice, during which a Constituent Assembly might be elected, but the conditions required by Bismarck were too harsh. He afterwards held the portfolio of Foreign Affairs, but in 1871 withdrew again to the bar. In 1876 he was elected to the Senate for Rhône department. F. was a member of the French Academy, an honour merited by his classic eloquence. He died 20th January, 1880.

Fawcett, Right Hon. Henry, the son of William F., an alderman and magistrate of Salisbury, was born at Salisbury in 1833, educated at King's College School, London, and at Trinity Hall, Cambridge, where he graduated with high mathematical honours as B.A., in 1856, and took the degree of M.A. in 1859. On 17th September, 1858, he was accidentally shot in the eyes by his father while partridge-shooting, and totally deprived of sight. In spite of this great calamity he kept up his studies, and with indomitable courage continued to the end of his life to engage in riding, fishing, and other athletic exercises in which he delighted. By his political essays he soon gained a considerable reputation, and in 1863 was elected Professor of Political Economy at Cambridge. In 1864 he published his *Manual of Political Economy*, in 1865 his *Lectures on the Economic Position of the British Labourer*, and in July of the same year was elected M.P. for Brighton, for which he was again returned in 1868. He opposed and defeated the Irish Universities Bill in 1873, and to this may be attributed the loss of his seat for Brighton in 1874. But in the same year he was elected for Hackney, for which he was again returned in 1880, when, on the formation of Mr. Gladstone's administration, he was appointed Postmaster-General, in which capacity he inaugurated many valuable reforms, particularly in the money order and savings bank systems. He was the originator of the Postal Order, Parcel Post, and Post Office Annuities schemes, reduction in cost of money orders, penny postage stamp savings cards, &c., while he had in contemplation the inauguration of sixpenny telegrams afterwards carried out by his successor. F. also showed himself anxious to improve the condition of Post Office employés, introducing or contemplating the introduction of many reforms for their benefit—benevolent schemes which his premature death frustrated. He also largely extended the employment of women in the Post Office. F. married, in 1867, Millicent, daughter of Newson Garrett, of Aldeburgh, Suffolk, the authoress of *Tales in Political Economy* (1869), and, jointly with her husband, a volume of essays and lectures. The University of Oxford in 1880 conferred on F. the degree of D.C.L., and in 1882 the University of Wurtzburg that of Doctor of Political Economy. In 1883 he was elected Lord Rector for Glasgow University. On 6th November, 1884, he died at his own house in Cambridge, after a few days' illness, of pleurisy. His life was a bright example of what can be accomplished in the face of difficulty and what seemed a crushing calamity by courage and perseverance.

Mrs. Fawcett is one of three sisters who have all by their talents taken a prominent position in public life. One, Dr. Garrett-Anderson, was the first lady licensee of the Apothecaries' Hall, and became Dean of the School of Medicine for Women. Since her husband's death, Mrs. Fawcett's pen and voice have constantly been used for the furtherance of social reforms, especially in the interests of women and the working classes. She has energetically advocated the Higher Education of Women and the extension of the parliamentary franchise to women. In 1889 she was appointed President of the Women's Unionist Association.—**Philippa Garrett F.**, daughter of the Rt. Hon. Henry and Mrs. Fawcett, was born in 1868, and was educated at Clapham High School, Bedford College, and Newnham College, Cambridge, where she won a scholarship and achieved the high position, in the Mathematical Tripos of 1890, of being ranked above the Senior Wrangler.

Fawkes, Guy (properly **Guido**), an English gentleman, born of a Protestant family at York in 1570. At an early age he became a Roman Catholic, and on his return from the Low Countries, where he had served in the Spanish army, he became head of the Gunpowder Plot (q.v.), a conspiracy formed by several fanatical Catholics for blowing up James VI. and the members of the Commons and Lords, on 5th November, 1605. F. was seized when about to fire the train, was put to torture, and executed in Palace Yard, Westminster, 31st January, 1606. It was formerly the custom in English towns to burn his effigy every 5th November.

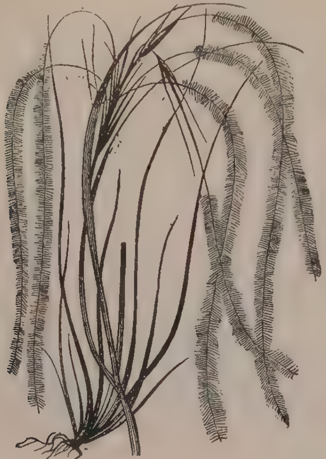
Fayal' or **Faial** (Port. *faya*, 'a beech-tree'), one of the Azores (q.v.). It is extremely fruitful, grows myrtles, firs, palms, pine-apples, vines, and orange-trees, and exports largely fruit and wine. Horta, the capital, is a favourite 'port of call,' for provisions and repairs. Pop. 23,630.

Faydit or **Faidit, Anselme**, born at Limousin, at an early age took to a strolling life, as a juggler, buffoon, and finally as troubadour. He attracted the attention of Richard Cœur-de-Lion in the course of an entertainment, and the King became his patron. He accompanied his master to Palestine, and died in 1220.

Fayûm' or **Fayoom** (from the Coptic *Pi-om*, rendered by Wilkinson 'the cultivated land,' and by Mariette 'the sea'), a division or *murdirieh* of Upper Egypt, on the W. side of the Nile, about 65 miles S.W. of Cairo, and 30 miles W. of Beni-Suef. It lies in a depression of the Libyan waste, and is only connected with the Nile valley by a single gorge. Area, 493 sq. miles, 100 of which are occupied by the Birket-el-Kerun ('the horned'), the Lake Mœris of the Greeks. In spite of an arid soil, F. is one of the richest parts of Egypt, yielding figs, dates, grapes, apricots, olives, and roses for the perfume factories. Medinet-el-F., the capital, stands about 25 miles to the S.E. of Lake Birket-el-Kerun, and on the site of the ancient Krokodilopolis. Pop. 228,709.

Fealty (Old Fr. *féalté*, from the Lat. *fidelitas*), in English law, was the oath of fidelity sworn by the vassal to his lord. Under this oath the vassal or tenant bound himself to do his lord no bodily injury, and no harm in his house secretly, in his reputation, and in his possessions; and also to offer no impediment but rather to assist his lord in doing good. The word has not now any practical signification.

Feather Grass, a genus of grasses, so named from the great development of the awns, which in many species resemble a feather, as in the common F. G. These grasses occur more abundantly on the Continent than in Britain, and are frequently used in room decorations, the long awns having an elegant and graceful appearance. They are often dyed. The awns are supposed to favour the dispersion of the seed, and its feration in the soil.



Feather Grass.

Feathers, the name given to the characteristic appendages of the skin of Birds (q.v.). They present the exoskeleton or outer skeleton of birds, just as scales represent that structure in fishes, reptiles, &c. They are formed in little *papillæ*, or rounded processes of the *dermis*, or true skin. The papilla which gives origin to a feather exhibits a deep middle groove on one side, this groove being broadest and deepest at its base, but shallower as it approaches the extremity of the papilla. Other grooves, which may be called *secondary*, are given off at right angles from the primary groove. These secondary grooves are closely set, and extend almost wholly round the papilla, but vanish at the side opposite to that on which the median primary groove is situated. Smaller grooves, which may be named *tertiary*, are given off from the secondary grooves, and these tertiary grooves lie in a manner parallel to the primary groove. A feather is formed on such a papilla much in the same manner as fluid metal is shaped in a mould. Horny matter secreted by the skin is pushed over the papilla, and naturally becomes thickest where the grooves are deepest. Thus, as the horny matter is pushed outwards, the material deposited in the central and primary groove becomes the *quill* or *shaft;* the matter deposited in the secondary grooves forms the *barbs*, which together compose the *web;* and the horny substance contained in the tertiary grooves forms the little *barbules*, or processes borne on the *barbs*, which bind the latter together to form the *vane* or *web*. These are the parts seen in any ordinary feather. The quill or barrel of the feather is its last-formed portion, and that by means of which it is inserted in the skin of the bird. The lower surface of the shaft exhibits a groove, the shaft itself consisting of a spongy white pith enclosed in a tough membrane. At the lower aspect of the shaft the barbs of the F. are disconnected, and form downy filaments; *down* itself, well seen in the under layer of F., especially in aquatic birds, consisting of a number of barbs, without any central shaft, united by a short quill. A small or miniature feather, often termed the *rachis, accessory plume*, or *plumule*, exists at the point where the quill and shaft unite. In some birds the rachis may be as large or larger than the feather itself, and in such birds as the ostriches, emus, and their allies, the barbs of the F. are not united to form a web, but are disconnected and free. It is this peculiarity of structure which gives to the ostrich F. their singular grace. In the cassowaries and other birds, the texture and appearance of the F. become singularly altered, and give to these birds the appearance of being clothed with long black hair.

The F. of birds receive various names, according to their situation. Those attached to the bones of the 'hand' are named *primaries;* the *secondaries* are attached to the forearm, and the *tertiaries* to the arm. The F. attached to the shoulder-blade are the *scapularies.* The *bastard wing* or *alula* is the name given to the collection of F. supported by the rudimentary *thumb*. The quills of the wings are covered at their bases by small F. forming the *wing-coverts*, the tail F. or *rectrices* being similarly protected by *tail-coverts.* F. once fully formed do not *grow.* They are mere appendages, and are therefore mostly renewed by new F. being developed, and by the moulting of the previously formed plumage. Changes of colour are observed in F., due probably to chemical action.

F. are applied to many useful and ornamental purposes, especially those of the ostrich, the rhea or American ostrich, emu, birds of the heron kind, adjutant and Marabou stork, birds of paradise, argus pheasant, and many other common birds. The plumage of the male ostrich is most esteemed, that from the back and above the wings being preferred to that of the wings and tail. These F. adorn ladies' bonnets, and form military plumes, &c. Other ornamental F. are chiefly devoted to the preparation of ladies' head-dresses, artificial flowers, wreaths, fans, ornamental screens, &c. The soft F. and light elastic down procured from swans, geese, ducks, and fowls, are extensively used for stuffing beds, cushions, &c. France supplies Great Britain with large quantities of goose and duck produce, and smaller quantities are obtained from Germany and Holland. Goose F. are most appreciated for their softness and elasticity. The down of the eider-duck is much valued for quilts on account of its warmth and softness, but its matting character when lain upon keeps it from being much used for stuffing beds. Articles of clothing are made in different countries of birds' skins.

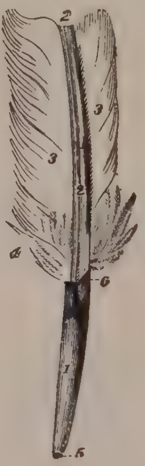


Fig. 1.—Parts of a Feather.

1, Quill; 2, Shaft; 3, 3, Vane or Beard; 4, Accessory Plume; 5, Lower Umbilicus; 6, Upper Umbilicus.

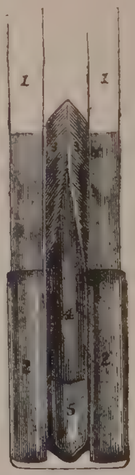
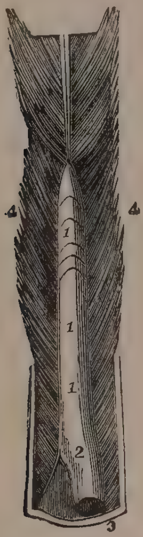
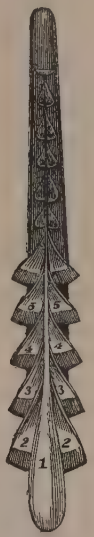


Fig. 2.—Matrix of a growing Feather laid open.

1, 1, Capsule of matrix; 2, 2, External membrane; 3, 3, Matter of the vane; 4, Internal membrane; 5, Bulb or medulla.

Brazilian tribes make garments of the rich and varied plumage of native birds, and the Greenlanders wear the skins of waterfowl, turning the F. to the inside. Tippets, muffs, and many other articles used by ladies are likewise made of F. A special fabric, composed of upper and lower layers of wool, and a thick intermediate one of down, the whole being carded together, is now manufactured in France for use as ladies' cloaks and other apparel. Spinning is performed by hand, and the wool-down is woven in the ordinary way with a warp of worsted.





Structure of the Bulb.

Fig. 3.

1, 1, 1, Bulb; 2, Part of the bulb in process of drying up as the shaft forms; 3, Part of completed shaft; 4, 4, Growing barbs.

Fig. 4.

1, Medulla or bulb; 2, 2, 3, 3, 4, 4, 5, 5, Membranous cones, indicating stages of growth of medullary matter.

Quill-pens are made from the hollow tubes of swan, goose, and crow feathers. The quills of the Solon goose are used as floats for rod-fishing. In many parts of the world quills are employed for making ornamental baskets, cigar-cases, &c. Goose quills dyed various colours are made into ornamental articles by the Slave Indians of N. America, and in the East peacocks' quills are similarly used. The following table affords information concerning the importation of F. into the United Kingdom. It would appear that Germany, France, China, and the U.S. of America are our chief suppliers of F. and down for beds, and that we obtain ornamental F. principally from the Cape of Good Hope, France, Holland, Bombay, U.S. of America, and Bengal.

IMPORTS OF FEATHERS AND DOWN INTO THE UNITED KINGDOM DURING THE YEAR 1894.

Feathers and Down for beds, in beds, or otherwise, from	Cwts.	£
Germany	7128	29,254
Holland	1038	5371
Belgium	188	1029
France	6744	19,124
Portugal	875	1322
Turkey	255	1385
China	4912	12,773
Japan	459	1379
U.S. of America	2387	4041
Other foreign countries	369	1617
Total from foreign countries	24,355	77,295
Hong Kong	1917	4668
Other British possessions	111	459
Total from British possessions	2028	5127
Total	26,383	82,422
Ornamental Feathers, from	Lbs.	£
Germany	$7803\frac{5}{16}$	3995
Holland	101,996	52,375
Belgium	4197	4989
France	$307,070\frac{7}{16}$	329,814
Tripoli	$2735\frac{8}{16}$	1700
U.S. of America	41,887	9384
Colombia	836	3513
Venezuela	749	11,860
Brazil	$3463\frac{7}{16}$	4152
Argentine Rep.	11,538	7210
Other foreign countries	5626	3352
Total from foreign countries	$487,901\frac{11}{16}$	432,344
Cape of Good Hope	$316,889\frac{13}{16}$	511,436
Bombay	$60,747\frac{12}{16}$	13,715
Madras	581	238
Bengal	34,747	15,083
Straits Settlements	1228	1645
Ceylon	309	909
Australasia	$11,417\frac{9}{16}$	2867
British W. Indies	665	1921
Other British possessions	1636	1301
Total from British possessions	$428,221\frac{2}{16}$	549,115
Total	$916,122\frac{13}{16}$	981,459

Feather Star, a species of *Crinoid* (q.v.) *Echinodermata* (q.v.), which in its earlier stages exists in a stalked condition, but in the adult state is met with as a free starfish form. The F. S. derives its name from its ten arms or rays being provided with numerous little *pinnæ* or processes, which give the arms a feathered appearance. The F. S. was formerly included in the order *Asteroidea* with ordinary starfishes, its early history being then unknown to naturalists. When first discovered in its young and attached state, it was thought to be a new form of *crinoid*, and as such was named *Pentacrinus Europæus*. But when this new crinoid was observed throughout its entire history, the star-like head was seen to detach itself from its stalk, and afterwards (as the F. S.) to live a free existence. The discovery of its early and attached condition at once showed that the F. S. was a true crinoid, and not an ordinary starfish, which is free and unattached throughout its entire existence. The arms are used by the F. S. as locomotive organs; and the internal organs are confined to the central body or *disk*, and do not, as in ordinary starfishes, send prolongations into the rays. The young or larva of the F. S. is an ovoid creature with four ciliated and transverse bands, and a small mouth and end. The young F. S. is developed within this primitive embryo. The F. S. is widely distributed; it occurs in certain localities on the British coasts.

Febric'ula (Lat. 'a little fever') is a fever of short duration and mild character. The simplest form is Ephemera (q.v.), but the more severe, called *simple continued fever*, may last seventy-two or more hours. See FEVER.

Feb'rifuge (Lat. *febris*, 'a fever,' and *fugo*, 'I drive away'), a medicine having the property of curing a fever, such as mineral and vegetable acids, potassæ chloras, P. citras, P. nitras, &c.

Febro'nianism is a development or a phase of Jansenism (q.v.) which made its appearance in the Roman Catholic Church in Germany towards the end of last century. Among other things F. asserted the independence of national churches. It was so called after Justinus Febronius, the *nom de plume* adopted by J. H. von Hontheim in his work *On the State of the Church and the Legitimate Authority of the Roman Pontiff* (1767).

Feb'ruary, the second month of the year, was, along with January, introduced into the Roman calendar by Numa Pompilius, who allotted twenty-nine days to it, except in leap years, when it had thirty. Augustus, however, transferred one day from F. to the month named in his honour, that it might be inferior to no other month of the year. The name F. is derived from *Februare*, 'to purify,' because on the 15th of F. the *Februa* or *Lupercalia*, the Roman festivals of lustration and expiation, were held. Some consider (from the coincidence of the time of year) that the Christian festival of the Purification of the Virgin on Candlemas Day was engrafted upon the Roman rite.

Feb'ruus (Lat. *februa*, 'purifications,' a word of Sabine, or according to others of Etruscan, origin), an ancient Italian divinity in whose honour lustrations were celebrated on the 15th of February, which thus took its name from him. As these were supposed to produce fertility among men and beasts, Juno likewise, as the goddess of marriage, was designated Februata. F. was sometimes identified with the god of the infernal world (*Hades*), because the festival for the dead (*Feralia*) was also celebrated in February.

Fécamp, earlier **Fescan** or **Fescamp** (Lat. *Fiscanium* or *Fiscarium*), a seaport of Seine Inférieure, France, on the English Channel, 23 miles N.N.E. of Le Havre. The most interesting building is the church of Notre Dame, a fine specimen of the 14th c. Gothic, in which the wood-carvings in the choir and lady-chapel are extremely delicate and beautiful. F. has shipbuilding yards, forges, cotton, saw, oil, and bark mills, and breweries. Its sea-baths are famous. Here boats are fitted and employed in the herring, mackerel, and cod fisheries. Pop. of commune 13,577.

Fech'ner's Psycho-Physical Law. This is as follows:—'Sensations increase proportionately to the logarithms of the strength of the stimulus.' See SENSORY IMPRESSIONS.

Fech'ter, Charles Albert, an actor of considerable originality and brilliance of style, was born in London, 23rd October, 1824. His father was a German, his mother an Englishwoman, while he himself by education was practically a Frenchman. He first appeared on the Paris stage, and afterwards joining a company, travelled through Italy, played in Berlin in 1846, and in Paris and London in 1847. Returning to Paris, he made the part of Duval in the *Dame aux Camélias*, and earned a reputation which never afterwards declined. In 1860 he appeared at the Princess's in *Ruy Blas*, and at once took a high position on the London stage. His Hamlet (20th March, 1861) created great interest, and was the topic of much discussion. Originality of conception and rejection of stage traditions were the chief characteristics of F.'s Hamlet, and constitute it, perhaps, the first of what may be called the 'new light' interpretations of Shakespeare, of which we have had several since. In 1863 he became lessee of the Lyceum Theatre, in which he produced *The Duke's Motto*, *Bel Demonio*, &c. In America, to which he removed in 1870, he achieved a brilliant success. After making the tour of the principal cities of the States, he was for some time lessee of the Globe Theatre, Boston. He died in 1879.

Fecia'les, an order of priests among the Romans appointed to proclaim war and to negotiate peace. The *jus feciale* was the only principle recognised by the Romans corresponding to modern international law.

Fec'ula, or **Fæc'ula** (Lat. dim. of *fæx*, 'sediment,' Fr. *fécule*), organic matter obtained as a sediment after macerating the cellular tissue of plants with water. F. is frequently employed as a synonym for Starch (q.v.).

Fedchenko, Alexel, a distinguished naturalist, of Russian parentage, born about 1830. He lived principally at Moscow while not on his travels. Being desirous of comparing the glaciers of the Alps with those on the mountains of Khokan, which he had visited, he set out from Chamouni to climb the *Col du Géant*, but was overwhelmed in a snowstorm and perished from exhaustion. He left behind important notes which had been composed by himself and his wife, who usually accompanied him on his journeys, though on this last occasion he left her behind him.

Fed'eral Gov'ernment, in the historical sense, has been said to exist whereever the bond of union between the members is closer than that of alliance, and the degree of independence possessed by the members is greater than that of municipal freedom. In the ideal federation each of the members ought to be wholly independent in those matters (*e.g.*, criminal and constitutional law) which concern itself; while the union itself is absolutely sovereign on all matters affecting all the members, being chiefly external matters of international law, questions of peace and war, diplomatic intercourse, &c. There are four great examples—the Achaian League (B.C. 281-146); the Swiss cantons, converted in 1847 from a *Staaten-bund* into a *Bunde-staat;* the Seven United Provinces of the Netherlands (A.D. 1579-1795); the United States of America (A.D. 1778). The minor confederations of ancient Greece, such as the Phokian, the Akarnanian, and the Epeirot Leagues in the N.; the Bœotian League; and in modern times the German Confederation (1815-66), followed by the North German Confederation, are much less developed specimens of union. Of the old leagues of the thirty cities of Latium, and of other cities in ancient Italy, history relates nothing certain. The league of the Hanse towns, though now of a special and restricted kind, is perhaps the oldest modern form of political union; the youngest and least promising are among the republics of S. America. The change mentioned above in the Swiss constitution indicates the fundamental distinction between the 'system of confederated states' and the 'composite state.' In the latter the federal government acts directly on all organic questions on the subjects of every state who are truly also its own subjects. In the former it must act by the intervention of the state governments. This was tried for the first few years of American independence, but emphatically repudiated by the great leaders, Hamilton, Jay, and Madison, who wrote the *Federalist* in support of the composite state. The older principle again appeared in the German *Bund*, which was not able even to maintain an alliance in peace and war. It had no executive power, and the arrangements as to currency and customs were really the work of Prussia. Mill has stated three conditions of useful federation—(1) a certain degree of mutual sympathy arising from common race, language, religion, political institutions; (2) that none of the members be sufficiently powerful to lose nothing by standing alone; (3) that there be no great inequality among the members. Even in the most successful federations it has been a delicate matter to preserve the balance of power between the federal government and the states. In the United States, questions on the constitution have frequently been decided in a peaceful way by the supreme court of justice; but the institution of slavery, being one naturally repugnant to civilised feeling, with its attendant questions of free soil, fugitive-slave law, &c., for a long time threatened, and at last nearly broke the Union. The American plan of a double chamber, one of which elected by a mass vote represents population, and the other elected by the legislatures of the states gives an equal representation to the states, seems wise and successful. It is always a question of circumstances whether federalism is better than an undivided government. The extent of territory, the commercial interests, the history of the inhabitants, must all be taken into account; and it must be remembered that such local autonomy, extending even to different systems of law and religion, may exist under a central monarchy. Generally, however, some great enthusiasm of race, the remembrance of a common history, devotion to a great family, or a political or religious principle, will be required to weld into unity the elements of difference. It has been suggested by Freeman that federalism combines to a certain extent the advantages of large states (viz., peace and the diminution of local prejudices and party strifes) with those of small states, of which the chief are a higher political intelligence and freedom from corruption.

Fee and Liferent. The first is the right of proprietorship, the second is the right to the use and profits of the subject during life. The rights may be held by one person, or they may coexist in different persons. In Scotland it is usually applicable to heritable property, though there may be liferent upon household furniture, which wears out, or on farm-stock, which dies. In such cases the life-renter must leave the stock, &c., at the close substantially of the same description, value, and extent as when he entered. The interest of money may be due to a life-renter but seldom any bonus. The person whose property is the subject of the liferent is called the *Fiar*. There are two sorts of liferent: *conventional*, which is simple or by reservation; *legal*, which is terce, or third of heritable subject, due to widow and wife who has divorced her husband, and *courtesy*, or liferent given by law to surviving husband of all wife's heritage when a child of the marriage has been born alive and has been heard to cry.

Fee-Simple. In England, a tenant in F.-S. is one who has unconditional and freehold possession of a property. He can dispose of his estate by sale, gift, or will. F.-S. is the largest interest that can be held in real property. To create it the conveyance must be to the grantee *and his heirs*, except in a will, in which equivalent expressions are admitted. The estate is subject to escheat on there being no heirs of the deceased intestate owner. The term is used in contradistinction to that of fee-tail, which is a limited tenure. See ENTAIL.

Fees in English Law Courts. All fees in courts of justice allowed by Act of Parliament are established fees, and the officers entitled to them may enforce their claim by law. Under the Supreme Court of Judicature (1875) Act, the Lord Chancellor, with the advice and consent of the judges of the supreme court, or any three of them, with concurrence of the Treasury, may fix the fees and percentages to be taken in the High Court of Justice or in the Court of Appeal, or in any court or office connected with these. The fees are to be taken in stamps, to counterfeit which is forgery, rendering the criminal liable to penal servitude.

Fees, Professional. In England it has been conclusively decided in the case of Kennedy *v.* Swinfen, that a barrister has no valid ground of action for his fees, which are given as a gratuity, not as hire; but a client cannot by law recover a fee paid to counsel, not even if he fail to attend the cause for which he has received the fee. In Scotland it is considered that an advocate has no legal claim for a professional fee. By 21 & 22 Vict. c. 90, which applies to the United Kingdom, physicians, surgeons, and apothecaries are now entitled to recover reasonable charges, with costs of medicines and medical appliances, in any law-court. The general rule of law is that a member of any recognised profession has a legal claim for fees according to custom, if the custom be reasonable, for an unreasonable or unjust custom will not be upheld by law. See RETAINER.

Fehérvár Székes (Ger. *Stuhlweissenburg*), a royal free town, and capital of a county of the same name, lies near the swamp Sár-Rét, 37 miles S.W. of Pesth by railway. Till 1527 it was the place of coronation and burial of the Hungarian kings. The seat of a bishop, F. has a cathedral, a bishop's palace, the beautiful Johanniskirche (1752), several higher schools, and a Hungarian theatre. Its manufactures are woollens, flannel, patent leather, soap, and cutlery. There are artesian wells. F. occupies the site of the Roman *Floriana*. It suffered in the early wars with Austria, and fell in 1543, and again in 1602, into the hands of the Turks, who held it till 1688. Pop. 27,548.

Feign'ed Iss'ue, in English law, was an action feigned to be brought with consent of parties to determine a question without pleading, so as to save time and costs.

Feign'ing of Disease' is of common occurrence in the army and navy, and amongst convicts and others desirous of escaping from discipline or avoiding compulsory service. In such cases it is technically called *malingering*. The diseases most commonly simulated are epilepsy, blindness, deafness, paralysis, insanity, neuralgia, and rheumatism causing lameness, &c. F. of D. is frequently practised by begging impostors, and in very many cases solely for the purpose of exciting sympathy and procuring notoriety. Detection, although difficult, is generally effected by very simple means, and by not any more quickly or more surely than by the unexpected application of electricity to the impostor. A little dry Scotch snuff, blown through a quill up the nostrils of a feigning epileptic, excites a fit of sneezing which may continue for an hour. When practised for a length of time, F. of D. often becomes a monomania, resulting in real mental disease, and cases are on record in which amputations have been submitted to for the removal of diseased parts, artifically produced. Feigning lunatics often become really insane.

Feint (Fr. *feindre*, 'to feign,' from the Lat. *fingere*), in warfare, is a seemingly offensive movement, usually made with the view of withdrawing the attention of the enemy from a position against which the real attack is to be made.

Feith, Rhijnvis, an eminent Dutch poet, born 7th February, 1753, at Zwoll, in Oberyssel. He studied at Leyden, became burgomaster of Zwoll, won considerable fame as a poet, was chosen member of the Institute of the Low Countries, and died in his birthplace, 8th February, 1824. His chief productions are *The Grave* (Amst. 1792); a didactic poem, *Old Age* (Amst. 1802); *Odes and Miscellaneous Poems* (1796-1810); *Thirza* (1791), and *Ines de Castro* (1793), tragedies; and *De Geuzen*, a patriotic lay on the water-beggars. A collection of his works appeared at Rotterdam (1824).

Feld'mann, Leopold, a German author of Jewish family and faith, was born at Munich, 22nd May, 1803. He first showed his poetical powers, according to common report, when a boy of thirteen and a cobbler's apprentice, by sending in a lady's pair of shoes, which he had mended, verses expressing his admiration of their owner. At the age of fourteen he produced a play, *Der Falsche Eid*. After spending a few years in trade, he was persuaded by Saphia, the poet, to throw himself into literature. His career as a man of letters was eminently successful. The foundation of his fame was his comedy, *Der Sohn auf Reisen* (1841). In 1850 he was appointed histrionic teacher (*dramaturg*) at the National Theatre of Vienna. F.'s comedies, which are marked by spontaneity and sprightliness, have been published under the title *Deutsche Originallustspiele*.

Felegyha'za, a market-town of Lesser Cumania, Hungary, on the railway between Pesth and Temesvar, 15 miles S.S.E. of Kecskemét, produces wine, fruit, and tobacco, and has cattle markets. Several Roman remains have been discovered in the neighbourhood. Pop. 30,326.

Feli'cians, the adherents of Felix, Bishop of Urgelles, in the Adoption Controversy (q.v.).

Fel'idæ or **Fe'line Animals,** a large family of Carnivorous mammalia, represented by the typical genus *Felis* and its varieties. It includes the lion, tiger, lynx, leopard, panther, cat, and other such animals. The F. are *digitigrade Carnivora*, that is, they walk on the tips of their toes. The soles of the feet are hairy, and the metacarpus and heel are raised from the ground. The jaws are usually short, and the muscles of a great size and strength. The molar and præmolar teeth exist in fewer numbers than in any other *Carnivora*. They possess cutting edges, except the last upper molar, which is tuberculate, or provided with blunted points. The upper 'flesh' tooth (the last tooth but one in the upper jaw, and the last tooth in the lower jaw are named 'flesh teeth') in the F., has three lobes or divisions, and a blunt internal process. The lower flesh tooth has two cutting lobes. The typical arrangement of the teeth in F. is six incisors, and two canines in each jaw; six præmolars in the upper, and four in the lower jaw; and two molars in each jaw—making a total of thirty teeth. The legs are usually of equal size, and there are four toes on the hind, and five on the front feet. The toes are provided with retractile claws, which can be withdrawn at will within sheaths—an arrangement exemplified in the common cat. The tongue of the F. is rough, and its papillæ are horny; this structure fitting it to serve as a rasp in scraping the flesh from the bones of the prey. The muscular system is well developed, the bones having prominent ridges for the attachment of muscles. The F. are very generally distributed throughout the world, but attain their greatest size in tropical regions. They approach their prey stealthily, and generally spring or bound upon it from a distance. It is doubtful if any other genus than the single genus *Felis* can with good reason be classed in this family. Many varieties of its included forms exist, but these can hardly be regarded as distinct species.

Fe'lix, the Roman procurator of Judea in the reigns of Claudius and Nero, to whom St. Paul was consigned by the chief captain at Jerusalem when his life was in danger from the Jews (Acts xxiii.). Originally a slave, he was manumitted by Claudius Cæsar, from whom he took the prænomen Claudius. He had also the surname Antonius, after Antonia, the emperor's mother. He was loaded with military honours by the emperor, and finally made procurator of Judea, in which position he indulged in all kinds of cruelty, relying on his influence at court to shield him from punishment for any crime he might commit. Superseded in 62 by Porcius Festus, he was accused by the Jews, and only escaped punishment through the influence of his brother Pallas with Nero.

Popes.—**Felix I.** (about 269-274), gained an adventitious importance owing to the following circumstance. Paul of Samosata (q.v.), Bishop of Antioch, after being deposed for heresy by the Council of Antioch (269), kept possession of the Church property. The Emperor Aurelius was appealed to by the orthodox party to compel Paul to resign his office. The emperor decided that he should be bishop who was recognised as such by F., the Bishop of Rome. F. is said to have perished in the persecution under Aurelius, about 274. —**Felix II.** was an archdeacon who acceded to the wishes of the Emperor Constantius when, in 356, he banished Bishop Liberius (q.v.) because he would not agree to the condemnation of Athanasius, and was elevated to the place of Liberius. After Liberius was restored F. was banished, and is said to have spent the rest of his life in penance for his declension to Arianism.—**Felix III.** succeeded Simplicius in 483. The Emperor Zeno had (482) put forth a formula of concord, called *Henoticon*, intended to settle the dissensions caused by the Monophysite controversy. This Henoticon, for its concessions to the Monophysites (q.v.) was rejected by F., who also attacked Acacius, Bishop of Constantinople, by whose advice Zeno had acted, and got him deposed in a council of seventy bishops held at Rome (484). Acacius was supported by the emperor and the Eastern bishops, and thus arose the first schism between the Eastern and Western Churches, which lasted thirty-four years. F. died 492.—**Felix IV.** (526-530) was raised to the papacy by Theodoric, in opposition to the wishes of the senate aud the people.—**Felix V.,** who became pope in 1439, was Amadeus VIII., Duke of Savoy, being elected by the fathers at Basel, who had deposed Eugenius IV. But as the majority of the Church adhered to Eugenius, there were two popes, and also two councils, the one sitting at Basel, the other at Constance. F. resigned his high dignity in 1449, leaving the undivided papacy to Nicolaus V., who had meantime succeeded to Eugenius.

Fell'ah (Arab. 'a peasant;' plural *Fellahin*), the name of the agricultural labourer in Egypt, or of the peasant in contemptuous contradistinction to the inhabitant of the towns. Fellahin are the descendants of the ancient Egyptians, and form some three-fourths of the inhabitants. In the 7th c. they were forced to accept the religion and language of the Arabs, and the long period of their degrading toil and miserable subject condition has permanently influenced their character, habits, and appearance. They are from 5 to 6 feet in height, muscular and active, with an oval skull and a broad round face, a low retreating forehead, long deep-set eyes, large mouth, thick lips, and excellent teeth. The hands and feet, however, are of small size. A grinding system of taxation has lowered, if not broken, the spirit of the F., yet he is a brave, hardy soldier. Like the Egyptian of old, he is of grave, sustained temperament, and is distinguished equally for intelligence and immorality, sobriety and indolence. The women, who tattoo, marry often before eleven years of age. The Fellahin villages are for the most part disorderly clusters of filthy huts, surrounding a mud-built mosque. Under British direction the condition of the F. has greatly improved. It is estimated that in Lower Egypt there are 2359 villages, representing 2,800,000 acres of cultivated land, and in Upper Egypt there are 1420 villages, representing 2,300,000 acres of cultivated land. Upon this land 342,309 date-trees and 64,493 fruit-trees are grown, and 99,220 sheep and goats and 69,454 farm animals are reared and employed. Over 2500 villages are engaged in the cultivation of cotton, with an annual yield of some 4980 millions of lbs. The export is valued at £E8½ millions for raw cotton, and at £E1¾ millions for cotton-seed. Besides cotton, the country yields sugar, rice, onions, wheat, beans, lentils, &c., and the value of the export is estimated at £E12¾ millions.

Fellata' (also called by the various tribes Fula, Fellani, Fulbe, &c.), the most intelligent of all the African races, now occupies a wide area in the W. of the Sudan, and includes many powerful states, as Flausse, Futa-Jallon, Senegal-Futa, Massina, &c., between 7° E. long.—12° W. long., and 19°—12° N. lat. The F. advanced from Senegal in an easterly direction, and already in the 16th c. had spread beyond the Niger, and comprised several large tribes. It was only, however, in the beginning of the 19th c. that they were stirred to conquest and to the spread of the Mohammedan religion by the Imam and reformer, Othman of Benue, on whose death (1816) the F. territory had increased to an area of 327,146 sq. miles. The people, who are of a reddish colour, and of great variety of type, are industrious and clever, but they are oppressed by a grasping aristocracy. The pop. is estimated at about 7,000,000.

Fell'enberg, Philip Emanuel von, a great improver of Swiss agriculture and education, was born of good family at Bern, 27th June, 1771. After studying law at Tübingen, and travelling in different European countries, he finally devoted himself to a career of philanthropy. Purchasing the estate of Hofwyl, near his native city, he commenced a series of efforts to increase the productivity of the soil, and also to better the condition of the peasantry. He founded an asylum for forsaken children, a school of theoretical and practical agriculture, and in connection with it an institution for the education of the higher classes, which became quite famous and the model of similar institutions in other lands. F. died 21st November, 1844. See Hamm, *F.'s Leben und Wirken* (Bern 1845).

Fellows, Sir Charles, was born in August, 1799, at Nottingham, where his father was a banker. From an early age F. took a delight in travelling, and made himself familiar with Scotland, Switzerland, Italy, Greece, and Asia Minor, when, according to popular belief, the statement of Colonel Leake, that the valley of the Xanthus had never been explored, led him to make it the centre of archæological investigations, which he prosecuted with but slight intermissions to the end of his life. Lycia was explored by him in three different journeys in 1838, 1839, and 1841-42, the results of which were the discovery of the ruins of fifteen ancient cities, including Tlos and Xanthus, the original capital of Lycia, and the bringing home to England a great number of works of art from these cities, including twenty cases of marbles and casts, now in the British Museum. F., who was knighted in 1845, died 8th November, 1860. For a description of his investigations see his published works, *The Xanthian Marbles* (1843); *An Account of the Ionic Trophy Monument Excavated at Xanthus* (1848); *Travels and Researches in Asia Minor, particularly in the Province of Lycia* (1852), containing journals formerly published by him; and *Coins of Ancient Lycia before the Reign of Alexander* (1855).

Fell'owship, the name applied, almost universally, to the holders of the larger endowed posts in the colleges of Oxford and Cambridge, being a translation of the 'socius' of the original statutes. The number varies in the different colleges, and there are several other minor differences, most of which have been created within the past few years. The following is an outline of the general system. Candidates must have qualified for the degree of B.A., and the selection is determined by an open examination. The post brings with it an equal vote in the government of the college, but involves no specific duties, and has no place in the life of the university proper. As a rule, it was tenable for life, subject only to the conditions of celibacy and the absence of a specified income from other permanent sources. Now it is more commonly for a term of years, or during the continuance of a certain occupation in connection with the college to which it belongs. The restrictions on marriage is relaxed, and religious disqualifications are more the exception than the rule at the universities.

Fe'lo de Se, a verdict in English law by which it is declared that one who has committed suicide has done so in sound mind, and has thereby become a felon. Formerly the punishment was ignominious burial in the highway with a stake driven through the body. As the ignominy, however, could only be felt by innocent survivors the penalty was mitigated by 4 Geo. IV. c. 32. By the Interments Act (Felo de Se), 1882 (45 & 46 Vict. c. 19), interments of suicides may now be made in any of the ways authorised by the Burials Act, 1880, and with a religious service, on the ordinary granting permission, though not of course with that of the Prayer Book, which is expressly forbidden to be used on such occasions. An attempt to commit suicide is a misdemeanour. The meaning of F. de S. is *a felon with respect to himself*.

Fe'lony (the word *fello*, 'a felon,' is found in the Capitularies of Karl the Bald, but its origin is unknown), a term of English law denoting the more serious offences. The chief distinction between F. and *misdemeanour* used to be that the former occasioned the forfeiture of lands or goods, or both, at common law. This distinction has been done away with by 33 & 34 Vict. c. 23, which abolishes forfeiture for felony. The chief distinctions that now exist are: a person convicted of felony has a right to be heard before the judge pronounces judgment; the jury that tries him may not separate till they have given their verdict; the person charged must plead personally; and concealment of felony is a crime in any person other than the felon. A conviction for F. is a disqualification for certain offices.

Fel'spar (Ger. *feldspath*, 'field-spar'), a family of minerals, the most important of all in the structure of rocks. It is divided into two groups according to the crystallization:—(1) *Orthoclase* (Gr. 'straight-cleavage') or monoclinic F.; (2) *Plagioclase* (Gr. 'oblique-cleavage') or triclinic F. The former group, comprehending the so-called *potash* felspars, comprises the varieties adularia, rhyacolite, sanidin, orthoclase, and loxoclase, which are composed of silica, alumina, potash, and soda, in varying proportions; are coloured white, grey, or flesh-red, with sometimes greenish and bluish tints; have a vitreous lustre, and are transparent to subtranslucent. F. is taken as one of the standards of the scale of hardness, being degree 6. *Moonstone* and *sunstone*, often set in jewellery, are opalescent varieties of adularia, the latter containing minute scales of mica. The members of the second group contain lime instead of potash, and are termed *soda* or *lime* felspars, according as soda or lime predominates. Of the soda felspars albite and oligoclase are the chief varieties, having usually a white colour, a pearly or vitreous lustre, with physical and optical properties similar to the other felspars. The type of the lime felspars is labradorite, which varies in colour from dark grey to brown, frequently relieved by the play of rich delicate tints due to internal reflections. The felspars form the basis of all true igneous rocks, the *orthoclase* varieties occurring in granite, felstone, pitchstone, obsidian, syenite, orthoclase porphyry, trachyte, and phonolyte; and the *plagioclase* varieties in porphyrite, diorite, basalt, dolerite, andesite, diallage rock, and also granite. Plagioclase granite is distinguishable from orthoclase by its usually lighter colour. Grains of F. frequently occur in sandstones, which are named the *felspathic* sandstones, in distinction to the *micaceous*, *quartzose*, and *argillaceous* sandstones. *Kaolin* (q.v.) results from the decomposition of F.—the potash and part of the silica being removed and water added.

Fel'stone, the name given by Sedgwick to a class of igneous rocks, otherwise known as petrosilex, felsite, felsite porphyry, &c., is composed of orthoclase intimately mixed with quartz. It is smooth, compact, and flinty-like, varies in colour from dark-grey to white, and has a smooth fracture.

Felt (Ger. *filz*, 'woollen cloth,' allied to the Lat. *pileus*, 'a felt hat or cap') is a kind of cloth or texture made without any process of spinning and weaving, by matting together or interlacing fibrous substances. The property of felting which is possessed by certain fibres is due to the jagged or notched character of their surfaces, which enables them by the application of pressure, combined with a certain amount of moisture, to adhere firmly and closely together, so that if the moisture and pressure are applied to a lap, or evenly spread-out layer, a uniform compact cloth may be produced. A certain amount of felting power must be possessed by all fibres in order that they may adhere sufficiently to enable them to be spun, but it is only wool and certain other animal fibres that are capable of being used for F. Examples of the felting property are found in the matting which takes place in mattresses and cushions filled with woollen flocks, and in the shrinking of flannels and woollen fabrics by washing. Woollen cloths in addition to the process of weaving receive a certain amount of felting in their finish. The property of felting is chiefly turned to account in the manufacture of F. hats (see HAT MANUFACTURE), for which, in addition to wool, the hair of the rabbit, hare, nutria, musquash, and various other mammals is employed.

The import of felt hats into the United Kingdom during the year 1894 was as follows:—

	Number.	Value £.
From Holland	14,350	2,119
,, Belgium	346,019	46,793
,, France	71,506	14,993
,, Other Foreign Countries .	6,906	1,008
Total from Foreign Countries .	438,781	64,913
From Canada	192	17
Total	438,973	64,930

Felted cloth is very extensively employed for making table-covers, crumbcloths, and cheap carpetings, which generally are ornamented with printed patterns, and sometimes in the case of tablecovers embossed. The Persians make a felted carpet in which a pattern is produced by inlaying the various colours in the substance. A heavy coarse kind of F. is very extensively used by the Russian peasantry for their winter garments, and for boots and shoes, which are moulded in a single piece. F. prepared with artificial asphalt is employed for roofing buildings.

Fel'ton, Cornelius Conway, LL.D., a distinguished American scholar, was born at West Newbury, Massachusetts, U.S., 6th November, 1807. He graduated at Harvard in 1827. In 1832 he became Professor of Greek in Harvard, and in 1860 President of the College. In 1853 and 1858 he visited Europe, and wrote his *Familiar Letters from Europe* (published in 1865). He died 26th February, 1862. F.'s chief works are—*Homer* with English notes (1833), a translation of Menzel's *Deutsche Literatur* (3 vols. 1840), *Panegyricus* of Isocrates (1849), *Birds* of Aristophanes (1852). Along with Sears and Edwards he published *Ancient Art and Literature* (1843). His most important work, *Greece, Ancient and Modern*, published in 1867, was compiled principally from his lectures before the Lowell Institute at Boston.

Fel'tre (Ger. *Felters*), an old town in the province of Belluno, N. Italy, on a height overlooking the Piave, 50 miles N.N.W. of Venice. It has a cathedral, considerable manufactures of silk-twist, some trade in wine, oil, and grain, and extensive bleachfields. Pop. 12,947.

Felucc'a (Ital., from Arab. *fulk*, 'a ship'), a small vessel used in the Mediterranean, rigged with lateen sails, but propelled also by oars when required.

Female Whipp'ing was abolished as a penalty by 1 Geo. IV. c. 57, imprisonment or solitary confinement being substituted.

Feme Coverte′ is the English law term for a married woman. At Common Law a husband and his wife were treated as one person in most cases, and all the property of the wife passed to her husband for his absolute use, while the latter could not make a grant to his wife except under the Statute of Uses, or by making a trust, or by surrendering copyhold to her use, or by will, or by local custom. The Married Women's Property Acts have changed all this, and now there is scarcely any difference in respect of property between the position of the unmarried and that of the married woman. On the other hand, the husband is relieved of the responsibility of paying the debts incurred by a F. C. and of fulfilling the contracts entered into by her when his authority has been neither expressed or implied. The husband and the F. C. may, however, be jointly sued for debts incurred by the latter before marriage, and the former is liable for them to the extent of the property he may have obtained by his wife.

Fem′ern, or **Feh′mern** ('the place of cattle'), an island in the Baltic belonging formerly to Denmark but now to Germany, separated from the N.E. point of Holstein by a narrow shallow channel, the Femersund. It is 16 miles long by 12 broad, is low and marshy, but fertile, producing much wheat and barley, which are largely exported. The fisheries are also valuable. The chief places are Burg and Petersdorf. Pop. 1014.

Feme Sole is the English law term for an unmarried woman. A married woman who by the *custom of London* traded on her own account without the husband being liable for her dealings was called a F.S. trader, because with respect to her trading her position was the same as that of a single woman. The *custom of London* is the general law of France, where any married woman can hold property irrespective of her husband and his creditors.

Fem′gerichté, or **Fæm′gerichté** (Old Ger. *fem*, 'punishment,' and *gericht*, 'a court of justice'), secret tribunals which arose during the Middle Ages in Westphalia, and took the place of the regular courts of justice. They seem to have grown out of the open-air meetings held by the German tribes in very early times, the notion that they took their origin from the courts held by the Missi Dominici, or imperial legates appointed by Karl the Great, being probably erroneous. Little is known of them before the end of the 12th c., when, on the deposition of the Emperor Heinrich the Lion (1180) and consequent removal of legal restraints, they were organized as a curb on feudal tyranny. They were centred in Westphalia, which was known among their members as the *Red Land*, but their influence was soon felt throughout Germany, and seems at first to have been a potent check on crime. They gradually, however, became a gigantic evil, wielding a terrible power, enhanced by the gloomy mystery which veiled them, and enforcing a system of irresponsible terrorism. Though at first the emperors made them occasional instruments of imperial designs, they grew strong enough to defy the civil government, and even on one occasion summoned the emperor to appear before them. The Pact of Westphalia in 1371 declared them lawful institutions, and during the 14th and 15th centuries their power rose to its height. In 1438 the Emperor Albrecht II. strove to abolish them; and in the second half of the 15th c. so flagrant were their evils, that in 1461 a league was formed against them by the Swiss commonwealth and several German cities and princes. In 1495 Maximilian I. made them accept a new code, which greatly weakened their authority; and on the *Landfriede* or general peace being established through Germany, and the administration of public justice secured, their influence rapidly waned, the last public F. being held at Celle, Hanover, in 1568. The secret meetings lingered on in Westphalia, though shorn of real power, until 1811, when they were suppressed by Jerome Bonaparte. The procedure at the secret meetings is somewhat obscure. The president of a court was called a *Freigraf* ('free-count'), while the members of the brotherhood who carried out his sentences were named *Freischöffen* ('free-justices'), or *Scabini*. These *Freischöffen*, who at one time are said to have numbered 100,000, were also styled *Wissenden* ('wise' or 'initiated men'). At first none save a free Westphalian could be admitted into the brotherhood, but afterwards men from other districts were enrolled. They were sworn to secrecy by a terrible oath, and recognised each other by various signs, the chief of which was the mysterious S.S.G.G., whose meaning has never been revealed. The Freischöffen were bound to disclose any crime against 'the holy Fem,' or they were liable to the punishment due to the offence they had concealed. A man accused by one of the brotherhood was thrice summoned to appear by a citation secretly affixed to his door; and if he did not answer the command, was again called upon in a secret meeting named the *acht*, when, if he still disobeyed, the first Freischoff who met him was empowered to bind him to a tree, or, if he resisted, to slay him at once, in either case leaving the dagger borne by each of the members to show who had done the deed. The emperor was nominally head of the F., and the Archbishop of Köln was styled imperial lieutenant. Societies of like nature are said to have been organized in Italy.

Fence (lit. 'that which defends' or 'guards'), a wall, hedge, or railing used for enclosing agricultural land, or for dividing it into fields. The F. most suitable for agricultural purposes consists of a rough stone dyke, but this form is only practicable in situations where stone is abundant and easily obtained. In many parts of Scotland most substantial and serviceable dykes are built from the boulders which have been removed from the fields they enclose. The lee side of a F. of this description affords excellent protection to cattle and sheep, while the F. occupies much less ground than hedges of any kind and needs no trimming. In England hedge fences are much more abundant than in Scotland, and their extent and abundance has occasioned great complaints of unnecessary waste of agricultural land. Hedges are most commonly formed of hawthorn, but the following trees and shrubs are also used:—Privet, beech, holly, crab-apple, barberry, furze, broom, maple, willow, yew, box, sweetbrier, and some others. To make and keep these living fences in an efficient condition, the plants require different methods of treatment according to their nature, and it is only in certain situations and conditions that some of them will succeed. Fences made of wooden rails and posts, or of shingles, are also very frequently employed in localities where wood is abundant and cheap, but in Great Britain it is now found to be much more economical to use fences of iron wire. These are made either entirely of iron, or the wire may be attached to wooden posts driven firmly into the ground. At certain intervals there are heavy straining posts, between which lighter posts sustain the various strands of wire in their proper relative positions. Where economy is not an object, strong fences of bar and rod iron built in short sections are employed.

Law regarding Fences.—Any one stealing or cutting, breaking, or throwing down with intent to steal, any part of a live or dead F., or any post, pale, wire, rail (set up as a fence), or any stile, gate, or part thereof, is liable under Statute 24 & 25 Vict. c. 96, for a first offence, to a fine of £5; for a second offence, to a year's imprisonment with hard labour. The Act does not apply to Scotland. Also by Statute 24 & 25 Vict. c. 97, any person convicted of unlawfully and maliciously injuring any of the mentioned fences or parts of fences, &c., becomes liable to the same penalties for first and second offences. In England a tenant is bound to keep fences in good repair, and with regard to them he must act according to rules of good husbandry. In Scotland a landlord is bound, without stipulation in the lease, to put fences on a farm in good repair on the entry of the tenant; but the tenant must maintain them and leave them in as good condition as when he received them. With regard to fences erected spontaneously by the tenant, it has been decided that if he is not entitled to remove them, he is not bound to repair them.

Fen′cible, a combatant or regiment of combatants levied to serve in defence of the country during a crisis, such as that of a threatened invasion. During the French war almost every country had its corps of 'Fencibles.' The name survived in the 'Royal Malta F. Artillery,' which is now called the Royal Malta Artillery, and won the distinction of the Egyptian medal in 1882. There are one lieut.-colonel, four majors, four captains, five lieutenants, one 2nd lieutenant, &c.

Fen'cing is the art of using the sword skilfully in attack or defence. It is one of the oldest of all modes of fighting, and was cultivated widely by the ancients. The Roman gladiators were well trained in handling the sword, but as they also defended themselves with armour and shields, their movements in fence were few and simple. As known in modern times, F. may be said first to have come into practice as the ponderous weapons and metal casings of feudalism were passing into disuse. During the religious wars of the Emperor Karl V., the prevailing sense of insecurity in Italy led to the general adoption of the small-sword as a safeguard by the civil classes. The Italians rapidly carried F. to great perfection, and subsequently introduced the art into Spain and France. A school was established for its prosecution in Paris, where fresh subtleties and improvements arose from day to day. The early Spanish and Italian schools generally drilled the fencer in the management of the dagger and the mantlet; to change position rapidly in avoiding attack was also regarded as necessary. But in more recent times all adjuncts were discarded in favour solely of the rapier, while the increased force and velocity of attack endangered the life of any one attempting to shift ground. As a ready and equable weapon, the rapier was long universally employed in Duelling (q.v.); and since the general abandonment of that practice, F. has continued to hold its ground firmly as an attractive, healthy pastime. In the modern exercise the Foil (q.v.) has supplanted the rapier, and the face of the fencer is defended by a strong wire mask. Space will only here permit of a description of the chief blows or thrusts and guards, together with a brief definition of the phrases in common use. The *guard* is the wary attitude which the swordsman most naturally assumes, advancing the right foot 24 inches in front of the left, slightly bending the knees, resting the weight of the body mainly on the left leg, and holding the foil extended at the height and in front of the breast. When on guard, it is essential, by supporting the foil over the right or left breast, to *cover* the side towards which the adversary's weapon points. The guard is a passive, the *parry* an active, defence. In F., the left arm, which is extended to the rear, is of great assistance in preserving the equilibrium. The *engagement* is the act of crossing foils. There are three engagements—(1) when the blades are brought in contact on the right side; (2) when on the left; and (3) when they cross obliquely from left to right, and the points are on a level with the groin. These may be changed rapidly, but from one or other of them all blows are made. The *blow* is the act of forcibly advancing the point towards one's antagonist either by simple thrust with the arm or by the heavier lunge, in which the right foot, and consequently the upper part of the body, is thrown quickly forward. There are three main points of attack. These are (1) the breast or, as it is called, the *inside*; (2) the face, on either side of the opponent's weapon, the *outside*; and (3) the body below the sword-arm, spoken of simply as *below*. Two of these points are always exposed, it only being possible to guard one at a time. To *parry*, which is done on the *forte* or part of the blade nearest the handle, is to divert the thrust of an antagonist's weapon. Ten guards are regarded as affording complete protection, and these are designated by the old French ordinal numbers—prime, seconde, tierce, quarte (carte), &c. Tierce, quarte, quinte, and six are called simple parries, only requiring the weapon to be slightly moved from guard. In prime, seconde, sept, and octave, which are called half-counters, the point describes a half-circle. The two remaining are known as counters, from the weapon having to sweep a complete circle in their execution. The counter has two advantages—(1) It cuts all the lines of attack in its ellipse, and (2) it throws the opponent's weapon to the side, leaving him exposed to a direct return blow. A *double counter* is a form of parry in which two rapid counters are made consecutively; it gives great command of the weapon, and should therefore enter regularly into practice. In assault, the *feint* is of great effect, being through all its modifications merely an attempt to throw one's adversary off his guard by illusive thrusts. The *riposte* is the name given to the blow with which one follows up a successful parry. A blow delivered at the flank of the antagonist when he menaces at the 'left' is called a *flanconade*. Fencers do not tierce, or carte, &c., at the same time, but A lunges while B guards. The motion of advancing and retreating is performed by rapidly withdrawing the left foot some 18 inches, and instantly following it with the other, and *vice versâ*. One must retreat as the adversary advances, unless ready to offer him the sword-point. *Appels*, or beats with the right foot on the floor, and *glissades*, or glidings of one's weapon over the adversary's, are mainly intended to confuse and lay the enemy open to thrusts.

The cavalry sword exercise is only a modification of F. adapted to horseback, and the attack and defence with the foil is the basis for that of the sabre. Bayonet exercise, as another form of F., is cruder and clumsier, but extremely formidable. The *throw*, during which the forward hand unclasps the rifle, is a later thrust that is made to the full extent of the other arm. This, when delivered precisely, is often a winning thrust, yet it must always be risky, as it leaves the body of the thruster exposed and unprotected, until *recovery*.

Fén'élon, François de Salignac de la Mothe, a great French ecclesiastic, whose name is revered throughout Christendom, was born at Fénélon in Périgord, 6th August, 1651. He was descended from the Marquis de la Mothe, a well-known diplomatist during the St. Bartholomew Massacre period. At the age of fifteen he passed from the college of Plessis to the seminary of St. Sulpice, where he took holy orders in 1675. He was then made superior of the 'New Catholics,' an institution patronised by Turenne for the edification of converts in the faith. Here he remained till 1691, composing his book *De l'Éducation des Filles* (1687), and joining in Bossuet's *promenades* and *conférences* at St. Germain. He also wrote a *Réfutation du Système de Malebranche sur la Nature et la Grâce*, revised by Bossuet, and a book against the *status* of Protestant ministers, which no doubt helped to pass the revocation of the Edict of Nantes. After that event he was sent with Fleury to convert in Poitou. In 1689 he was selected as tutor for the Duke of Burgundy, heir-presumptive to the crown, for whom he wrote his *Fables*, his *Dialogues des Morts*, and also the once famous *Les Aventures de Télémaque*. He was much in the good graces of Madame de Maintenon, who consulted him about the rules of her new institution, St. Cyr. F. became successively abbé of St. Valery, near Amiens, and Archbishop of Cambrai. Now began his connection with Quietism. This was a form of spiritualism which aimed at producing a special kind of ecstatic existence in which all the daily duties of life would be performed, but everything with the immediate sense of God's presence. The tendency of this perpetual adoration was, however, to weaken the active powers. F. became acquainted with Madame de Guyon and Père Lacombe, and did not share the dislike of Bossuet, Bourdaloue, and other eminent divines, for doctrines of 'pure love,' &c., which, whether within the compass of human nature or not, were hardly suited for a court of which De Maintenon was the head. On Madame de Guyon's imprisonment, F. published his *Explication des Maximes des Saints* (1697), to show authority in the recognised Christian mystics for the gradual removal from the mind of the desire of reward and the fear of punishment. This Bossuet called 'fanaticism,' and the book was submitted to examination at Rome. After sixty-four congregations had met and discussed, the votes were discovered to be equal. In the meantime, the doctors of the French Sorbonne had condemned the book, and F. lost his pension and his post of royal teacher. While Bossuet damaged his cause by the offensive personalities contained in his *Account of Quietism*, the influence of the king easily procured from Innocent XII. a special verdict of the congregation of cardinals, setting forth twenty-three propositions in F.'s book as rash, scandalous, erroneous, &c. F. at once submitted but was never reconciled to the court, which soon after tried to suppress his *Télémaque*. This work had been stolen in MS. by a servant, and published without F.'s authority. Its success over a great part of Europe was immense. F.'s archiepiscopal life at Cambrai was marked by strict performance of professional duty, and a simplicity of life and real sympathy with the poor very unusual in high dignitaries of the Church. One touching fact is that during the wars he was never molested, but equally revered by the hostile armies of English, German, and Dutch. F. was a man of great sweetness, piety, and dignity of character, and these fine qualities are always conspicuous in his writings. He was disinterested even to generosity in money matters, and zealous for the welfare of his Church. He desired that the rule forbidding the Scriptures to be read in the vernacular should be relaxed, at least in his diocese; and he defended the Jesuit missionaries from the charge of having adopted the superstitions of the Chinese. About 1702 the Jansenist war broke out again on the publication of the book called *Le Cas de Conscience*. F. took part in it on the side of the Church. He also wrote on political subjects, suggesting the revival of the States General, not as representative assemblies, but as royal councils, and denying the right of civil interference claimed for the Pope. F. died 7th January, 1715. Complete editions of F.'s *Œuvres* are those of Bausset (Par. 1821-24) and of Gosselin (1853). A favourite collection is that entitled *Œuvres Choisies de F.*, containing an *Éloge* by La Harpe and a biographical and critical sketch by Villemain. The *Correspondance de F.*, from original documents, was published by Caron (Par. 1827-29). See Bausset's *Histoire de F.* (Par. 1808).

Fenestell'a, a genus of *Polyzoa* (q.v.), including those forms familiarly known as 'lace corals,' from their close resemblance to delicate lace, although they have no relationship to the true Corals (q.v.). The species of F. are typically Palæozoic. They begin in the Lower Silurian rocks, and extend to the Permian series, but are most frequent in Carboniferous strata.

Fe'nian (so called from the mythical *Fionna Eirinn*, an Irish national militia, levied as early as 400 B.C., but which took its name from Finn or Fioun MacCumhail, the famous hero of Irish legend) was a national association, the main object of which, formerly kept secret, but afterwards avowed, was to overthrow English rule in Ireland in favour of a native republic. This association, the origin of which is traced chiefly to the Irish famine of 1846-47, during which so many Irish were forced to emigrate, and to the insurrectionary movements of 1848, which increased the number of enforced exiles, was organized in America and Great Britain as a society for the restoration of Irish independence in 1859. The society was framed on the republican model. It consisted of social, district, and state 'circles,' each circle under the direction and control of a 'centre,' and the management of the whole organization vested in a senate or 'congress.' F. congresses were held in Chicago in 1863, and in Cincinnati in 1865, and after the latter the order embraced 80,000 members in America. From this time the activity of the Fenians was unbounded, if for the most part ineffectual. In the United States several attempts were made in 1866 to invade Canada, which proved, however, ludicrous failures, and in 1867 an attempt, equally abortive, was made to create a revolution in Ireland. In September, 1867, a number of daring leaders of the movement attacked a police van in Manchester, killed the officer in charge, and released the prisoners, who were under arrest for complicity in the late insurrection. The release of F. prisoners was the object of the attempt to break into Clerkenwell prison by blowing down its walls with gunpowder, an attempt attended with great destruction of life and property. At this period considerable excitement prevailed throughout England. A rising of the Irish was feared in London, and special constables were sworn in for the preservation of the peace. The number of suspected Fenians arrested from the 1st January, 1867, to the 31st January, 1868, was 265, of whom 95, including many most daring and influential members, had come from America, where having been engaged in the War of Secession, they refused to return to civil life. In May a party of 2000 invaded Canada from Vermont in the United States. They 'were ninety minutes on Canadian soil,' when they were driven back across the frontier with the loss of one man.

In 1868 the F. cause lost ground owing to an attempt on the life of the Duke of Edinburgh in Australia by O'Farrel, who, however, protested that he was not a F., and to the assassination of Thomas D. McGee, a Canadian minister and opponent of Fenianism. According to the Queen's Speech in July, 1868, it would appear that the Ministry regarded Fenianism as crushed. In 1869 a deputation, headed by the Lord Mayor of Dublin, attended at the bar of the House of Commons, and presented a petition of amnesty for the prisoners. Several were released. In 1869 the Irish Church was disestablished, and in 1870 an Irish Land Bill was passed. Both concessions were claimed by the Fenians as results of their active policy. In 1871, during Mr. Gladstone's tenure of office, most of the F. prisoners were released on their undertaking to leave the country, and Fenianism sank into obscurity, which lasted for some years. Fresh vigour was inspired by the formation of the Land League, and ere long the brotherhood commenced to threaten, and then to act. The atrocious murders, in 1882, of Lord Frederick Cavendish and Mr. Burke, secretary and under-secretary to the Viceroy of Ireland, were followed by several attempts, more or less unsuccessful, in 1883 and 1884, to destroy life and property in England by means of explosives, but these acts may be attributed to a certain section of sympathizers with the National movement in Ireland, and must certainly not be referred to any programme of the Fenians, who by that time may be said to have ceased to exist as a recognised party of rebellion in Ireland. See Rutherford's *Secret History of the Fenian Conspiracy*.

Fenn'ec, a species of Carnivorous Mammalia, belonging to the family *Canidæ* (q.v.) or Dogs (q.v.), and nearly allied to the foxes. It is also known by the name of 'Zerda,' and is found in Nubia and Egypt. Its average length is about 8 inches, and the colour is a pale fawn, the base and tip of the bushy tail being black. The F. is an active little animal, and appears to subsist, notwithstanding its carnivorous nature, almost entirely upon fruits. It inhabits burrows, which it excavates in sandy places. The fur is valued by the Arabs.

Fennec.

Fenn'el, a genus of *Umbelliferous* plants belonging to the Harmless or Esculent section of the order. The common F. appears to have originally come from S. Europe. The fruit consists of a *cremocarp*, composed of two single-seeded portions or *achenes* united by their faces, and exhibiting a ribbed appearance. Common F. attains a height of 3 or 4 feet. It is a biennial plant, and its leaves are served with fish, either whole, or in the form of a sauce. Another species is sweet F., also named Italian F. from being cultivated in S. Europe. It yields an aromatic, and *oil of F.* is obtained from it. Other species are Cape F. of S. Africa, and the

F. of India. The giant F. of S. Europe belongs to the genus *Ferula*.

Fennel.

Fenn'y (*Pheni*), a river of India which rises in the hill tracts of Tipperah, Bengal province, flows between Tipperah, Noakali and Chittagong districts, and falls into the Sandwip Channel, a corner of the Bay of Bengal. It brings down much hill produce, chiefly cotton, tobacco, and timber, though it is only navigable for large boats for thirty miles or so from its mouth.

Fens. See BEDFORD LEVEL.

Fen'ugreek, a genus of Exogenous plants included in the natural order *Leguminosæ* (q.v.), and in the *Papilionaceous* section of that group. The plant is distinguished by the appearance of the flowers, which have a small *carina* or keel, the *alæ vexillum*, together forming the most prominent parts of the flower. The leaves are obovate, and are stipulate. The common F. inhabits S. Europe, but is also largely cultivated in India. The name F., or 'Greek hay,' is derived from the fact that in Greece, as well as in India, it is used as fodder. The pods are cylindrical, and recently it has been stated that the seeds are exceedingly nutritious, and might with advantage be used as a dietary. There is a nearly-allied species also grown in India, and the edible F. affords food in the latter country. A British species grows in sandy soil, generally near sea-coasts.

Fen'yes, Elek', a Hungarian geographer, was born at Csokaj, 7th July, 1807, studied law at Debreczin and Presburg and sat in the Presburg diet of 1830. He then devoted himself to geography and statistics, and settled at Pesth in 1836, where he became director of the Industrial Society, and editor of two journals. During the Hungarian revolution he was appointed, in 1848, chief of the statistical department in the Ministry of the Interior. He was for some time president of the war tribunal at Pesth in 1849, and in the same year was imprisoned by the Austrians. He then retired into private life. His works are comprehensive and accurate, and give the first reliable survey of Hungary. They were written in Magyar, but several of them have been translated into German. The chief are—'State of Hungary and the Neighbouring Countries,' 'Statistics of Hungary,' and 'General School Atlas.'

Fe'odor (the Russian form of *Theodore*, Gr. 'Gift of God'), is the name of three czars.—**Feodor I.,** son of Ivan the Terrible, was born 11th May, 1557, succeeded to the throne in 1587, but left the government to his brother-in-law, Boris Godunov. He died 7th January, 1598, the last of the race of Rurik.—**Feodor II.,** son of Boris Godunov, reigned only for a short time, being murdered 10th June, 1605. To him succeeded the first of the 'false Dimitris.'—**Feodor III.,** the son of the Czar Alexei, was born in May, 1661, and ruled from 1676 to his death, 26th April, 1682. He warred with varying success against the Turks and Poles. In his reign the first learned academy was founded in Russia. F. was succeeded by his brother, the famous Peter the Great.

Feodo'sia. See KAFFA.

Feoff'ment, in English law, was a grant of lands to another in fee, to him and his heirs for ever, by the actual delivery of seisin. The grantor was called the *Feoffer*, he that received was the *Feoffee*. It is the oldest form of conveyance of real property. *Livery of Seisin* was the feudal investiture on delivery of the possession of the land or tenement to another, by giving him in the former case a piece of turf from it, or twig of a tree grown on it; in the latter case, by giving the latch or key, or by some similar act. The formality has been superseded by deed of grant under 8 & 9 Vict. c. 106.

Feoffment to Uses was an artifice of the clergy to avoid the prohibitions against Mortmain (q.v.). The feudal form was applied so as to give the possession to some one as a trustee for the Church or for an ecclesiastic. The evasion was regarded favourably by the judge of the Chancery Court, who in those days was usually a priest. See USE, USES, AND TRUSTS. In Scotch law, see INFEFTMENT, SASINE.

Fer'æ Natu'ræ, a term applied in English law to all kinds of beasts and birds which are not tame or domesticated. According to Roman law these became the property of any one catching them, though it was held that no one was entitled to enter the ground of another in the chase. But a trespasser who caught his game was held to be entitled to keep it, though liable in damage to the proprietor of the land on which he trespassed. In England if *game* be found in the possession of any one trespassing, he may, under statute, be required to deliver it to the person having the right, or to his servant or gamekeeper; and if delivery be refused, the game may be taken forcibly. But the statute does not apply to animals which are not game. (See GAME LAWS.) Curious questions of common law arise as to the right of property in animals F. N. For example, the question came before the supreme Scotch law court some years ago as to the right of property in a whale which, having been harpooned by one party, had broken the attached rope, and been subsequently secured by another whaling party. Eskimo witnesses were fully examined as to local custom, and decision was given, we believe, in favour of the actual captors. A swarm of bees, if it can be identified, belongs to the owner of the parent hive. F. N., when reclaimed and tamed by a man, or confined by him, may become his property and continue so, so long as he retains possession of them, or when they escape, they have become *homing*, as hawks, pigeons, &c.; also, when they breed on his land, he attains a property in their young while unable to escape; also, when he has the right, as against everybody else, to hunt and kill them, he acquires a property in them so long as they remain within the land over which he has such rights. Dead and edible F. N., or when reclaimed or confined, may be subjects of larceny, but while living they cannot be. A landlord cannot distrain F. N. for rent. See FORESTS, SALMON-FISHING, TROUT-FISHING.

Fer de Lance, a well-known and most virulent species of Viperine snakes, included in the Rattlesnake (q.v.) family (*Crotalidæ*). It inhabits Brazil and some islands of the W. Indies, and is commonly found in sugar plantations. A large pit exists in each side of the head between the eye and nostril, as in other members of the family *Crotalidæ*. The usual length is 5 to 6 feet. The colour is olive above, with cross markings of darker hue, and whitish grey below, the head being of a brown colour. The tail has no 'rattle,' but is provided with a spinous process. The bite of the snake is fatal usually within a few hours, mortification spreading rapidly from the part bitten to other portions of the victim's body; and even where recovery takes place, the effects of the poison may persist for long periods.

Fer'dinand, a name borne by the sovereigns of various European countries.

German Emperors.—**Ferdinand I.,** the second son of Philip the Handsome, Archduke of Austria and King of Castile, was born at Alcala, in Spain, in 1503. He married Anna, daughter of Ladislas VI.; and on the death of his brother-in-law, Ludwig II., at Mohacz, in 1526, he added the thrones of Bohemia and Hungary to the Austrian archduchy and the palatinate of Upper Alsace. His possession in right of his wife was, however, disputed by John Zapolya of Transylvania, seconded by Suleiman II. A long war was closed by the peace of Gross Waradein in 1538, but renewed by John Sigismund on his father's death. Named King of the Romans in 1531, F. became emperor in 1558 on the abdication of his brother Karl V. He was the last King of the Romans, or emperor elect, crowned at Aachen on the marble throne found in the tomb of Karl the Great. F., who had before oppressed the Calixtines and Lutherans in Bohemia, now urged the latter unsuccessfully to join the Council of Trent. He tried to get the sacrament in two kinds and priests' marriage from Pius IV., but failed. He died 25th July, 1564.—His grandson, **Ferdinand II.,** born at Gratz, 9th July, 1578, was the son of Archduke Karl of Carinthia and Styria, and Maria of Bavaria. He became King of Bohemia (1617) and Hungary (1618), and succeeded his cousin Matthias as emperor in 1619. His Ultramontane tendencies were well known, and there was a great revolt under Count Thorn in Bohemia, helped by Bethlen-Gabor and the Hungarians, Moravians, and Silesians. The siege of Vienna was raised, but with the approval of the Protestant Union the Bohemians elected as king Friedrich, the Elector Palatine. With the help of the Catholic League, especially of Johann Georg, Elector of Saxony, F.'s general Tilly crushed the Bohemians. The Charter of Rudolf II. was destroyed; the Reformed preachers sent out of the country, and with them thousands of the inhabitants. The alliance of Christian IV. of Denmark was, in spite of the bravery of Brunswick and Mansfield, overturned by Wallenstein, and the Peace of Lubeck (1629) was followed by the Edict of Restitution, directing the property of the Catholic clergy to be given back by the nobles, who had seized it so long ago as 1555, and excluding Protestants from the Peace of Religion. Now, however, Gustavus Adolphus was in the field, nor did the Catholic nobility relish the idea of restitution. Therefore, though Lutzen (1632) was soon followed by Nordingen (1634), which left the Swedes almost alone in the cause of religious freedom, this edict was never properly carried out. F. died 15th February, 1637.—**Ferdinand III.,** son of preceding, born at Gratz, 11th July, 1608, succeeded his father on his imperial and royal thrones. He reluctantly continued the war against the Swedes, now backed by Richelieu, who wished to weaken the Habsburg house. The preliminaries of Hamburg, ratified by the Congress of Münster and Osnabrück, at last led to the Peace of Westphalia (1648), just when the Swiss Wrangel had entered Prague. F. died 2nd April, 1657. A reform of the judicial arrangements in Germany took place during his reign.

'Emperor' of Austria.—**Ferdinand I.** (Karl Leopold Franz Marcellin), eldest son of the Emperor Franz I. and Maria Theresa of Naples, was born at Vienna, 19th April, 1793. He was sickly in mind and body. In 1830 he was crowned *Rex Junior* of Hungary, and next year married Maria, daughter of Vittorio Emanuele of Sardinia. Succeeding his father in 1835, he left foreign affairs in the hands of Metternich, but published an amnesty for political offences in Lombardy. The insurrection in Galicia was followed by the revolutionary movement of 1847-49. F. promised a constitution, dismissed Metternich, and then in 1848 abdicated in favour of his nephew, Franz Josef. Roads and railways were largely constructed in Austria under F.'s influence. He died 29th June, 1875.

Kings of Aragon or Castile. (1) *Aragon.*—**Ferdinand I.,** the Upright, King of Aragon and Sicily, the son of Juan I. of Castile, was born in 1373. His disinterested treatment of his nephew, Juan II. of Castile, and his successes against the Moors (especially in taking the city of Antequera), secured his election from a number of competitors to the throne of Aragon in 1412. His intervention in Sicily on behalf of Blanca, widow of Martin I., was marked by the same spirit of justice and courage; and in the Church he exerted himself on the side of peace, entreating Benedict XIII. to retire, and so end the schism. F. died in 1416, and was succeeded by his son, Alfonso V. the Wise. (2) *Castile.*—**Ferdinand I.,** the Great, was a son of Sancho III., King of Navarre, who first liberated Castile from the rule of Bermuda, or Veremund, III. of Leon. F. afterwards annexed Leon and Asturias to Castile. He confirmed the ancient *fueros* of the people, and collected the code of Visigothic law. A victory gained over his brother on the 'Field of Murder' confined the power of Navarre to a territory beyond the Ebro. F. then made a brilliant campaign against the Moors. He was the founder of Castile, and styled himself Emperor. This alarmed Heinrich the Swart, German Emperor, and the Pope was called in. The 'Cid' belonged to this reign. F. died in 1065.—**Ferdinand III.,** the Pious, was born in 1199, succeeded his mother as sovereign of Castile in 1217, and his father, Alfonzo IX., as King of Leon in 1230. He suppressed the revolt of the Lara family in Castile, and then attacking the Moors in Andalusia, captured Cordoba in 1236. Twelve years later Seville fell, and the Emir of Granada was compelled to pay tribute. F. died in 1252. He burned the Albigenses who had fled to him for protection, but did much to check lawlessness, and founded the famous University of Salamanca. The Archbishop Rodrigo Ximenes of Toledo wrote his biography, *Cronica del Santo Rey Don F. III.*—**Ferdinand IV.,** the son of Sancho IV., the Brave, reigned over Castile from 1295 to 1312. A great war with Portugal and Aragon, each supporting a claimant to the crown, in which the heroic Perez de Guzman fought for F., was ended by double royal alliances. In his Moorish campaigns (1305-6) F. captured Gibraltar. He was on good terms with Pope Clement V., who gave him the right to levy a tithe on Church property, and to confiscate the property of the Templar order.

Kings of Spain.—**Ferdinand V.** of Aragon, known as F. the Catholic, born 10th March, 1452, was the son of Juan II., King of Navarre and Aragon. In 1468 F. was declared by his father King of Sicily, and next year, in spite of the rivalry of Alfonso V. of Portugal and Louis XI. of France, he married Isabella, Princess of Asturias, daughter of Juan II. and sister of Enrique IV. of Castile. After some years' skirmishing with the French, the death of Enrique (probably by poison) permitted F. and his wife to assume the royal power in Castile. A powerful party was formed against them by the Infanta Juana *Beltraneja*, or the Bastard, daughter of Enrique, who was affianced to Alfonso V. F. soon routed the Portuguese army at Toro, and drove the French from Roussillon. The Pope having recalled the dispensation for the marriage of Juana and Alfonso, peace was made in 1479. Internal peace was also in great measure restored by the institution in towns and villages of the *Santa Hermandad* ('holy association'), half militia, half police, to suppress crime in each district. This incidentally weakened the powers of the feudal nobility. The consolidation of the Spanish monarchy was inaugurated in Castile by the abolition of franchises and the imposition of taxes. In 1481, with the approval of Pope Sixtus IV., F. started the Inquisition, nominally to punish those Jews and Moors in Andalusia who, having taken Christian baptism, were secretly practising their old religion, but quite as much that he might strike his political enemies in the dark. Owing to the divisions among the Moors, Muley Abul Hassan and Boabdil both claiming their allegiance, it was comparatively easy for Gonzalvo of Cordoba to subdue Granada. After ten years' fighting, in 1492 the Spanish dominion was assured, the Moorish claims being renounced on condition that the Moorish inhabitants should be allowed the exercise of their religion. This agreement was afterwards broken. To the great hurt of Spanish commerce, the Jews, numbering, it is said, 800,000, were also expelled from Spain, except those who accepted baptism. The policy of F. was ably carried out by his minister, Cardinal Ximenes, and the glory of his reign enhanced by the expedition of Columbus. Queen Isabella by her will left Castile to Juana the Foolish, wife of Philip the Handsome, Archduke of Austria, F. to be regent. Philip, by an armed demonstration, forced F. to resign the regency, but soon after died, and F. reobtained the regency. Always zealous for the Church, F. now made two successful expeditions into Africa, where he was acknowledged by Tunis, Algiers, and Tripoli, and also lent assistance to Pope Julius II., who suffered a heavy defeat at Ravenna. The conquest of Navarre left him master of the whole of Spain. He died at Madrigalejo, 23rd January, 1516. See Prescott's *History of the Reign of F. and Isabella of Spain*.—**Ferdinand VII.**, born 14th October, 1784, was the son of Charles IV. of Spain and Maria Louisa of Parma. Weak in mind and body, he was entirely led by his tutor Escoiquiz, who gradually formed a party round the young prince hostile to the minister Godoy (q.v.) and the queen-mother, and therefore favourable to British influences. His young wife, Maria Antonietta of Naples, died in 1806; Escoiquiz was removed from court; and for some time F. lived in wretched solitude. He then began to correspond with Napoleon. This being discovered, he was tried in the famous case at the Escurial, and all his accomplices (whose names he confessed) were exiled. The French, however, entered Spain, the Spanish troops revolted at Aranjuez, Godoy fled, Charles IV. abdicated, and F. was proclaimed king under the auspices of Murat, stationed at Madrid. Still desiring French protection, F. foolishly met Napoleon at Bayonne in 1808, the result being that it was declared the Bourbons had ceased to rule in Spain; Joseph Bonaparte became king, and F. was sent to Talleyrand's house at Valencay, where he behaved in the most undignified manner. He had, in fact, sold his country's honour for a promise of Navarre and £32,000 a year. Although Joseph reintroduced the Cortes, he could not pacify the country; guerilla leaders appeared in almost every district, and after six years' fighting F. was at the end of 1813 sent back as king on condition that he would drive out the English. The Cortes made it a further condition that he should sign the moderately Liberal constitution which had been proclaimed at Cadiz in 1812. This F. repudiated by the Valentia Decree (4th May, 1814). The document was applauded by the Absolute (*Netto*) or Servilest party, and a reign of terror and darkness began in Spain. The Inquisition was recalled, and education formally put in the hands of the Jesuits; and only by the intervention of Britain were the members of the late Cortes saved from death, many of them being sent to the galleys instead. At last, in 1820, the army revolted and proclaimed the Constitution of 1812, which F. swore to observe. This constitution did not guarantee religious liberty to any extent. The king did everything in his power to enfeeble the government, refusing his *veto* without reason, and dismissing ministers whenever the Cortes met. In 1823 Louis XVIII., acting on the principles of the Holy Alliance, sent 100,000 men to the help of F. The result was that the Cortes retreated to Cadiz and dissolved, and F. at once proceeded to declare null all the solemn acts of three years. Even the advice of ultra-royalist laymen was despised by this absolute king, and in 1826 there was an *auto-da-fé* at Valencia! In 1829 F. married his fourth wife, Maria Christina of Naples, on whose suggestion he issued the decree, which has cost Spain so much blood, that women may succeed to the throne. F. died 29th September, 1833. See *Memoirs of F.*, translated by Quin.

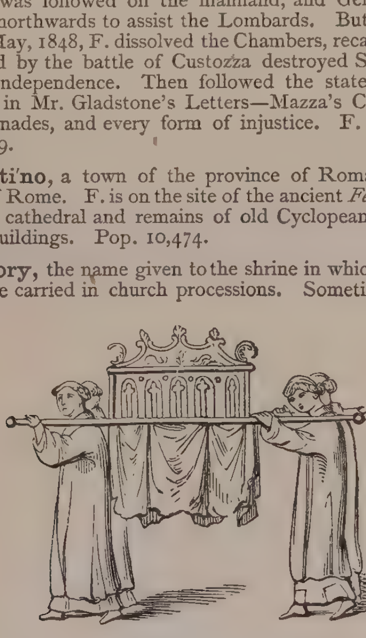
Sovereigns in Italy.—(1) *Tuscany*.—**Ferdinand I.** de' Medici, third Grand Duke of Tuscany, born in 1549, was a son of Cosmo the Great. He was made a cardinal by Pius IV., and succeeded his brother Francisco in 1587. F. energetically suppressed the Tuscan brigands under Piccolomini, and with the help of the Knights of St. Stephen he cleared the Italian coast of the Moslem pirates, whom he pursued to Cyprus and Africa. His policy was that of friendship to France, for he saw Spain threatening the liberties of Italy. He therefore lent large sums of money to Henri IV., and sowed discord between Pope Sixtus V. and Olivares, the ambassador of Philip II. F. also had friendly relations with the Protestant princes in Germany, and the Jews and other heretics expelled from Spain found a refuge in Leghorn. Dying in 1609, he left enormous wealth to his son Cosmo.—**Ferdinand III.**, born at Florence, 6th May, 1769, was the son of the Grand Duke Pietro Leopold, who became German Emperor in 1791. F. was the first Italian sovereign who recognised the French republic in 1793. In spite of this a provisional republican government was set up in Florence, which lasted till Suwarrow drove Moreau and Macdonald from Italy. After Marengo, when Tuscany was converted into the kingdom of Etruria, F. retired to Vienna, where, as Elector of Würzburg, he was admitted into the Confederation of the Rhine. In 1814 he returned, and spent his remaining years in carrying out a humane and liberal policy. He opened up communications and organized public schools, and Tuscany was not disgraced by those harsh and secret proceedings against *Carbonari* which were seen in other Italian states. He died 17th June, 1824.

(2) *Naples*.—**Ferdinand I.**, born in 1423, was the natural son of Alfonso V. the Magnanimous, of Aragon, who bequeathed Naples to F., Sicily with Aragon going to Juan. Though Pope Nicholas V. had bound himself to recognise F., Calixtus III. refused the investiture on the ground that F. was born of adultery. By a bull he also forbade recognition by any other state. The next pope, Pius II., was, however, bribed to keep his predecessor's word by the gift of the town of Beneventum. The turbulent barons, the Count Piccinino, Jean d'Anjou, Duke of Calabria (whom Charles VII. of France had made Governor of Genoa), and the Prince of Tarentum, made war on F. in 1460, and gained a decisive victory near Nola in that year. This was compensated by the victory of Troja in 1462, for which F. was indebted to Scanderbeg of Albania. In 1480 F. retook the town of Otranto from Mohammed II. He died 25th January, 1494.—**Ferdinand II.** was the son of Alfonso II., and the grandson of the preceding. When Charles VIII. marched into Italy, F., deserted by Trivulzio, was beaten at Faenza and San Germano (1495) by D'Aubigny and Armagnac, and compelled to retire to Sicily. Next year the influence of F. the Catholic in the Holy League caused the French evacuation of Naples, and the re-entry of F. He died 7th October, 1496.—**Ferdinand IV.** (after 1817, First of the Kingdom of the Two Sicilies), born at Naples, 12th January, 1751, was the son of Don Carlos, afterwards Carlos III. of Spain. He was brought up to know nothing of public affairs, and the government was one long dispute between Tanucci, the minister, and the queen, Maria Carolina, Archduchess of Austria and a daughter of Maria Theresa. The vacillating policy of F. through the wars of the French republic met a proper end in the complete defeat of General Mack by the French in 1798, which caused the king to seek refuge on board Nelson's fleet. The population of Naples fought with desperate bravery against the disciplined troops of France, but the upper classes received them well, and tried to form a Parthenopean Republic. This exciting period has been described in Coletta's *History of Naples*, and in *Sketch of Popular Tumults* (Lond. 1837). Next year, Cardinal Ruffo and the Calabrian peasants besieged the republic in Naples, and finally F. re-entered his capital, having promised an amnesty which was at once violated by the most sweeping measures of political oppression, and unlicensed cruelty. In 1801 he arranged that a French army should again occupy part of his kingdom, and in 1805 he permitted a large army of British and Russians to land. This brought down Massena and 30,000 men, who drove out F., established Joseph Bonaparte, and subdued the country, except in Calabria, where opposition lingered for many years. (See Botta, *History*, book xx.) F. and the queen remained in Sicily, protected by the English fleet, till 1815, when F. resumed royal authority at Naples. In 1820 a revolt, inspired by the *Carbonari* societies, broke out. F. granted the same constitution as the Spanish Cortes had just obtained, but soon after went to a congress of the northern powers at Laybach, and returned with an Austrian army sent expressly to get rid of the troublesome constitution. He died 4th January, 1825. His daughter

Amelia married Louis Philippe.—**Ferdinand V.** (Second of the Two Sicilies), better known as 'Bomba,' born 12th January, 1810, was the son of Francisco I., and grandson of the preceding. He began political life in 1830 by dismissing Viglia, Scaletta, and others from office, and carrying out a scheme of economy in the court and the public service. Unhappily his second marriage with Maria Theresa Isabella, daughter of the Archduke Karl, brought him more under Austrian influence. He introduced the Jesuits into Sicily, and suppressed the ancient constitution of the island. In 1840 he had a serious quarrel with Britain about the sulphur trade. The natural result of these arbitrary acts was repeated insurrection, which was cruelly punished. Ricciotti was the most popular of the leaders. The impulse of the election of Pius IX., 'the reforming pope,' at last gave to Sicily a constitution substantially the same as that of France in 1830. The example was followed on the mainland, and General Pepe marched northwards to assist the Lombards. But suddenly, on 15th May, 1848, F. dissolved the Chambers, recalled everything, and by the battle of Custozza destroyed Sicily's last hope of independence. Then followed the state of things described in Mr. Gladstone's Letters—Mazza's Commission of Bastonnades, and every form of injustice. F. died 22nd May, 1859.

Ferenti'no, a town of the province of Roma, 42 miles E.S.E. of Rome. F. is on the site of the ancient *Ferentinum*, and has a cathedral and remains of old Cyclopean walls and Roman buildings. Pop. 10,474.

Feretory, the name given to the shrine in which a saint's relics were carried in church processions. Sometimes it was made of wood, or of ivory, beautifully carved *in relievo;* at other times it was of metal, decorated with enamel and chasing. The illustration is taken from one of Matthew Paris' MS.



Feretory.

Fer'guson, Adam, a Scotch philosopher and author of eminence, was born at Logierait, Perthshire, 20th June, 1723, and was educated for the Church at St. Andrews and Edinburgh Universities. After being for a short time chaplain to the 42nd Regiment, during which he showed great gallantry at the battle of Fontenoy (1745), he settled in Edinburgh, where he became in succession Keeper of the Advocates' Library, Professor of Natural Philosophy, and (1764) Professor of Moral Philosophy. He wrote, besides other works, *Essay on the History of Civil Society* (1767), a reply to Dr. Price's work on the same subject, which resulted in his being sent out as secretary to the commission that attempted (1778-79) to bring to a peaceful close the quarrel between the American colonies and the mother country; *Institutes of Moral Philosophy* (1769); *History of the Progress and Termination of the Roman Republic* (1784), the most popular of his works, and translated almost immediately after its appearance into French and German; and *Principles of Moral and Political Science* (1792). F. died at St. Andrews, 22nd February, 1816.

Ferguson, James, F.R.S., was born at Keith, Banffshire, 1710. Of poor parentage and little education, he early showed his mechanical talent in the construction of a wooden watch; and when engaged in tending his master's sheep spent his ample leisure time in contriving machines during the day, and in studying and mapping the stars at night. He thus attracted the attention of influential neighbours, who aided him in his mathematical studies and enabled him to go to Edinburgh, where he gained a livelihood by miniature portrait drawing. In 1743 he removed to London, received a pension of £50 in 1760, became a Fellow of the Royal Society in 1763, and died 16th November, 1776. His principal works are *Astronomy Explained on Sir Isaac Newton's Principles* (1756); *Lectures in Mechanics, Hydrostatics, Pneumatics, and Optics* (1760); *Select Mechanical Exercises* (1773); *The Art of Drawing in Perspective* (1775)—besides several papers in the *Philosophical Transactions*. The *Eclipsareon* was thought by himself to be his best invention. This showed the time, quantity, duration, and progress of solar eclipses in all parts of the world. Sir David Brewster re-edited several of his works. See F.'s autobiography, prefixed to his *Select Mechanical Exercises*.

Ferguson or **Fergusson, Robert**, a poet, born at Edinburgh 5th September, 1750. He was educated at Dundee and at St. Andrews University, became clerk in an Edinburgh attorney's, and published several poems in the Scottish dialect which won considerable fame. Being thus led into society, he ruined his health by dissipation, and died insane, 16th October, 1774. His poetry has a strain of pleasant fancy and humour, and is written in pure Lowland Scotch. Burns called F. his 'elder brother in the Muses,' and is said to have taken his idea of *The Cottar's Saturday Night* from *The Farmer's Ingle* of F. See F.'s works, with a biography by Dr. Irving.

Fergusson, Sir William, Bart., F.R.S., a distinguished surgeon, was born at Prestonpans, East Lothian, 20th March, 1808. Educated at Lochmaben grammar-school and at the High School and University of Edinburgh, he became assistant to Dr. Knox and Dr. Turner in the Edinburgh College of Surgeons, of which institution he was made a Licentiate in 1828 and a Fellow in 1829; began to lecture on surgery in 1831, was made Assistant-Surgeon in the Royal Infirmary in 1836, Fellow of the Royal Society, Edinburgh, in 1839, and Professor of Surgery in King's College, London, in 1840. F. was for five years Examiner in Surgery at London University, was made a baronet in 1865, and President of the Royal College of Surgeons of England in 1870. He was a Fellow of the Royal Society of London, and Sergeant-Surgeon to the Queen. F. wrote several treatises on lithotomy, aneurism, &c., and an admirable *System of Practical Surgery*, and invented many surgical instruments. He died 10th February, 1877.

Feriæ (probably for *fesiæ*, from *festus*) were days of rest, holidays in which all business (especially litigation) was suspended. F. were either private or public, according as their observance was limited to families or individuals or extended to the general community. Occasions for the former class of F. were found on birthdays.' The public F. were of three kinds—*stativæ*, observed regularly every year on a fixed day, such as the Lupercalia; the *conceptivæ*, observed regularly every year, but on days fixed from year to year by the priests or magistrates, such as the *F. Latinæ;* and *imperativæ*, days fixed by the magistrates for supplication or thanksgiving, in connection with some national event. On the F. the people generally visited the temples, and offered prayers and sacrifices, and were strictly prohibited from performing any kind of work. In Old Scotch, *feriat* (also *feryale* or *feriell* tymes) denoted the immunity from prosecution secured during *harvest*, as if every day of it had been devoted to religion.

Ferin'ghees, a name applied by Mohammedans to Christians generally, and derived from the 'Franks' or 'French.' In India it was appropriated to the descendants of the early Portuguese settlers, born of native women, who had retained the Roman Catholic faith, but had in all other respects, even in colour, sunk to the condition of the surrounding native population. They were especially numerous in the neighbourhood of Dacca and Chittagong, and were chiefly employed as cultivators and domestic servants.

Fer'ish'ta or **Firish'ta, Mohammed Kâsim Hindu Shah,** a Persian historian, born at Astrabad about 1570. His father travelled to Ahmednagur in the Deccan, and was there made tutor to Miran Hassein, the son of Murteza Nizam Shah. F. was patronised by Murteza and Miran, and on the latter's death repaired to Bijapur, where he was highly honoured by Ibrahim Adil Shah II., and where he devoted himself to his *Tarikhi Firishta*, or history of the Mohammedans in India. He is supposed to have died about 1612. F.'s history consists of twelve books, is clear and impartial, but takes no notice of the institutions and social state of the people. It is very popular in India, where it has completely obscured the histories on which it was founded. The work was published at Bombay in 1831, edited by J. Briggs, who issued a translation of the whole (Lond. 1832).

Ferman'agh (Ir. Gael. 'the men of Monagh,' or from *Feormagh-eanagh*, 'the country of the lakes'), a county in the W. of Ulster, Ireland. F. is mostly covered with wild mountains (composed chiefly of limestones and sandstones of the Old Red Sandstone period) and a network of lakes and streams, but contains rich arable land and strips of fine wood and undulating pastures. In the central depression of the uplands lies the Great Lake or Lough Erne (q.v.). The chief summits are Dowbally, 2188 feet, and Slieve Baught, 1812 feet. The rivers are small and most of them flow into Lough Erne; Cloddagh, Woodford, Colebrook, Silees, and Arney are the chief. Linen manufacture is carried on, but only on a small scale. Although F. became a county early in the reign of Elizabeth, it remained quite ungoverned till Ulster was 'planted.' In 1641 much of the land was forfeited from the Irish and was handed over to English and Scotch families.

Of the 417,665 acres constituting the area of F., 20,387 are under corn, beans, and pease (oats 19,425), 19,535 under green crops (potatoes 14,605), 5631 under clover, sainfoin, and grasses in rotation, and 1854 under flax. Permanent pasture and grass not broken up account for 59,039 acres, while woods and plantations cover 5632. There are 24,879 acres of barren mountain-land, 2366 of marsh, and 19,746 of turf bog. (See also articles CATTLE, HORSE, PIG, and SHEEP.) There are 23 flax scutching mills in F., representing 146 stocks, and 47 corn mills. Oats and dairy produce are the chief exports. Enniskillen is the chief town.

F. contains two parl. divs., each of which returns one member: N. F., consisting of the baronies of Lurg, Magheraboy, and Tirkennedy, pop. 37,799; and S. F., consisting of the baronies of Clanawley, Clankelly, Coole, Kockninny, and Magherastephana, pop. 36,371. Pop. of county, 74,170.

Fer'mat, Pierre de, a French mathematician, was born at Toulouse, or near Montauban, in August, 1601, and spent the most of his life as an advocate in that town, where he died in January, 1665. He shares with Pascal the honour of having invented the calculus of probabilities, and in his method for finding maxima and minima anticipated the differential calculus; but his reputation rests chiefly upon his ingenious investigations into the properties of numbers. The French claim for him the honour of discovering the differential calculus, Hallam ranks him in genius next to Descartes and describes him as a man 'incapable of envy, forgiving of detraction, and delighting in truth, with almost too much indifference to praise.' A collection of his works was published by his son Samuel in 1679, at Toulouse.

Ferma'ta, in music, the name of the pause, usually indicated by the sign 𝄐. When found at the end of a part it enables the musician to insert extemporaneous matter, should he so desire.

Fermenta'tion (from the Lat. *fermento*, and that from *fervere*, 'to boil') originally signified the boiling or bubbling up of a substance attended with disengagement of gas, and not produced by the action of heat; and in this sense it was employed by the alchemists and early chemists to denote such chemical changes as the solution of metals in acids, &c. The term now, however, has a different signification, and may be defined as the decomposition or change of an organic substance in a definite manner, produced by the action of another organic substance, which does not itself suffer any change, nor lose any of its own material during the process. The latter substance is termed a *ferment*. Fermentations may be divided into two kinds:—(1) Those in which the ferment possesses a definite organized structure, and is, in fact, a plant (or possibly in some cases an animal); (2) those in which the ferment is not organized, but consists of a small quantity of an azotized substance, very often occurring along with the fermentable material. In many instances mineral substance may be substituted for the ferment of the latter order, which is sometimes called a *false ferment*. As an example of the former or true F., the conversion of sugar into alcohol—the *vinous* F.—may be instanced. This is produced by adding to a dilute solution of sugar a small quantity of yeast, and maintaining the mixture as a temperature of from 21°-26° C. Shortly after the addition of the yeast, bubbles of gas begin to be disengaged, and the yeast rapidly increases in quantity, new cells being produced by a process of budding. This action continues until the whole of the sugar is decomposed. The chief products of this F. are alcohol and carbonic acid, the latter being the gaseous substance which causes the frothing, or, as it is technically called, the *working* of the mixture.

It should be observed, however, that although alcohol and carbonic acid are undoubtedly the chief products of the decomposition of the sugar, yet small quantities of several other substances are formed, of which higher homologues of alcohol, glycerine, and succinic acid may be mentioned. Another familiar instance of F. is the souring of milk. This is due to the conversion of the sugar present in milk into lactic acid, and is also brought about by the action of a special organized ferment, differing, however, entirely from the yeast plant. Its spores are introduced into the milk either from the atmosphere, or by contact with vessels which are already contaminated with them. Milk undoubtedly grows sour more rapidly in a dairy than elsewhere, no doubt from the great number of the spores of the lactic ferment present. Of the fermentations produced by the action of a non-organized ferment, the conversion of starch into dextrine, and eventually into dextrose, may be mentioned. The ferment in this case is Diastase (q.v.), a substance produced during the germination of grain. (See BEER.) Another very remarkable instance is the change brought about by the action of emulsine on Amygdaline (q.v.), both of which substances occur in the bitter almond.

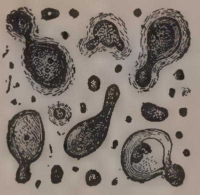


Fig. 1.

Growing yeast cells, and most minute germs, magnified 2000 diameters.

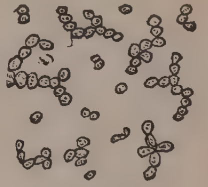


Fig. 2.

Yeast cells, growing during 48 hours, magnified 250 diameters.

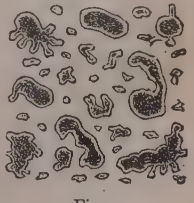


Fig. 3.

Growing yeast cells, showing buds magnified 1300 diameters.

Fermented and Distilled Drink, Consumption of. There are no means available of obtaining any reliable estimate of the quantity of alcoholic beverages made and consumed throughout the world; but as in one form or other such drinks are habitually consumed in all nations, the grand total must be prodigious. From customs and excise returns a fairly accurate statement of the consumption in Great Britain and Ireland can be framed. In the seventy years lapsed from 1801 to 1871 the population of the United Kingdom almost doubled itself; while in the same period the ostensible consumption of spirits of all kinds rose from 8,800,840 gallons to 29,151,000. The quantity of malt charged with duty in 1801 was 19,643,345 bushels, and in the year ending March, 1871 it reached 52,929,000 bushels. These figures would appear to indicate a very serious increase in the drink consumed in this country, but they must be regarded as quite untrustworthy, seeing to what a great extent smuggling prevailed during the early part of the century. The returns for the forty years from 1830 to 1870 afford a fairer basis of contrasts, and show upon the whole a decline from 1·16 gallons to 0·95 gallons per head. In the case of Scotland the decrease is very marked, amounting to over 30 per cent., thus indicating a great change in national habits. The quantity of malt charged with duty in the United Kingdom in 1830 was 32,962,000 bushels, equal to 1·62 bushels per head; and in 1871 it had risen to 52,929,392, representing still only 1·68 bushels per head. The individual consumption of malt liquors had thus remained practically stationary over a period of forty-one years. On the other hand, the consumption of wine had increased enormously, and that increase had principally taken place since the rearrangement of the wine-duties in connection with the French Commercial Treaty of 1860. The home consumption of wine, which in 1851 was 6,280,653 gallons, and in 1859 was very little more, had by the year 1869 risen to 14,168,321 gallons, the greater part of the increase consisting of French wines, containing little alcohol. The total quantity of *all* kinds of wines retained for home consumption in 1874 amounted to 17,284,242 gallons.

During the last twenty years the amount of wine imported and retained for consumption in the United Kingdom has gradually been increasing and in 1894 it reached 27,692,598 gallons, of which 11,704,044 were in casks. Over 3½ millions of proof gallons of rum and nearly 2½ millions of proof gallons of brandy were imported in the same year and retained for consumption in the United Kingdom. Our export trade in beer, ale, wines, and spirits in 1894 was 412,590 barrels and over 3¾ millions of proof gallons. Its value was estimated at £2,847,647 (methylated spirits included), which, it is true, paid our *brandy* bill of £2,443,167 but left only a small balance to settle our *rum* account of £3,609,111. The following table sets forth in portentous figures our demand for F. and D. D., beyond the amount we manufacture for ourselves, and is sufficient evidence of the enormous bill which this country annually pays to the foreign wine and spirit merchants :—

IMPORTED FERMENTED AND DISTILLED DRINK IN 1894.

Wine—	Gallons.	Value £	Home Consumption.	Duty £
Wine in casks .	12,099,327	2,708,335	11,704,044	928,838
Still wine in bottles	744,966	417,311	697,739	37,180
White sparkling wine in bottles .	1,510,947	1,882,144	1,431,915	214,765
Red ditto . .	13,381	10,318	12,601	1,890
Total . .	14,368,621	5,018,108	13,846,299	1,182,673
Beer and Ale—	Barrels.	Value £	Home Consumption.	Duty £
All sorts . . .	41,590	95,199	40,647	13,969
Spirits—	Proof Gallons.	Value £	Home Consumption.	Duty £
Rum . . .	6,092,063	422,607	3,609,111	2,011,019
Rum, imitation .	31,206	1,737	31,037	17,218
Brandy . . .	3,401,538	1,437,312	2,443,167	1,363,594
Geneva . . .	336,179	58,560	300,153	167,737
Unenumerated, not sweetened or mixed . . .	2,028,070	96,595	1,168,463	651,651
Methylated in Bond	...	...	617,704	10,294
Unenumerated, sweetened or mixed (tested) .	69,604	116,305	54,465	30,421
Liqueurs, Cordials, &c. (not tested) (gall.)	11,396	17,375	3,818	2,891
Perfumed . .	49,873	112,475	34,931	31,144

EXPORTED FERMENTED AND DISTILLED DRINK IN 1894.

Beer and ale .	412,590 (barrels),	value	£1,463,107
Spirits . . .	3,859,205 (proof gallons),	,,	1,378,404
Methylated . .	20,815 ,,	,,	1,856
Wines . . .	9,567 (gallons),	,,	4,280

On 30th September, 1880, the duty on malt and sugar used in brewing was repealed. In 1884 the excise duty paid on spirits was £14,222,828 and in 1894 it rose to £15,189,345 (exclusive of additional duties collected for local authorities on beer and spirits which amounted to £1,158,666). In 1884 the excise duty on beer was £8,488,169, which became £9,536,948 in 1894 (exclusive of the additional duty already stated). We may, therefore, conclude that the consumption of spirits and beer in this country is greatly on the increase.

Fermented Liquors are alcoholic beverages prepared by the fermentation of infusions of starchy or saccharine substances. A few F. L. are enumerated under the head BEER, but that most extensively consumed throughout the world is wine, which is fermented from the juice of the grape. Cider and perry are fermented from the apple and pear respectively, toddy from the sap of various palm-trees, and Mexican pulque from the *Agave Americana*. There is, however, scarcely a juicy fruit or vegetable sap from which alcoholic beverages may not be prepared. All alcoholic drinks may be divided into (1) F. L.; (2) spirits distilled from fermented infusions or saps; and (3) *liqueurs*, which are sweetened and aromatized spirits, or spirits simply aromatized.

Fer'mo (anc. *Firmum*), a town of Central Italy, in the province of Ascoli-Piceno, 4 miles from the Adriatic, and 30 miles S.E. of Ancona. It is a very ancient town, having been founded by the Sabines before the date of the building of Rome by which it was colonised in 264 B.C. Till 1860 it formed part of the Papal states and was then made over to Italy. It is circled by old walls, has a cathedral and several churches and convents, is the seat of an archbishop, and has some trade in corn, wool, and silk, chiefly carried on by the small harbour, Porto F. Pop. 18,556.

Fermoy' (Ir. Gael. *Feara-muighe*, 'men of the plains'), a town of Cork, province of Munster, in the rich and beautiful valley of the Blackwater, 18 miles N.E. of Cork. It lies on the high road from Cork to Dublin. F. stands on both sides of the Blackwater, which is here spanned by a stone bridge. It was an important military station. The chief buildings are the Roman Catholic cathedral, banks, flour mills, union workhouse which was part of the barracks, and parish church. At the end of the last century F. was simply a collection of cabins, but in 1797 John Anderson, the principal proprietor, built a hotel and barracks. Now F. has become a thriving centre for agricultural produce. Pop. township and mun. bor. (each) 6469.

Fern, Male, the old botanical name still retained to designate a species of ferns, the fronds or leaves of which are bipinnate in form, the pinnules or secondary fronds being oblong and serrated. This species is common enough in Britain, and obtains its importance from its root-stems or *rhizome* being used in medicine as an anthelmintic. The rhizome may attain the length of a foot.

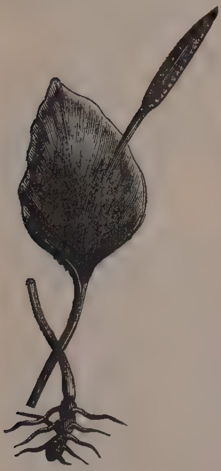
Fern, Sweet, a species of plants belonging not to the Fern order (*Filices*), but to the *Myricaceæ* or Gale order, the plants of which have generally aromatic, tonic, and astringent properties. S. F. is used in N. America as an antidote to diarrhœa. Its bark is aromatic and astringent, and its leaves possess a glandular structure.

Fernan'do de Nor'onha, a group of small islands, about 8 miles long, in the S. Atlantic, 220 miles N.E. of Cape St. Roque. It belongs to Brazil. The largest, called F. de N., which gives its name to the group, is covered with woods, and liable to long periods of drought. It is used as a convict establishment. No woman is allowed to land here. In one place the surface attains an elevation of 1000 feet. The sea around abounds with fish.

Fernando Po, properly **Fernan Po** (in Portuguese *Fernão Po*), an island in the Bight of Biafra, W. coast of Africa, 44 miles long by 20 broad. F. P. is the chief of the Spanish Guinea Isles, the others being Corisco, Elobey, San Juan, and Annabon. F. P. is mountainous, rising in Clarence Peak to 10,714 feet; the soil is fertile, from the number of springs and streams. Discovered by the Portuguese in 1472, and originally named *Ilha Formosa* ('the beautiful isle'), it passed in 1778 into the possession of Spain. Palms, yams, and many other tropical plants abound. Turtle and all kinds of fish are plentiful. The inhabitants are called 'Boobies' and are wanting in good looks and intelligence. Palm-oil and India-rubber are the principal exports. It is used as a place for deportation of persons convicted of political offences. The capital is Clarence Cove, the seat of the palm-oil trade, and originally an English settlement. Pop. of the five islands, 30,000; area, 850 sq. miles.

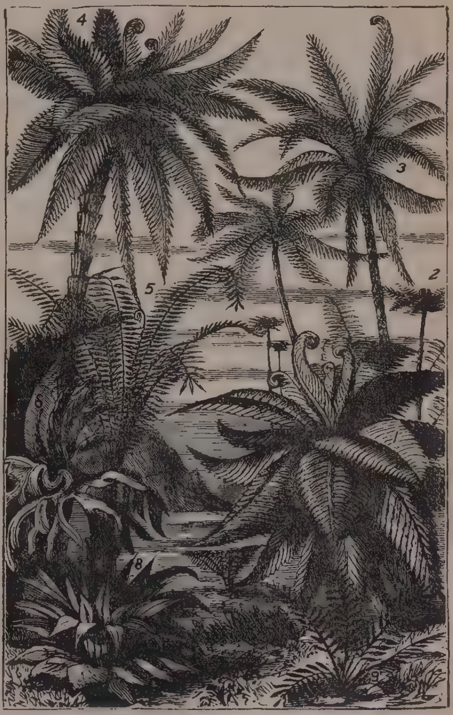
Clarence Peak, Fernando Po.

Ferney or **Fernex** (*Ferney-Voltaire*), a town in the department of Ain, France, at the base of the Jura mountains. Hither the persecuted Huguenots fled for refuge. Voltaire lived here for twenty years, and during that time he, by his energy, raised the place from being a collection of miserable hovels to a position of prosperity. Watch-making was the chief industry. After his death the trade languished. He built a church and a theatre here. Pop. 1200.



Adder's Tongue.

Ferns, an important order of Acotyledonous plants, which are sometimes also named Acrogens, or 'summit growers,' from their mode of growth. They are leafy plants; the leaves, or fronds, are rolled up within the bud after the fashion of a bishop's crosier—this being named *circinate vernation*. The stem exists either in a form of a rhizome or underground stem, or in that of a hollow erect stem. The fructification is borne on the veins of the lower surface of the fronds, or on the margins of the latter. The reproductive organs consist of *sporangia* or spore cases, which may be arranged either in round *sori* or clusters, or in an elongated manner, while sometimes they are covered by a layer of the Epidermis (q.v.) or skin, termed the *indusium*, or they may be entirely destitute of any covering. Occasionally (as in *Osmunda*, the royal fern) the fructification may appear in the form of a spike on the end of a frond. The sporangia or spore cases open or burst by the contraction of an *annulus* or ring, which may encircle the spore cases in various ways. Sometimes the ring may be wanting. The spores of F., when placed in suitable conditions, germinate, and give origin, not directly to F., but to soft cellular structures, each of which is known as a *prothallus* or *pro-embryo*. On the latter, peculiar reproductive cells, supposed to correspond to the ovules and pollen of higher plants, have been found; and by the contact of these latter elements a new embryo is produced which develops into the true fern. This process reminds us of the Alternation of Generations seen in some animals, such as zoophytes. F. grow best in moist places and climates. They flourish in greatest perfection in tropical islands, where they attain a great size and dimensions. In New Zealand they form the characteristic flora, and from 2000 to 3000 species are known. F. have been classified into the (1) *Polypodiaceæ*, with sori borne on the back of the fronds, and covered by an indusium — genera, *Polypodium*, *Adantium*, *Pteris*, &c.; (2) *Osmundaceæ*, or flowering F., represented by the genera *Osmunda*, *Todea*, &c., in which the spore cases are dorsal, or clustered on the sides of a modified frond; (3) *Ophioglossaceæ*, the adder's tongue tribe, with spike-like sporangia; and (4) *Danæaceæ*, with spore cases forming dorsal masses, and represented by the genera *Danæa*, *Angiopteris*, &c.



Tree Ferns.

1, Alsophila excelsa; 2, Dicksonia arborescens; 3, Cyathea elegans; 4, Cyathea arborea; 5, Hemitelia speciosa; 6, Drynaria coronans; 7, Platycerium grande; 8, Bird's nest fern; 9, Asplenium lucidum.

Feroz' or Firoz Canal, an irrigation work in the Punjab, British India, N.W. of Delhi, first constructed by the Moghul emperor Firoz Shah (1351-88), to water his hunting ground at Hissar. In 1568 the works were reopened by Akbar, and further developed in 1626 by the engineer Ali Murdan Khan, under orders from Shah Jehan, to bring water to Delhi. But by 1753 the canal had again become choked, and in 1823 it was restored by the British as part of the Western Jumna Canal (q.v.). The F. C. proper, which follows the old channel, leaves the main line near Karnal, and passes to Hansi through the districts of Karnal, Hissar, and Rohtack. The water here is absolutely necessary, not only for agriculture, but even for the cattle.

Fero'zepore (*Firozpur*), the chief town of the district of the same name in the Punjab, British India, 3 miles from the present bank of the river Sutlej, and 1181 miles N.W. of Calcutta. Pop., including the cantonments, 50,437. It is an ancient town, with a strong fort, and was formerly very populous and supposed to have been founded by Firoz Shah between 1351-87. For fifteen years it was the frontier station of the British power, and the scene of many military and diplomatic events. It contains a memorial church, inscribed with the names of those who fell in the Sikh campaigns. The present streets, shops, &c., were laid out, and the fort rebuilt, by Lord Lawrence. The river traffic is considerable. The arsenal is vast and well-stocked and a large cotton-press in the neighbourhood is a centre of much commercial activity. At the time of the Mutiny, in 1857, the three regiments of sepoys stationed here were partly disarmed and partly dispersed, and the immense magazine in the fort was thus saved.—F. *district* lies along the left bank of the Sutlej, S. of Jalandhar and Lahore; area, 4302 sq. miles; pop. 886,676, of whom 252,200 are Hindus; 226,361 are Sikhs; 1381 are Jains; 404,977 are Mohammedans; 1738 are Christians; and 17 are Parsees. Dhanna Singh, the ruler of F., was the first Cis-Sutlej chief to accept the British offer of protection when Rangit *crossed the Sutlej* in 1808. Consequently he remained in undisturbed possession till his death, ten years later, when being childless, his widow succeeded him and ruled till 1835, in which year it passed to the British. When acquired by the British, the country was desolate and covered with jungle, but it is now fairly populous and cultivated. It is well watered, and in some of the marshes rice can be grown; but wheat, barley, gram, cotton, tobacco, sugar-cane, and millet are the staple crops.

Fero'zeshah (*Firozshah*), a village in the district of Ferozepore, Punjab, British India, 12 miles from the left bank of the Sutlej. It was the scene of the second battle of the first Sikh war, 21st December, 1845, when the British, under Lord Gough and Lord Hardinge, stormed the Sikh entrenchments with great loss.

Feroz, or **Firoz, Shah,** an Indian Emperor of the Toghluk dynasty, reigned at Delhi from 1351 to 1387. In his reign the administration was improved and public works were lavishly undertaken. Of these last, the Firoz-Canal (q.v.) is the most celebrated; but F. is said to have constructed altogether 50 dams across rivers, 30 reservoirs, 100 caravanserais, as many hospitals and public baths, and 150 bridges. See the Chronicle *Tarikh-i-Firoz Shahi* in Elliot's *History of India*, vol. iii.

Ferr'alum, a mixture of the sulphates of iron and alumina, carbolic acid and terebine, has been introduced for crude deodorizing purposes, where the coarser results of decomposition, such as sulphuretted hydrogen and ammonia, have to be neutralised, as in purifying drains, sewers, cesspools, stables, &c.

Ferra'ra (anc. *Forum-Alieni*, 'the market-place of the foreigners'), an Italian city in the province of F., on the Po di Volano, 4 miles S. of the main branch of the Po, and 26 miles N.N.E. of Bologna. F. stands in a low unhealthy plain, is girt by walls, and consists mainly of wide and often grass-grown and deserted streets, with many crumbling palaces. In the centre of the city is a square castle of red brick, surrounded by a deep moat, the former residence of the Este family. The chief buildings are the cathedral of St. Paolo, which has a noble façade and massive campanile, and is rich in frescoes and statues; the churches of San Domenico, Campo Santo, Santa Maria del Vado, and San Benedetto, in which Ariosto was buried. These have many fine paintings, and the tombs of various artists of F. The house of Ariosto, and the cell of Sant' Anna, in which Tasso was imprisoned, are still shown. The university, now only a school of medicine and law, was founded in 1264, and possesses a valuable library of 100,000 vols. The town has some trade in corn, and caviare is made from the sturgeons caught in the Po. F. began to rise in the 5th c., and was included in the exarchate of Ravenna. It was a great trading city in the Middle Ages, and at one time numbered 100,000 inhabitants. In 1240 it fell into the power of the Este family, under whom it became famous as a seat of literature and art, and of the most splendid court in Italy. It was seized by Clement VIII. in 1597, taken by the French in 1796, restored to the Pope in 1814, held by an Austrian garrison from 1849 to 1859, and in 1860 united to the kingdom of Italy. Pop. 76,422.

Ferra'ri, Gauden'zio, one of the most famous painters and sculptors of the Milanese school, was born at Valduggia in 1484, and executed some remarkable frescoes and highly-finished pictures when little more than twenty years of age. Afterwards he visited Rome, worked under Raffaelle, and modelled his style upon that of the great master. His numerous works—sacred subjects with a few portraits—are for the most part in Milan. His 'St. Paul in Meditation' at Paris, his 'Martyrdom of St. Catherine,' and his magnificent 'St. Jerome' at Milan are his *chefs-d'œuvres*. F. died at Milan in 1550. His composition is noble, his expression animated and true, his drawing correct, and his colour extremely gay, though somewhat deficient in harmony and tone.

Ferré, Théophile Charles, originally a merchant's clerk, but afterwards a fierce Communist, was born in 1845. He became in turn member of the commission of public safety, adjunct procurator general, and prefect of police. At the massacre of hostages in May, 1871, he took the chief part and caused the inmates of the penitentiary to be released and armed and to act as the executioners. Opportunity alone was the limit to his excesses. He was executed in November, 1871.

Ferrei'ra, Antonio, 'the Portuguese Horace,' was born at Lisbon in 1528, studied law at Coimbra, where he became a professor, afterwards held an office at the court of João III., and was cut off by the plague in 1569. F. was a zealous student and imitator of the Greek and Latin poets, especially of Horace. His works, which include sonnets, odes, elegies, epistles, and dramas, are marked by depth of thought and graceful conciseness of diction, and belong to the Portuguese *classic* school. F. is particularly happy in his *Cartas* or epistles. His play *Inez de Castro* was the second tragedy written in Europe after the revival of letters, and his *Cioso* was the earliest comedy of character written in Portugal. F.'s *Poemas Lusitanas* were published at Lisbon in 1598; all his works appeared at Lisbon in 1771. See Sismondi's *La Littérature du Midi* (Par. 1813).

Ferr'et, a species of Carnivorous Mammalia nearly allied to the polecats, weasels, &c., and included with these in the Digitigrade (q.v.) family *Mustelidæ*. The F. is employed chiefly in the extermination of rats and other vermin, and for hunting rabbits, its active lithe movements and its carnivorous propensities suiting it admirably for its work. The exact nature of the F. species or breed has been much disputed. Most naturalists agree in considering the F. to be an albino variety of the polecat, while a few have maintained its specific identity. The polecat and F. will breed together, but the latter appears to require a warmer climate than the former. The F. is said to have been originally brought from Africa. The common F. is the albino-like animal already alluded to, with a creamy-white body and pink eyes. The polecat-F. is larger and dark coloured. Both are very persistent and ferocious, especially if irritated. They breed twice annually, and produce from six to eight or nine young at a birth.

Ferret.

Ferricyan'ogen is the name given to a compound radical (or group of elements which can be transferred from one compound to another).

The radical itself cannot be isolated, its compounds alone being known. Of these, the ferricyanide of potassium is the most important. This salt is prepared by the action of chlorine on ferricyanide of potassium, and differs from the latter only in that it contains an atomless metal.

Ferricyanide of potassium crystallizes in large prismatic bubbles, which are of a beautiful ruby-red colour. It is employed in the manufacture of *Turnbull's blue*. This compound is precipitated on mixing solutions of protosulphate of iron and ferricyanide of potassium, and when pure it is the ferricyanide of iron or ferrous ferricyanide. F. contains the element iron and the group of elements called cyanogen, but neither of these can be recognised in it by the ordinary test.

Ferr'ier, James Frederick, a subtle and strong metaphysician, was born at Edinburgh, November, 1808. Educated at Oxford, where he took the degree of B.A. in 1832, he was called the following year to the Scotch bar, but did not practise. He became known in literature first as a contributor of articles, chiefly on metaphysical subjects, to *Blackwood's Magazine*, and his election to the chair of history in the University of Edinburgh in 1842 was followed in 1845 by his appointment to the professorship of moral philosophy in the University of St. Andrews. F.'s magazine 'studies' formed the basis of his *Institutes of Metaphysics, a Theory of Knowing and Being*, published in 1854, which, though cast in a mathematical form, has occasional bursts of radiant humour and paragraphs of the rarest literary beauty. It is on the whole the most keen and luminous exposition of Berkeleian idealism in the English tongue. In 1855 F., who had married a daughter of Professor John Wilson, published the collected works of his father-in-law. He died 11th June, 1864. His *Lectures on Greek Philosophy*, and other philosophical remains, were published in 1864, under the editorship of Sir Alexander Grant and Professor Lushington.—**Susan Edmonston F.,** aunt of the preceding, and sometimes called 'the Scottish Miss Edgeworth,' was born in Edinburgh in 1782, her father, James F., being, like Sir Walter Scott, one of the principal clerks of the Court of Session. S. E. F. was herself on intimate terms of friendship with the great novelist. She first gained favour by her novel of *Marriage* (1818), which is rich in humour and in genuine portraits of Scottish character, although they occasionally verge on caricature. Her other works are *The Inheritance* (1824) and *Destiny* (1831), marked by the same enduring excellences as *Marriage*. Miss F. died 7th November, 1854.

Ferr'o (Span. *Hierro*), the most westerly and the smallest inhabited island of the Canaries (q.v.) which belong to Spain, and for administrative purposes are considered part of Spain. Area, 82 sq. miles. It attains a height of 3500 feet. is fruitful, but deficient in water. The chief place is the village of Valverde on the N.E. coast. All geographers at one time reckoned longitude from F., and maps are still constructed on this principle in Germany. Pop. 5897.

Ferrocyan'ogen is usually represented as having the same composition as ferricyanogen; but its salts differ from those of the latter compound, in that they contain more metal. The most important compounds of F. are its potassium, iron, and copper salts. The first of these is obtained by heating animal refuse—horn, blood, clippings of hides, &c. —with carbonate of potash and scrap iron. The resulting mass is dissolved in water, filtered, and evaporated to crystallization. Ferrocyanide of iron, or *Prussian blue*, is prepared by mixing solutions of a persalt of iron and ferrocyanide of potassium. Ferrocyanide of copper is called *Hatchett's brown*, and is also largely employed as a pigment; it is obtained by mixing solutions of sulphate of copper and ferrocyanide of potassium. Neither the iron nor cyanogen present in F. can be detected by the ordinary tests.

Ferr'ol (Span. *farol*, 'the beacon'), a fortified seaport in the province of Coruña, Spain, 12 miles N.E. of the town of Coruña, on a neck of land on the N. shore of the Bay or *Ria* of F., is a large naval arsenal of Spain. The entrance to the harbour is so narrow that only a single ship of the line can pass at a time, and it is defended by the castles of San Felipe and Palma. The land side was fortified in 1769-74 with a wall on which 200 cannon can be mounted. Fifteen ships of the line could be built in F. at the same time. F. has manufactures of sailcloth, ropes, and leather, and exports pickled herrings and sardines, wine, brandy, and corn. The arsenal and dockyards cover over 24 acres. Pop. 6089.

Ferro'type, a photographic process published in 1844 by R. Hunt, whereby paper is sensitised by means of succinic acid, common salt, gum-arabic, and nitrate of silver; the image being developed by photosulphate of iron, and fixed by hyposulphite of soda. In the United States of America cheap photographs on tin have been called by the same name.

Ferru'ginous (from Lat. *ferrum*, 'iron'), a term in geology applied to rocks and soils which contain large quantities of red iron oxide. Its presence is easily recognised by the brownish-red colour which prevails.

Ferr'y (from Old Eng. *faran*, 'to move'; *cf.* Lat. *fero*), in law, is a right by prescription or by license from the Crown or by Act of Parliament to keep a passage-boat on water, and to make a reasonable charge for the conveyance by it of passengers or goods. The right prevents another from setting up another F. in the same neighbourhood. It is not essential to a right of F. that the possessor should be the proprietor of the land on either side. By 8 & 9 Vict. c. 45, certain rules are laid down for the regulation of ferries, and by the Land Clauses Act the owner of the right is debarred from compensation when the traffic ceases or decreases owing to competition by a railway bridge.

Fertil'ity is the capability of producing progeny. This capability varies very much in the animal kingdom. A mode of estimating F. would be to note the number of real progeny resulting. This can rarely be done, but it may be stated generally that the number of the progeny stands in a certain relation to the mean duration of life of the species. The greater the mean duration of life the less will be the F., and *vice versâ*. The F. of the human being is affected by social influences and habits in a manner at present not understood. The actual descending F. of animals also varies considerably. This F. of the human being may be reckoned to be one in one year, whereas in the case of the mouse it is estimated at 43,000 in the same period; that is, the human parent at the end of twelve months remains simply the parent, whereas the mouse parent may by the end of a year be raised to the proud position of ancestor of a numerous progeny in the first to the seventh degree. Yet this power of reproduction is insignificant when compared to that of the members of the lower animal-vegetable kingdom, where the offspring becomes a parent of ten descendants in less than ninety seconds after birth.

Fescenn'ine Verses (from Lat. *fascinum*, 'a bewitching,' as they were supposed to be a protection against witchcraft) were the earliest attempt at versification made by the inhabitants of Italy. They were a rude kind of dramatic satire, in which the interlocutors ridiculed one another, and they were accompanied by music and dancing. In course of time they became malicious and libellous in character. At first they were confined to rustic gatherings, especially after harvest, but were subsequently introduced, probably in a more refined form, into the towns. It is a common error to suppose that the F. V. were of Etrurian origin, and that the name was derived from Fescennia, an Etrurian town.

Fesch, Joseph, Cardinal, an eminent ecclesiastic, who from the marriage of his father to the grandmother of the First Napoleon was considered uncle of the latter, was born at Ajaccio, 3rd January, 1763. He was educated for the Church of Rome, but entering into the spirit of the French Revolution, served in the army under General Montespan as storekeeper. When his nephew resolved to revive the Roman Catholic worship in France and to gain the favour of the Pope, he made use of F., who returned to his original profession, and proved himself an adroit and successful ecclesiastic. In 1802 he became Archbishop of Lyon; in 1803 he obtained a cardinal's hat; and in 1804, while ambassador at Rome, he induced the Pope to consecrate Napoleon as emperor. F., however, was too staunch a Churchman to approve of the policy which his nephew pursued towards the Pope; he declined to be made Archbishop of Paris; Eugène Beauharnis was preferred to him for the primacy of the Confederation of the Rhine, which he had been promised; and he retired with his half-sister Letitia to Rome. His later years were embittered by the persecutions of the Legitimist clergy, who compelled him to resign his charge. F. died 13th May, 1839, leaving behind him one of the largest collections of paintings ever made by one person. See *Le Cardinal F., Fragments Biographiques* (Lyon 1841), and *La Vérité sur le Cardinal F.* (Lyon 1842). Napoleon's Correspondence with F. was published by Du Casse (Par. 1855).

Fes'cue, a genus of Grasses represented by various characteristic British species, and possessing spikelets with many flowers or florets, each floret having two lanceolate paleæ. The meadow F. attains a height of 2 or 3 feet and is common in meadows and pastures in Europe, N. America, and N. Asia. The panicle in this species is of spreading form, and the spikelets are arranged in linear fashion. Spiked F. has the branches of the panicle represented by a single spikelet, and has a *raceme* arrangement of florets, or two-rowed spikes. It is otherwise nearly allied to the former species. Hard F. grows well on dry soils, and has a shortened panicle. Creeping or red F. is allied to the preceding species, and is also of hardy nature. A smaller species is sheep F., most common in hilly districts. Tall F. may attain a height of 4 or 5 feet. It grows most profusely in moist soil, and near rivers and lakes. The heterophyllous F. is a native of the Continent, but has been cultivated with success in Britain; and the F. of Peru is used in that country for thatching roofs.

Fesse, in heraldry, one of the honourable ordinaries, is formed by two parallel lines drawn horizontally across the centre of the shield, so as to contain two-thirds, and is regarded as an emblem of the military girdle worn by mediæval knights. *Fess-point* is the centre of the shield; *F.-wise*, placed like a F.

Fess'enden, William Pitt, was born at Boscawen, New Hampshire, U.S., 16th October, 1806. He graduated at Bowdoin College in 1823, established himself as a lawyer in Portland, Maine, in 1829, and soon acquired a high reputation in his profession. F. entered political life as a Whig, and was elected to the state legislature in 1832. In 1841 he was sent as representative to Congress; entered the United States Senate in 1854, and signalised himself by an able speech against the Nebraska bill. He became a leading Republican, and as chairman of the finance committee rendered invaluable service during the war. In 1864 he became Secretary of Treasury, but returned the following year to the Senate, where he voted for the acquittal of President Johnson. After suffering long from ill-health, he died 8th September, 1869. F. was an eloquent debater, a skilful tactician, an able statesman, and a man of strict probity and honour.

Fes'tival Plays. See MYSTERIES, MORALITIES, AND MIRACLE PLAYS.

Festivals are, speaking generally, holy-days or 'solemn assemblies celebrated by cessation from labour, by sacrifices, feasting, dancing, singing, or any other sign of joy.' They have been instituted chiefly from four causes:—First, in honour of the gods, for offering sacrifices and praises to them, out of gratitude for benefits received; secondly, in order to propitiate the gods, so as to obtain some particular blessings or deliverance from evils under which men were labouring; thirdly, in memory of deceased patriots or public benefactors; and fourthly, as times of rest and recreation to labourers. Perhaps the earliest of all F. were those connected with agriculture, as after harvest or vintage, when men rejoiced over the fruits they had gathered, eating and drinking plentifully. Astronomical phenomena would also be early observed, such as the moon's changes, the summer and winter solstices, &c., and F. celebrated in connection with them. Such celebrations have always had great attractions for primitive, half-civilised peoples, and have been of universal prevalence. The nation which was specially noted in ancient times for its attention to F. was the Egyptians, from whom probably the Greeks derived theirs to a great extent, the Romans again deriving theirs from the Greeks.

Greek and Roman Festivals.—The four great solemn F. of Greece were the Olympic, Pythian, Isthmian, and Nemean. The following, from their importance, also deserve notice:—The Adonia, in honour of Venus and Adonis; the Apaturia, of Bacchus; the Brauronia, of Diana Brauronia; the Dionysia, of Bacchus; the Eleusinia, of Ceres and Proserpine; the Thesmophoria, of Ceres the lawgiver; and the Panathenaia, of Minerva. F. to the same god were held in different localities, as the Apollonia at Sicyon, the Carneia at Sparta, the Daphnephoria at Thebes, the Delia at Delos—all in honour of Apollo. The Androgeonia and the Arateia (after Androgeus and Aratus) are examples of the numerous F. instituted in honour of heroes. The Romans freely enriched their mythology by foreign additions, but their F. were not at all so numerous as the Greek, never, indeed, having amounted to more than a hundred. The Epulum Jovis was held on the 13th November; the Matronalia, in honour of Juno, on the 1st March; the Quinquatrus, of Minerva, on the 19th March; and the other great gods were similarly honoured. Other notable sacred F. were the Cerealia, in honour of Ceres; the Consualia, of Consus, the god of secret deliberation; Matralia, of Mater Matula, or Aurora; Lupercalia, of Lupercus, the god of fertility, &c., &c. The Larentalia, in honour of Acca Larentia, nurse of Romulus and Remus, is an example of the F. that commemorate historical personages or events. Among the Romans, public games in the earlier ages were always regarded as religious rites. The chief athletic sports were the races, the mock fight (called the game of Troy), sham battles, sea-fights, and wild beast hunts.

The Hebrew F. may be divided into the Mosaic and post-exilian. 1. *Mosaic.*—The former are all connected with the sacred astronomical number *seven* (see WEEK), especially a series directly counted by sevens: (1) the Sabbath (q.v.) of Days; (2) the Sabbath of Weeks (see PENTECOST, FEAST OF); (3) the Sabbath of Months, kept on the first day of the 7th month (Tishri) as the beginning of the New Year, and called the Feast of Trumpets (Lev. xxiii. 23-25; Num. xxix. 1-6); (4) the Sabbath of Years, kept every seventh year as a year of remission (Exod. xxiii. 11; Lev. xxv. 1-7); (5) the Sabbath of Sabbath-years, kept every seven Sabbath-years, and called the year of Jubilee (q.v.). Besides these there were—(6) the Feast of the New Moon, kept at the beginning of every month, to connect the reckoning of weeks with the lunar month (Num. x. 10, xxviii. 11-15); (7) the Passover (q.v.), which had two real festival ('holy convocation') days—the first and seventh—and which was connected with the beginning of the harvest; (8) the Great Day of Atonement, on the 10th of the 7th month, which was a *fast* as well as a festival (Lev. xvi., xxiii. 26-32; Num. xxix. 7-11); (9) the Feast of Tabernacles (q.v.), or of the ingathering of the harvest; and (10) the feast which follows immediately on the Feast of Tabernacles, on the 23rd Tishri (Num. xxix. 35-38). The annual F. also made up the sacred number seven, with their days of 'holy convocation' (*two* Passover, one Pentecost, Trumpets, Atonement, Tabernacles, and concluding festival), and of these seven the Great Day of Atonement was pre-eminent as the 'Sabbath of Sabbaths,' as the ordinary Sabbath was pre-eminent among the seven days of the week.

2. *The post-exilian* F. were all annual, and in their order in the year were as follow:—(1) The Feast of Acra, instituted by Simon Maccabæus, B.C. 141, and held on the 23rd of the 2nd month, in commemoration of the capture of Acra and the expulsion of the Hellenists from Jerusalem; (2) the Feast of Wood-carrying, kept on the 15th of the 5th month from the time of the return from Babylon (Neh. x. 35); (3) the Feast of Water-drawing, held on the 22nd of the 7th month, the last day of the Feast of Tabernacles (*cf.* John vii. 37); (4) the Feast of Dedication (beginning on the 25th of the 8th month, and lasting eight days), instituted by Judas Maccabæus in commemoration of the purifying of the Temple (1 Macc. iv. 52-59; Jos. *Ant.* xii. 7, 7); (5) the Feast of Nicanor, instituted by Judas Maccabæus, and held on the 13th of the 12th month, in commemoration of the victory gained over Nicanor (1 Macc. vii. 49; Jos. *Ant.* xii. 10, 5); (6) the Feast of Purim, on the 14th of the 12th month, in commemoration of the deliverance of the Jews related in the Book of Esther (*cf.* iii. 7, ix. 20-28).

During the first few years of the existence of the Christian Church many of the Jewish F. were doubtless observed. As time went on the influence of Judaism diminished, and all Jewish F. were rejected except those which had been Christianized. At the end of the 2nd c. there is no evidence of the existence of any other Christian F. than the Sabbath or Lord's Day, the Passover—observed as Good Friday (q.v.)—and Easter (q.v.), and Pentecost (q.v.). But gradually other F. were adopted, perhaps a good deal owing to the analogy of other religions. The earliest of these was Epiphany (q.v.), and then Christmas (q.v.) came to be observed as a separate festival. Ascension Day (q.v.) began to be observed in the 3rd or 4th c., and the F. of the Presentation—Candlemas (q.v.)—and Annunciation in the 6th c. A very fruitful source of F. was the observance of the anniversaries of martyrs' deaths, reckoned as their birthdays (*i.e.*, their entrance into life), of which kind there was a widespread observance by the end of the 4th c. At first these saints'-days had only a local celebration, but in course of time those of the more eminent saints were celebrated by the whole Church. In the 7th c. a festival was instituted in honour of the Cross. At this time also (610), Pope Boniface IV., having got a gift of the Pantheon at Rome, which had been dedicated to Cybele and all the gods, dedicated it to the Virgin Mary and all the holy martyrs, and instituted the festival of All Saints (q.v.), which, however, had been observed in the Eastern Church from the 4th c. To this was added in the 10th c. the festival in memory of all departed souls.

The F. of the English Church are 149 in number (including Sundays):—Sixty-three in honour of Christ, three of the Holy Ghost, one of the Trinity, one of the angels, five of the Virgin Mary, and seventy-six of saints. As the day on which Easter falls varies from year to year, those F. which depend upon Easter—Septuagesima, Rogation Sunday, Ascension Day, Whit-Sunday, Trinity Sunday, Ash-Wednesday—are also 'movable feasts.' See C. D. Ginsburg in Kitto's *Cyclo. of Bib. Lit.* (Edinb. 1863); Smith's *Dict. of Christ. Ants.* (Lond. 1875); Blunt's *Annotated Book of Com. Prayer;* Bingham's *Ecclesiast. Antiquities.*

Festoon', an architectural ornament, frequently occurring on the friezes of Roman and Renaissance buildings, and consisting usually of wreaths of flowers and fruit, alternating with heads of animals. In modern architecture the F. is much used as a decoration for cornices, panels, &c.

Fes'tus, Sex'tus Pompei'us, who is supposed to have lived in the 3rd or 4th c. A.D., was the compiler of a valuable work in twenty books, entitled *De Verborum Significatione.* This work was a dictionary of notable Latin words, and consisted chiefly of an abstract of the *De Significatu Verborum* by Valerius Flaccus, an eminent grammarian of the time of Augustus. The epitome of F. was still further abridged by Paulus Diaconus, towards the close of the 8th c. Only one MS. of the work of F. has survived, the numerous blanks in which were filled up by Scaliger and Ursinus from Paulus, and from conjecture.

Fesz'ler, Ignaz Aurelius, a Hungarian novelist and historian, born at Czorendorf in July, 1756, joined the Capuchins, but afterwards became a Protestant, was reader to the Emperor Joseph in 1784, and from 1785-87 Professor of Oriental Languages at Lemberg. Being accused of atheism, he betook himself to Silesia, and finally to St. Petersburg, where he received the chair of Eastern languages in 1809, and died 15th December, 1839. He wrote various novels, treatises, &c.; but his chief works, which are all in German, are *Marc-Aurel,* a romance (1790-92), *Mathias Corvinus* (1793), *Attila* (1794), and *Geschichte der Ungarn* (Leipz. 1812-25). F. was a deep scholar and graceful writer.

Fetia'les. See FECIALES.

Fe'tichism, meaning the worship of fetiches (*fetich* is a corruption of the Portuguese *feitiçâo,* 'magic,' from the Lat. *ficticius,* 'what is feigned,' or perhaps from *fatidicus,* 'fate-telling'), is the first form of belief in the supernatural adopted by men altogether uncivilised. It is purely a worship of nature, the fetiches being natural objects, such as beasts, birds, reptiles, fishes, insects, trees, mountains, lakes, rivers, gems, metals, meteoric stones, the sun, moon, and stars, the earth, sea, and air, as well as artificial imitations of natural objects, which are credited with having a supernatural influence, and are appealed to by sacrifices and prayers against sickness, drought, &c., to cure insanity, barrenness, &c., to give rain, good crops, successful hunting, fishing, &c. The lowest form of F. is seen in what is also the first form of natural magic, when every man has his own amulet to protect him from all harm, and grant him all the success he desires in his occupation, being thus, at the same time, his own priest. Then family or household fetiches (teraphim, lares, &c.) are adopted, and the head of the house is the priest; or if wealthy, like Micah, 'the man of Mount Ephraim' (Judges xvii.), keeps a private chaplain. One step farther gives fetiches for the tribe, and a regular priesthood—medicine-men, rain-makers, jugglers, &c. The transition stage from F. to Polytheism is seen in the religion of the ancient Egyptians, with their unbounded use of amulets, and also their adoration of animals, or human forms with animals' heads, which were symbols of different attributes of deity. F. is systematized in the Shamanism (q.v.) of Tartary, and the Lamaism (q.v.) of Tibet and Mongolia.

Fe'tid Lime'stone, called by the Germans *stinkstein,* is the name given to certain kinds of limestone, which, when struck with a hammer, emit a fetid odour, like that of sulphuretted hydrogen—a result probably of the decomposition of animal matter. In the carboniferous limestones of Ireland such rocks are of frequent occurrence.

Fet'lock, or **Fett'erlock,** was at first probably an instrument fastened to a horse's leg to hinder his escape. It is the name for that part of a horse's leg where a tuft of hair grows behind the pastern joint. In heraldry it is represented by a short rounded bar, to which a semicircular steel band or chain is fixed.

Feu (Low Lat. *feudum,* lit. 'land held on feudal tenure,' from the same root as *fee, i.e.,* Old Eng. *feoh,* 'cattle,' 'goods'), a term of Scotch law denoting a sale of land for a stipulated annual payment, called the *F.-duty.* The deed of conveyance is called a *F.-contract,* or a *F.-charter,* there being some legal difference as to the mode of enforcing the two. The F.-contract, like other titles to land, has been simplified by the Titles to Land Act of 1858. A F.-duty is heritable, but an arrear is moveable. It is a *Debitum Fundi* (q.v.), and in addition to his personal action, in the event of non-payment the superior may *poind* the ground. (See POINDING.) He has also a real right in the land, and consequently a preference over purchasers and creditors. He has also a *hypothec* (lien) over the crop for the last or current F.-duty. Sometimes the stipulation is for payment in grain, in which case the quantity agreed on is valued according to the *Fiar* (q.v.) prices of the year, and the payment is made in money accordingly. But most modern feus are payable in money. Proprietors of land in Scotland near towns, manufacturing villages, or places of summer resort, are generally glad to add to their income by feuing ground for building purposes. F.-duties, being usually a very safe investment, bring a high price in the market, usually from twenty-two to twenty-three years' purchase, thus yielding a return of about 4½ per cent. The system of building on F. tenure possesses considerable advantages over the English system of long leases. The tenure being perpetual, the holder is probably led to erect more substantial buildings than he would otherwise do, and Scotch houses are accordingly remarkable for durability and warmth. From the Montgomery Act of 1770 down to the Entail Act of 1882 the legislation has favoured the relaxation of the severity of the law of entail, and now an heir of entail in possession may, amongst other things, feu out the entailed estate and grant long leases, provided he obtain the authority of the Sheriff or Court of Session for so doing. There is another kind of F.-duty called a *Ground Annual* (q.v.). For England see GROUND RENT.

Feud (Old Eng. *faehdth*, 'enmity,' 'deadly quarrel,' from *fian*, 'to hate'; *cf.* Frisic *faithe*, Dutch *veede*, Ger. *fehde*, Dan. *fejde*) was at first the war waged by the kindred of a murdered man to revenge his death, and then was applied to any strife between different clans or families, in the times before private disputes were settled by law. The word has no connection with 'feudal' or 'feudalism.'

Feu'dalism (for derivation see FEU), the principle of holding land by military tenure which prevailed during the Middle Ages. The Roman republic granted land to be held by military service, the holder being subject to the state; and after the Goths seized the Roman empire this Roman custom was united with the Gothic custom of devotion to a personal chief, and men received lands from their kings and leaders on condition that they gave their services in war. Land thus granted by a Gothic king was called a *feudum* or *fief*, and was held by *feudal* tenure; while lands which were not held of any lord were said to be held by *allodial* tenure, *allodial* being either the Latinised form of the Teutonic *odal*, 'noble' (*cf.* Mod. Ger. *adel*), or a derivative from the Teutonic *loos*, 'a lot.' Besides feudal and allodial tenures, there was a feudal relation called *commendation*, which Hallam compares to the Roman relation of patron and client, and by which a vassal promised military service in return for the protection of a powerful lord. The great chiefs, who admitted only a very slight supremacy on the part of the king, bestowed parts of their lands as fiefs, also on condition of military service, and these fiefs or benefices were again divided in subinfeudations. Gradually all the land in several countries was held by feudal tenure, but there never was a definite organized *feudal system*. 'Every one,' says Freeman (*Essays*, 2nd series), 'should be on his guard against believing that any such thing as a "feudal system" ever existed anywhere.' F., instead of being imposed as a uniform *system* upon the several European countries, grew up slowly and with great modifications in different lands, according to their previous history and the character of their inhabitants, and in no country was it largely developed before the 10th c. It was at first understood that the king could at will resume the great fiefs, but these were soon regarded as life-holdings; and after Karl the Bald, by the Diet of Chiersi in 877, gave his *leudes* or chief vassals hereditary possession of their benefices, allodial tenures lost their importance, and gradually changed into feudal fiefs, the protection of a strong over-lord being preferable to the perilous independence of an allodial landholder. Before the end of the 11th c. most allodial tenures were extinct, except in the S. of France. There was no clearly recognised hierarchy of landholders, but each feudal country may be said roughly to have been held by the king, the great vassals, and then the lords, barons, and lower vassals. The king was nominally lord of the whole country, but had a very lax control over his great feudatories, his real power being generally limited to his particular territories, which were granted to smaller holders in the same manner as were the fiefs of the great nobles. It was at one time held that the vassals of a feudal lord were not the 'men' of the king, but simply the 'men' of their over-lord, and that if an over-lord warred against the king, his vassals could support him without being guilty of treason. These doctrines were in great measure the cause of the temporary breaking up of the French monarchy, and of the prolonged disintegration of Germany. One man became the vassal of another by paying *homage* (Lat. *homo*, 'a man'), which consisted in his placing his hands in those of his lord and swearing to be his 'man,' and to aid him in war. The principal obligations of a vassal were *service in war*, each feudatory being bound to serve forty days, or if he were a *homo liguus—i.e.*, bound by a special arrangement—till the end of the war; *justitia*, the necessity of appearing to judge or be judged at his lord's court, a duty which, however, was generally discharged by proxy; *auxilia*, the obligation of paying sums when his lord had to be ransomed or went on a crusade, and when his lord's eldest or only son was knighted, or his daughter married. When the heir of a fief was a minor, the lord-superior was his guardian. If the ward was a female, the over-lord could propose a husband to her; and if she refused the suitor, she had to pay her feudal guardian as much as any one would give him for the right of marrying her. The over-lord was also entitled to payments from his vassals on their inheriting lands, or on the alienating of a fief, but this seldom happened, as the right of alienation was a privilege opposed to the spirit of F. which was only slowly won by the humbler vassals. The relation of vassal and superior could be severed by the ending of the superior's line, or by the violation of the feudal oath taken when the vassal did *homage*. When women held fiefs, they had to find substitutes to perform military service. From the 4th to the 10th c. the clergy were looked on as a privileged class, and were free from any feudal burdens, but after the 10th c. they were made liable to military service for their estates, unless they purchased immunity, or held their lands by *frank almoigne*, *i.e.*, by saying masses for their superior's family. As the churchmen were often unable to guard their possessions, they generally obtained the protection of a noble, called their *advocate*, who was recompensed by lands or money. After the Church became feudalised, the clergy, as holders of fiefs, were considered to be the king's vassals; and as the Pope maintained that they were independent of the monarchy, struggles arose on this point between the regal and papal powers. Beneath the feudal landlords, lay or clerical, were the *villeins* and serfs, the original inhabitants of the countries conquered by the Gothic tribes. The *villeins* (Lat. *villanus*, 'one belonging to a *villa* or district') were small farmers bound to the soil (*ascripti glebæ*), who paid heavy rents, and could not leave the estates in which their farms lay. The serfs were miserable slaves, who had no common country, and almost no communication with each other, having no connections beyond their lord's territory. Towards these villeins and serfs a feudal chief stood in a different relation from that borne by the head of a clan towards his followers, the chief of a clan having a common lineage and common traditions with his dependents, while the feudal ruler and his inferior tenantry and serfs were quite alien from each other. F. varied greatly in different countries, some being far more thoroughly feudalised than others. Thus in France it was ruled that the eldest son should inherit all his father's lands, while in Germany fiefs were generally divided among all the last holder's male offspring. In France there were soon very few allodial tenures, while small freeholders were long numerous in Germany. The French fiefs early became hereditary, but it was not till the reign of Heinrich II. (1002-24) that the great German nobles were allowed to transmit their lands to their children. In Germany, partly from fear of invasion, considerable power was at first entrusted to the kings, who in the 9th and 10th centuries were actual rulers, while the contemporary French monarchs had only a nominal superiority. The German vassals were at first less independent than the French, but after the German monarchy became elective, the regal power sank in Germany, while it rose steadily in France. The decline of the kingly power and the continued existence of small fiefs made F. endure longer in Germany than in any other country. In the N. of France, where there was no regular law after the breaking up of the Roman empire, F. was early and fully developed, while in the S. of France it was greatly modified by Roman law and a riper and fairer civilisation. France N. of the Loire was called *Pays du droit coutoumier*, 'the land of customary law'; France S. of the Loire, in which F. was only firmly established in the beginning of the 13th c., after the Albigensian crusade, being styled *Pays du droit écrit*, 'the land of the written or Roman law.' In the 10th c. there were in France 70,000 separate fiefs, of which 300 gave titles to their holders, and many were almost independent states, their rulers levying taxes, legislating, and administering justice at their own will.

The beginnings of F. in England can be traced before the Conquest. The thegns held lands from the king by military service, and practised subinfeudation before the reign of William the Conqueror, who, however, greatly strengthened the custom of holding land by feudal tenure from the Crown, while he checked the growth of F. as a system of government, and withstood its tendency to break up a kingdom. He prevented it from developing as it did in France by retaining the old English legislative, judicial, and administrative constitution; by preserving the courts of the shire and hundred, which were open to all freemen, but were subject to the decisions of the royal judicial assembly. In the 12th c. the royal power was far stronger in England than it was in France; and F. was also weakened in England by the national council, by the great mass of freemen, who neither ranked with the Norman nobles nor had lost their lands and sunk into villeinage, by the nobles' estates being smaller and more scattered than those in France, and by the fact that most of the English estates were granted as rewards to his followers by William, whereas in France the great nobles had held their lands before the accession of Hugo Capet. The English nobles never had the rights of private war and of coining, and being far feebler than the Continental lords, leagued with the people against the Crown. F. in England came to an end after the Wars of the Roses, in which many of the old nobility perished. F. was brought into Italy in the time of the Karolings, but was unsuited to the genius of the people. F. in Italy was always an exotic, which faded with the rise of the commonwealths, and had greatly vanished before the close of the 12th c., though feudal rulers shone with a transient brilliancy in the N. and S. of the land. Feudal tenures were introduced into Spain at a very late date, and, except in Aragon, had no strong effect on Spain. Neither did F. leave any impress on Hungary or on the N. of Europe. Feudal principles did not prevail whereever the feudal form was found. The kingly power, the Church, and the cities, though they seemed to conform to F., were always its foes at heart, and clung to the monarchic, ecclesiastic, and democratic principles. As the kingly power gradually rose and leagued itself with the communes, as Roman law was restored, as the universities brought together men from different countries and broke down the old severance of nation from nation, F. gradually died away. It was greatly weakened in the 12th and 13th centuries by the battles of Mansourah, Courtrai, Crecy, and Poitiers, in all of which the French nobles were severely defeated. Money payments (*escuages*) began to be taken instead of military service; wider ideas were introduced by the Crusades; the strength of the great feudatories was sapped by their mutual strifes; a new mode of warfare was necessitated by the use of gunpowder; the superiority of infantry to feudal cavalry was finally proved by the battles of Agincourt, Granson, and Morat; and before the end of the 15th c. F., as a system of government, had well-nigh disappeared. 'F.,' says Guizot, 'is perhaps the only tyranny which men have never been willing to endure. They have willingly yielded to monarchic and theocratic despotisms; to F., never.' F. seems to have been at first almost indispensable for restoring something of social order to Europe; but it established no legal bonds, no political rights; it isolated man from man, and nation from nation, fostered private strifes, and ruined national unity and patriotic feeling. It transferred the governing power in great measure from the towns to the country, being intensely opposed to the spirit of civic life, and substituting personal for political relations. It only admitted the right of individual resistance in the case of the nobles, and offered no recognised place of appeal to such as could not redress themselves by force. Though a kind of rude federative principle ran through F., it was impossible to carry it into effect, the seignorial courts being very seldom held and of very slight influence. In its infancy it served to check invasion, and restored a harsh iron order in the place of chaos; while from the feudal lord being almost cut off from society, it gave a new importance to family life, and consequently improved the social position of women. See Guizot's *Hist. de la Civilisation en l'Europe*, and Hallam's *Middle Ages*.

Feu-de-Joie (Fr. 'joy-fire') is strictly a fire lighted in the streets or public squares on occasions of general rejoicing—a bonfire. The English use of the term is to denote a 'running fire' of musketry, when troops in line fire rapidly in succession, beginning from the right-hand man of the line, so that the effect is an uninterrupted, rolling discharge. The F.-de-J. is fired in commemoration of victories, in honour of distinguished persons, &c.

Feu'erbach, Paul Johann Anselm von, born at Jena, 14th November, 1775, devoted himself to the study of positive law, on which he lectured at Jena. In 1798 he published his *Anti-Hobbes* (on the limits of the civil power) and his *Untersuchungen über das Verbrechen des Hochverraths*. He soon became the head of the 'Rigorist' school, who maintain that in the administration of criminal law nothing should be left to the discretion of the judge. The importance of this position is very great, for nothing shakes the authority of law more than manifest inequality of punishment. Hence the attempts made in countries without codes to codify the penal law. On the other hand it is maintained that within certain limits the discretion of the judge may give effect to circumstances which the law cannot well define beforehand. The danger of the Rigorist principle is especially seen in the case of cumulative punishments for a series of offences. The chief work of F.'s life was the drafting of the Bavarian Penal Code of 1813. This code modified those of Saxony, Hanover, Würtemberg, and of four of the Swiss Cantons. F. died at Frankfurt, 29th May, 1833. His best-known book is the collection of *Merkwürdige Criminalfälle* (Giess. 1808-11), translated into English by Lady Duff Gordon, in which he explains and criticizes the system of seclusion and mental torture by which the law endeavoured to extract a confession from prisoners, even after conviction on circumstantial evidence, for the purpose of justifying the infliction of capital punishment. F. had several sons, who became distinguished in archæology, law, Oriental science, and mathematics. **Ludwig Andreas F.**, son of the preceding, was born at Landshut, 28th July, 1804. Under the theological and philosophical influences of Paulus at Heidelberg and Hegel at Berlin, he soon went further than his masters from the orthodox schemes of thought. Schleiermacher had analyzed emotional religion into a feeling of complete dependence on the universe of God. F., not content with demolishing the modes of thought which rest on sacrifice and prayer, attacks this feeling of dependence so far as it implies anything beyond the calculated result of human work, invention, culture. God is what man wishes to become. If he looks to God for what he wishes to get apart from his own striving, he loses the only true religion. The religion which consists in wishing, and trusting to an invisible power, is a perversion of human nature.

Hence F. looks with disgust on the lamentations of Christians over their sins, on the privations of monastic life, on self-sacrifice for its own sake, and that wisdom of the Cross which is opposed to the wisdom of the flesh. His chief work, *Das Wesen des Christenthums* (1841; Eng. trans. by George Eliot, 1871), is defiant and extravagant in its tone. He died at Nürnberg, 12th September, 1872.

Feuill′ans, the name of a reformed brotherhood of Cistercians founded in 1577 by Jean de la Barrière. The monastery of the order in the Rue St. Honoré, Paris, gave its name during the Revolution to a political club founded in 1790 by Lafayette, Sièyes, La Rochefoucald, &c., who at first named their association the 'Society of 1789,' but afterwards, from the circumstance of their holding their meetings in the monastery of the F., were named F. The club advocated moderate and constitutional opinions in opposition to the Jacobins; but the latter rising in popular favour, the former came to be regarded with suspicion, and on the 28th March the club was violently suppressed by the populace.

Feuill′et, Octave, a French novelist, was born at St. Lô in Manche, 11th August, 1812. He was educated at the College of Louis-Le-Grand in Paris, and appeared for the first time as a writer in the columns of the *National* (1845). Afterwards he sent forth an incredible number of tales, of which the best known are *Rédemption* (1849), *Bellah* (1850), *Le Cheveu Blanc* (1853), *La Petite Comtesse* (1856), *Le Roman d'un Jeune Homme Pauvre* (1858), *Histoire de Sibylle* (1862), *M. de Camors* (1867), and *Un Mariage dans le Monde* (1875). These are mainly distinguished by skilfully entangled plot, somewhat ambiguous morality, richly poetical descriptions, and lively satiric sketches of Paris society, not omitting its undercurrent of intrigue. F. also wrote many successful comedies. In 1862 he was made a member of the Academy in place of Eugène Scribe, and in the following year officer of the Legion of Honour.

Feuille′ton (Fr. 'leaflet'), properly a portion of a political journal reserved for non-political matters, consisting generally of articles of criticism, light literature, art, belles-lettres, &c., usually printed in smaller characters at the bottom of the page, and separated from the matter above by a line. This system of publication was introduced by the *Journal des Débats*, and soon became highly popular. The *roman-F.*, a fiction published in this way, has extended from France to England, Germany, and America. The writer of such articles is a *feuilletoniste*.

Feve′da, an island of British Columbia, in the Strait of Georgia, between Vancouver Island and the mainland. It is 32 miles long by 2 broad, and is valuable principally for its coal.

Fe′ver (Lat. *febris*, from *ferveo*, 'I grow warm,' or from *februo*, 'I cleanse') has been defined as a complex morbid state which accompanies many diseases as part of their phenomena, more or less constantly and regularly, but variously modified by the specific nature of the disease which it accompanies. The recognised characteristics of F. are those which relate either to the disintegration of the living substance of the body, or to the increase and diminished constancy of the bodily temperature. F. is both a state and a process, and has its beginning in the entrance into, or action on, the organism of some affecting or infecting cause. This event is followed by a period of latency, after which the first indications within the affected or infected organism begin to manifest themselves; but the F. process may vary indefinitely in its course, in its duration, and in the local inflammations which accompany it. In all cases, however, F. has its onset, accession, and declension, the onset being characterized by shivering, accompanied with rise of temperature of the internal parts of the body; the accession, by continued pyrexia and exhausting disorder of the bodily functions; the declension, epicrisis, or defervescence, by the restoration of these processes to their normal conditions and relations. Regarding the nature of F. and its relation to the febrile process, there are two possibilities, one being that F. originates in disorder of the nervous centres, and that by means of the influence of the nervous system on the systemic functions, the liberation of heat at the surface of the body is controlled or restrained, so that 'by retention' the temperature rises, and the increased temperature acts on the living substance of the body and disorders its nutrition; the other being that F. originates in the living tissues, and is, from first to last, a disorder of protoplasm, all the systemic disturbances being secondary. The most recent investigations have led to the conclusion 'that no disorder of the systemic functions, or of the nervous centres which preside over them, is capable of inducing a state which can be identified with febrile pyrexia; but that it is possible for such a state to originate and persist in the organism after the influence of the central nervous system has been withdrawn from the tissues by the severance of the spinal cord.' The tissue-origin of F. may, therefore, be adopted as the basis on which to construct an explanation of the F. process. This F. process is the prelude or accompaniment of a great variety of diseases, accidents, and surgical operations, but the term is most commonly applied to specific fevers, such as typhus and typhoid F., scarlet F., intermittent and remittent F., yellow F., and dengue. Small-pox and measles, although not usually called fevers, are so in reality. There being no single disease to which the term is applicable, no mode of treatment can be laid down suitable to every case of F. The treatment of F. will, therefore, be considered under the different forms of the disease referred to.

Fe′ver Bush, a shrub occurring frequently in the U.S. of America, and ranging from 10 to 4 feet in height. It is generally found in shady woods and near the edge of swamps. The foliage is abundant and handsome, and the flowers are of a yellowish-green colour. It bears bunches of dark-red fruit containing berries which, when ripe, are sometimes used as allspice. The young branches yield a juice useful as a cattle-medicine, and as a curative lotion when the skin is suffering from the itching effect of the poison of the sumach.

Fever Bush.

Fe′verfew, a genus of Composite plants, common in our gardens, and deriving its name from having long been employed as a popular remedy in ague and other fevers. It appears to possess stimulant and tonic properties. F. is a perennial plant, and may attain a height of 1 or 2 feet. Its leaves are flat and broad, its flowers small. It is nearly allied to Camomile (q.v.). The variety grown in gardens is generally of double nature. The Mayweed has larger flowers with white ray and yellow disk florets. It is common in cornfields and hedgerows.

Fe′verwort, a genus of plants included in the natural order *Caprifoliaceæ*. They are found in N. America, where, under the name of Tinkar's Root (from Dr. Tinkar), they have been long employed as emetics and purgatives. The berries are also used as a substitute for coffee. The F. has an erect rounded stem, opposite leaves, axillary whorls of flowers, a tubular corolla, and three-seeded berries.

Fez, or properly **Fês** (Arab. 'the fertile'), one of the capitals and provinces of Marocco, is picturesquely situated in the valley of the Sebu, 100 miles inland from its port, Mehedia. It is the Rome of the Western Arabs, and has, it is said, 360 mosques, of which the chief is the *El Karubin*—an inviolable sanctuary even for criminals of the deepest dye, and containing a screened chamber for women who are here, alone of all other Mohammedan places of worship, allowed to attend for prayer. During the 10th c. the Western Arabs performed their pilgrimage to F., while the Eastern Arabs went to Jerusalem, as the passage to Mecca was impossible at that time. There are several public schools, and a university, beside the sultan's palace, and numerous bazaars, caravanserais, baths, &c. The town is surrounded by walls. F. is the centre of an active caravan trade reaching to Mecca in the E., and to Timbuctu in the S., and has manufactures of Beduin mantles, morocco leather, linen, fine tapestry, jewellery, carpets, silks, slippers, and F. caps (called so, as F. was the place at which they were first made). Pop. estimated at 136,000, mostly Moors, Beduins, Berbers, Jews, and Negroes. F. was founded by Edris II. in A.D. 808, and was one of the largest and richest cities of the Mohammedan world in the Middle Ages.—The *province* of F., the most northerly in Marocco, was formerly an independent state. In 1548 both town and province were annexed by the Emperor of Marocco. Area, 117,725 sq. miles; pop. 3,158,000.

Fezzan (anc. *Phazania*), a great oasis of N. Africa, and the most southerly province of Tripoli, stretches from the springs of Meshru to the town of Bondshem, a distance of 350 miles. Area, 25,000 sq. miles; pop. 27,800, mostly Berbers and Beduins. It is traversed in the N.E. by two parallel ranges—the Black and White Mountains; and in the S. the fertility of its wadies gives way to the burning sands of the Sahara. The climate is very unhealthy, the summer temperature frequently reaching 133° F., and falling to 20° in winter. Journeys are performed on the camel or horse, and the plateaux are infested with the wild animals and birds of the great waste. Murzuk, where the sheik lives, is the capital (pop. 4160), and there are many small towns (the principal one is Sockna) and villages. The natives resemble negroes in colour, but are of Berber family, and speak a mixed Berber and Arabic language. Asses, camels, sheep, goats, cows, and horses are reared, and the country produces wheat, dourra, barley, and dates. The principal route from the Sudan passes through F. to the Mediterranean, and not unfrequently slaves form part of the caravan. Cornelius Balbus conquered F. for Rome in the 1st c. A.D., and in the 7th the Arabs overran the country. In 1842 F. fell to the Turks.

Fi′ars (Fr. *feurs*, 'money for tillage,' or Icel. *fe, fiar*, 'money'), in Scotch law, are the prices of grain in the different counties fixed by their respective sheriffs, in February each year, with the assistance of juries. The form of striking the F. is prescribed by Acts of Sederunt of the Court of Session. They regulate the prices of all grain stipulated to be sold at fiar prices. They also regulate the price in contracts concerning grain to be delivered, and in cases in which no price has been agreed to between parties. Results are arrived at by examining witnesses, whose testimony is digested by a skilled accountant.

Fias′co, an Italian word (from Mid. Lat. *flasco*, 'a flask,' but the reason for the derivation is unknown) applied to a failure generally, but originally an expression of frequenters of the theatre in Italy to mark a musical failure. The word has been introduced into France, Germany, and England.

Fi′at (Lat. 'let it be done'), a legal term for an order or warrant for the doing of an act. It was a term till lately of frequent use in the law of England under the Bankruptcy Act. But the term has now been abolished since the substitution of petition for adjudication was made under statute 12 & 13 Vict. c. 106.

Fi′ber. See BEAVER and MUSQUASH.

Fi′bres. By F. in histology is meant a microscopical solid filament. There are various kinds of F. found in the body, namely, white fibrous tissue, elastic tissue, involuntary muscular fibre, voluntary muscular fibre, and nerve fibre. These will be found described under their respective headings.

Fibres, Tex′tile, are all substances, mineral, animal, and vegetable, employed to form cordage or woven into webs. This definition includes all metallic wires from which cordage or wire cloth is formed, although such are not usually regarded as T. F. Besides these metallic substances, asbestos or amianthus is a fibrous material derived from the mineral kingdom, which has occasionally been woven into a kind of cloth, and in recent years has been much used for engine-packing, non-inflammable millboard, and such purposes. The ordinary T. F. of commerce are, however, entirely derived from animal and vegetable sources, and all those of any economic importance will be noticed under their proper headings. We here simply enumerate the principal fibrous materials.

Animal Fibres.—The chief T. F. of animal origin are Silk (q.v.) and the Wool (q.v.) of sheep, closely allied to which is the pashm, or fine wool of the Cashmir goat, and Mohair (q.v.). Camels yield a woolly hair much used for weaving and felting in Russia and Western Asia. To this family belong the Guanaco, Vicuña, and Alpaca (q.v.). The hair of several other animals, including the rabbit, the hare, the nutria, &c., is used for felting purposes. Horsehair must also be included among T. F., being used for the seating of chairs, sofas, &c.; and as a simple curiosity among animal fibres, the byssus of a mollusc (*Pinna squamosa*) deserves mention, as being occasionally woven into small articles.

Vegetable Fibres.—Of all vegetable fibres the most important is Cotton (q.v.), and next to it is Flax (q.v.). Following these comes Jute (q.v.), and for cordage specially, but also for weaving purposes, Hemp (q.v.). Esparto (q.v.) grass is now of extensive use in making paper. China grass, the beautiful fibre yielded by *Bœhmeria nivea*, has not yet won the prominence it deserves, from the difficulties connected with its preparation. Phormium fibre or New Zealand flax, derived from *Phormium tenax*, is highly useful, as is also Coir (q.v.), obtained from the outer husk of the coco-nut, and Manilla hemp, the produce of *Musa textilis*. The following are also of some importance—Sunn hemp from various species of *Crotalaria*, bowstring hemp from species of *Sanseviera*, aloe fibres from species of *Agave*, plantain fibres from species of *Musa*, lime-tree bast from *Tilia Europœa*. The fronds of several palm-trees also yield fibrous materials of considerable value for weaving, plaiting, and basket-making, and wheat straw and the stalks of many other grasses are employed for hat and mat making.

Fi′brin, Fibrin′ogen, Fibrinoplas′tic Sub′stance. In the coagulation of the blood a substance is formed known as F. At one time it was supposed to exist as such in the blood, but now it is known that it is formed by the union of two other matters, namely, fibrinogen and fibrinoplastic substance. See BLOOD, COAGULATION OF.

Fi′bro-Se′rous, a term used in anatomy to denote certain membranes, such as the pericardium, which are double, being composed of a layer of fibrous tissue lined by a layer of endothelial cells constituting a serous coat.

Fibula.

Fibula, a brooch or clasp in use in ancient times and during the Middle Ages, was made of gold, silver, or ivory, and sometimes ornamented with precious stones.

Fich′te, Johann Gottlieb, a German metaphysician, was born at Rammenau, Upper Lusatia, on 19th May, 1762, and studied theology at Jena. During a visit to Switzerland he made the acquaintance of Lavater and of Johanna Rahn, the niece of Klopstock. He then taught Greek and philosophy privately at Leipzig, and in 1792 went to Königsberg to see Kant, to whom he presented his *Kritik aller Offenbarung*. Its publication rescued F. from starvation, and gave him a chair of philosophy at Jena. Here he lectured with such intensity of moral enthusiasm and such original power of speculation that he was accused of atheism and had to resign. In 1799 he retired to Erlangen, where he occupied the chair which he afterwards filled at Berlin. The political tragedies of the time gave immense significance to his words. In 1810 he was employed to reconstruct Berlin University, of which, although there was a crowd of the most distinguished scholars in the chairs, he was made rector. When Germany rose against Bonaparte after his fatal campaign in Russia, F. enrolled himself as a volunteer in 1813, but died 27th January, 1814, from a fever caught while nursing his wife, Johanna Rahn.

As regards F.'s philosophical position, we must recollect there were already many modifications of Kantianism. Reinhold added a representative faculty. Sigismund Beck pointed out that the assumption of a *ding an sich* or *noumenon* was not consistent with the spirit of the critical system. Jacobi had advocated an intellectual intuition as a source of spiritual truth. Bardili had already effected a monistic analysis—thought is the ground of all, for the concept of possibility precedes the apprehension of reality. Schultze and Maimon had arrived at pure scepticism. F.'s heresy from Kant consisted in referring the non-ego, the objective element in knowledge, to the pure activity of the ego. Substance is merely a mental synthesis of accidents. Without the ego, then, there is no non-ego, no object, no world; and unless the ego be regarded as a spontaneous activity (*thathandlung*), you get the contradiction of A and not-A each requiring the other as its condition. Mankind are quite correct in attributing a real existence to objects, but the object is not independent of the subject, they are identical. On any system of dualism you must be content with a knowledge of phenomena; but admit the unity of existence, and your knowledge becomes certain. F. is, however, compelled to assume an underlying force different from the ego (*anstoss*) which originates all the reflective power and self-limitation of the ego. Perhaps this force is what he calls the 'reine Form der Ichheit, welche noch nicht Individuum ist'—an impersonal reason, like the 'divine mind' of Berkeley. Morality, or the perfect freedom and development of the ego, consists in the gradual assimilation of the non-ego which at first appears in opposition to the ego. Thus human virtue creates the world, it is the incarnation of duty. God is the infinite moral order, and is the subject of faith, not inference. In the *Wissenschaftslehre* he states the end of life to be the ordering of human relations with freedom according to reason, human life being assumed to be a necessary part or development of divine life. The five epochs are the state of innocence and instinct; the age of authority, external institutions, dogmatic creeds, and progressive sin; the age of indifference to truth, and the complete rejection of the authority of reason, conscious or unconscious; the age of science, in which the laws of reason are clearly seen, and truth is revered for its own sake; the age of art, in which humanity becomes beautiful by its cultivated and enlightened freedom. In the *Reden*, when Berlin was in the hands of the French, he contends that the *Mischvolk* (or mixed Romance nations, like the French) are now exhausted, while the *Urvolk* (primitive or German nations) have the world's future within them. F. took the deepest interest in the cause of German independence, and his fervid eloquence was constantly employed in stirring up his fellow countrymen in their contest against Napoleon.—**Immanuel Hermann F.**, son of the preceding, was born at Jena, 18th July, 1797. He studied philology at Berlin, and was early devoted to history and philosophy. He spent his early life as a teacher, was made Professor of Philosophy at Bonn in 1836, and at Tübingen from 1842 to 1875. He died in 1876. His works are voluminous. In philosophy F. was mainly a disciple of his father. He was strongly opposed to the Pantheistic doctrines of Hegel, against which he advocated what he called 'concrete theism,' maintaining the personality of God and the perfect dualism between God and the world. He held that the chief fact in the history of German philosophy was the contest between Theism and Pantheism; that the latter had been most ably developed by Hegel, who, however, had been refuted by Baader; that recent progressive German thought was represented by Krause, Weisse, and Lotze. Christianity, he believed, ought to become a great instrument of civil reform. He wrote several political pamphlets advocating moderate Liberalism and decrying revolution.

Fici'no, Marsil'io, one of the leading scholars of the Renaissance, and one of the first who made Plato known to Western Europe, was born at Florence, 19th October, 1433. His father was physician to Cosmo de' Medici, who founded a Platonic school, of which he made F. the teacher. F. translated Plato and several of the Neo-Platonists, and lectured at Florence with shining success. His most distinguished pupils were Politiano and Lorenzo de' Medici, the latter of whom gave him a canonry in Florence cathedral. He died at Careggi, 1st October, 1499. Like his friend Mirandola, he sought to reconcile Platonic philosophy with Christianity, and developed a mystical theism enwoven with mediæval sentiment. Platonism, he held, was a foreshadowing and confirmation of Christianity, and he kept a lamp ever burning before the bust of Plato, as if it had been the image of a saint. He vastly aided the classical revival, while his fervent philosophy did much to counteract the immorality of the Church and the pagan license favoured by many of the humanists. His works, of which the *Theologica Platonica* and the translation of Plato were issued at Venice in 1516, were published at Basel in 1491, 1576, and at Paris in 1641. See Symond's *Renaissance in Italy*.

Fiction. See NOVELS.

Fiction of Law is a legal assumption that that is true which is either untrue or is as probably false as true. The law of England has adopted fictions more largely than that of any other country, but to some extent all nations have done so, dreading, according to Dr. Colquhoun (*Summary of the Roman Civil Law*) 'to adopt any abrupt measure which might disturb the practice and effect of former decisions.' By this he means that it is often considered desirable, in making a substantial change, to keep pace with social progress, to preserve an ancient form, and to force the change and the form into apparent harmony by means of a fiction. Thus while social progress has made it necessary that power which formerly belonged to the Crown in England should be transferred to the House of Commons, the dignity of the Crown—and consequently the social sentiment which has gathered round the institution from historical association—is preserved by important acts being still done in the name of the Sovereign. No doubt the social weight of royalty is preserved by this fiction, and a practical end desired by the people of England is thus attained. But where there is no sentiment in question, it is difficult to see the use of legal fiction.

Fid, a square bar of iron or wood which forms the support of topmasts. It is passed through a hole at the heel of the topmast, and its extremities rest on the tressel-trees. The *splicing-F.* is a pin tapering to a point at one end and made with an eye at the other, used by sailors in opening the strands of ropes preparatory to *splicing*.

Fid'eicommiss'um, a term of Roman law denoting the position of an estate bequeathed to an heir with the condition that he should transfer it to a third person mentioned, that third person being sometimes directed to pass it to a fourth person, and so on. When the practice of so bequeathing property was first introduced into ancient Rome, it was not sanctioned by the laws; performance of the condition therefore depended on the good faith of the heir; but in the reign of Augustus that monarch instructed the prætor to enforce these trust obligations. The condition of F. might be either particular or universal. If the former, it only applied to part of the inheritance; if the latter, it applied to the whole of it. Estates *fideicommissa* are the earliest instance which we find of entails. (See ENTAIL.) The authority given to the prætors by Augustus was by Clodius extended to the consuls and governors of the provinces. In German civil law the *fideicommiss* is the regulation according to which the whole or part of a family property goes to a certain member of the family conditionally on his leaving it to the person indicated by the family arrangement. In Holland also the principle of F. has important application in regulating succession to land.

Fidic′ula, a small lyre-shaped musical instrument.

Field, in heraldry, the ground or whole area of the shield, said by old writers to be so named because the charges upon it originally represented the great deeds done upon the field of battle.

Field, Cyrus West, was born at Stockbridge, Massachusetts, 30th November, 1819, and rose by energy and perseverance to be the head of a large mercantile business. He travelled in South America, and later became deeply interested in ocean telegraphy. In 1854 he took up the idea of an Atlantic cable, founded the two great transatlantic telegraphic companies, and toiled incessantly till he saw the realisation of his hopes in 1866. (See TELEGRAPH, SUBMARINE.) In the course of this work he crossed the Atlantic some fifty times. He received many medals and honours, and was afterwards engaged in helping to establish telegraphic communication between Europe, India, China, Australia, and S. America. Died 12th July, 1892.

Field Allow′ance, a compensation allowed to British officers for service in the field, in consideration of the extra expense which such service entails. When in camp in the United Kingdom or in the colonies, *ordinary* F. A. is made; when engaged in active service, *i.e.*, during a campaign, *extra* F. A. is made. *Ordinary* F. A. for a general is £1 10s. a day, *extra* £2 10s.; for a 2nd lieutenant, 1s. and 1s. 6d. respectively.

Field Bug, a genus of Hemipterous insects belonging to the Heteropterous section of the order. These insects occur in fields and amongst grass, and possess mouths adapted for biting and suction.

Fieldfare, a species of British thrushes included in the Dentirostral section of the order *Insessores* (q.v.). The F. arrives in Britain in winter, and departs in May or June for N. Europe to breed and build. The upper parts of the birds are ashen grey; the head is marked with dark-brown spots. The back, wings, and tail are dark brown; the chin and throat of a golden hue, spotted with black; the breast is reddish brown, and the belly white. The average length of the F. is 10 inches. Its nest is made of sticks, grasses, and clay. The eggs number three, four, or five, and are of light brown colour, spotted with dark brown.

Fieldfare.

Field-Glass is the lens interposed between the object-glass and eye-glass of a compound Microscope (q.v.), to receive the rays diverging from the focus of the former, and thus to render the image magnified by the eye-glass of more convenient dimensions and of greater distinctness than would otherwise be the case.

Field′ing, Copley Vandyke, the most distinguished member of an English family of painters, was born in 1787. A painter in water-colours and a teacher of art, he spent a singularly peaceful and prosperous life, was elected President of the Old Society of Painters in Water-colours, and held the office till his death, at Worthing in Sussex, 3rd March, 1855. He is one of the greatest of English landscape painters, though his manual dexterity and reputation led him latterly to produce many conventional pictures. The ideas which in these had become stereotyped he had originally taken from nature. His happiest efforts are vapoury perspectives in the Weald of Sussex, stormy sea-pieces off the chalky Kentish coast, and leafy dens in Hampshire.

Fielding, Henry, a famous English novelist, was born at Sharpham Park, near Glastonbury, Somersetshire, 22nd April, 1707. His father was Lieutenant-General Edmund F., a cadet of the Denbigh family, and thus connected with the imperial house of Hapsburg. After an education at Eton, where Fox and Lyttelton were among his friends, F. in his eighteenth year was removed to Leyden University. There he remained for two years, studying civil law, until his father's poverty compelled him to leave Germany for London. In his own words, he had to turn 'either hackney writer or hackney coachman,' and so, choosing the former alternative, he began to write comedies and farces. His first play, *Love in Several Masques*, was acted at Drury in 1728. From that time onwards he produced a constant succession of dramatic pieces, composing no fewer than six in the one year 1733. In 1736 F. married Miss Craddock of Salisbury, and about the same time fell heir to an estate in Dorsetshire of £200 a year. His improvidence, however, soon wasted this small fortune, and in 1739 he had to take refuge again in London. He resumed his legal studies with great diligence, and was called to the bar in 1740, but being prevented from practising by repeated attacks of gout, he had to fall back once more on the theatre and literature, and became editor of a paper called *The Champion*. In 1742 appeared his first novel, *Joseph Andrews*, originally intended as a parody on Richardson's *Pamela*. About this time his wife, to whom he was tenderly attached, died, and shortly afterwards F. braved the conventional by marrying her maid. His next published works were the *Journey from this World to the Next*, and *Jonathan Wild* (1743); but in 1748 the interest of Lord Lyttelton made F. independent of authorship, by procuring for him the police-magistracy of Middlesex and Westminster, which office he filled with much conscientiousness and credit. In the same year *Tom Jones* was published, and two years later *Amelia*. For the former of these works F. received £600, and for the latter £1000. The great novelist's health was by this time entirely ruined, and in July, 1754, he resolved, as a last resource under his complication of diseases, to seek the warmer climate of Portugal. This, however, was of little avail; he died at Lisbon, 8th October, 1754. F. is in some respects the greatest of English novelists. His inspiration was received from Richardson, but he is, far more than Richardson, the creator of the English novel. His power lies greatly in his intense yet artistic realism; and this charm is enduring, for he was not more conversant with the manners and feelings of his own time than with those feelings of humanity which are the same at all times. Hence it is that Byron calls him 'the prose Homer of human nature.' He had seen both high and low life, and reproduced both, but especially the latter, with consummate art. Many of his best-known personages are drawn from living models. The immortal 'Parson Adams' had for prototype the Rev. William Young; 'Mr. and Mrs. Booth' were Fielding and his wife—the latter appears also as 'Sophia Western'; 'Parson Trulliber' was F.'s tutor; and 'Squire Allworthy,' 'Blifil,' and 'Lord Fellamar,' all had representatives in real life. F.'s skill in the construction of a plot is not great, and one can only regard Coleridge's dictum that the '*Œdipus Tyrannus*, the *Alchemist*, and *Tom Jones* are the three most perfect plots ever planned,' as a profound hallucination. Yet F.'s fertility of invention was not lawless or digressive. There is a certain unity of design in all his work, and he excites interest without violating probability. Some of the finest features of his genius reappear in Thackeray. The masterpiece of F. is *Tom Jones*, a work of fiction unsurpassed for wealth of character, artistic construction, and easy grace of style. Despite occasional coarseness, its morality is on the whole healthy. Gibbon has called *Tom Jones* 'the first of ancient or modern romances,' and La Harpe 'le premier roman du monde.' *Amelia* has been styled the Odyssey to F.'s Iliad; it is less varied and interesting than *Tom Jones*, but the heroine is exquisitely drawn. *Joseph Andrews*, begun as a caricature in the style of Cervantes, ended by becoming a serious fiction, and contains the inimitable character of 'Parson Adams.' *Jonathan Wild*, the least of his novels, is wonderful as a piece of sustained irony. F.'s collected works were published at London in 4 vols. 1762, again in 10 vols. 1764, in 14 vols. 1808, and again in 1821 and 1851. See Murphy's Life, Sir W. Scott's Life, Lawrence's Life, Lady M. Wortley Montagu's *Letters*, Thackeray's *English Humourists*, and Jesse's *Celebrated Etonians*, vol. i.

Field-Marshal, the highest military rank in Britain and some other countries. The title is the same as the *maréchal de camp* of the old French army, and the *feld-marschall* of the German service. The F.-M. is saluted with the standards of all the forces except the Household Troops, who would pay him that honour only in the case of his being their colonel. In peace his pay is the same as that of any other general, but in war he receives nearly double the pay of his generals. There are at the present time seven Field-Marshals: the Prince of Wales, the Duke of Cambridge (late officer commanding-in-chief), Sir J. F. A. Simmons, Sir F. P. Haines, Sir D. M. Stewart, Viscount Wolseley (Commander-in-Chief), and Lord Roberts.

Field-Mouse, Wood-Mouse, or **Long-Tailed Field-Mouse,** the subject of at least one charming poem, is regarded as a nuisance and a pest whereever it occurs. Somewhat larger than a common mouse in tail, ears, and muzzle, it differs from it also in being lighter in the colour of the under parts of its body. It occurs throughout all the temperate regions of Europe, and the ravages it commits in the field and gardens may be estimated from the immense stores of grain and other food found in its storehouse among thick grass or in a hollow of the earth. Another species of F.-M. is the small harvest-mouse. See MOUSE.

Field-Officers are colonels, lieutenant-colonels, and majors, or such as may command battalions, and thus have charge of the field. They are always mounted in order to give ground for movements, circulate orders, &c.

Field of View is the space within which objects can be seen by a telescope or microscope which has been adjusted to its focus.

Field-Train was that department of artillery intrusted with the charge and supply of stores and ammunition, and whose duty it was during an engagement to see that each gun was served with its full supply of ammunition, &c. The duties are now performed by the Ordnance Store Department.

Field-Works are temporary fortifications, as trenches, ramparts, &c., constructed to cover an attacking, or protect an encamped force. See FORTIFICATION.

Fi'eri Fa'cias, in English law, a writ addressed to the sheriff for enforcing judgment against the goods of a debtor. If in execution the officer take the goods of a stranger, he is liable in damage. The writ cannot be enforced after a *Capias ad Satisfaciendum* (q.v.) has been issued. F. F. *de bonis ecclesiasticis* is a judicial writ directed to the bishop of a diocese or to the archbishop of the province when there is no bishop, requiring him to attach the ecclesiastical goods and chattels of a clergyman within his diocese in satisfaction of judgment. This writ is issued when the sheriff has made a return of *nulla bona* to the writ of F. F.

Fies'chi (sing. *Fiesco*), an ancient Italian family, Counts of Lavagna near Genoa, who are discernible in history as early as the 10th c. In the 12th c. we find them always quarrelling with the consuls and community of Genoa, of which, however, they finally became noble burgesses in 1198. The F. had possessions in Piedmont, Lombardy, Naples, Liguria, Umbria, and were owners of Massa and Cassara. The family produced two popes, Innocent IV. and Adrian V., thirty cardinals, more than 300 patriarchs, archbishops, and bishops, not to speak of soldiers and sailors. They were among the most zealous members of the Guelph faction. Few of them, however, possess much historical interest. We may note **Bartolomeo F.,** who flourished in the beginning of the 16th c. By an act of rudeness to a peasant he excited (1505) a revolution of the burgher and artisan classes, who then desired a share with the nobles in the government of the republic of Genoa. The result was that French troops, sent by Louis XII., took possession of the town.—**Giovanni Luigi F.,** born in 1523, distinguished himself by a conspiracy against the ruling house of Doria, which was assisted by Duke Farnese, and approved of by François I. The plot miscarried through the accidental drowning of its chief as he passed on board one of the admiral's ships, 2nd January, 1547. Schiller has dramatized this subject.

Fieschi, Joseph Marco, born in Corsica, 3rd December, 1790, served in Murat's army, and afterwards led an obscure life in France till 1835, when, having lost his place by the Government suppressing it, he resolved, along with Pepin and Morey, to attempt the murder of Louis Philippe on the anniversary of the Revolution (28th July). They contrived the 'infernal machine' of twenty small cannons, which was fired from a house in the Temple Boulevard, killing eighteen persons and hurting F. The king escaped with a slight injury. The conspirators were guillotined, 16th February, 1836.

Fie'sole, a small Italian town in the province of Firenze, crowning a hill above the Arno, about 3 miles from Florence. It is the seat of an archbishop, and possesses an old cathedral. The Franciscan church rises far above the rest of the town, and marks the site of the ancient *arx* or citadel. Many of the wealthy Florentines possess country villas here. Lorenzo the Magnificent and Walter S. Landor lived in the neighbourhood, and at the adjacent monastery the illustrious painter Fra Angelico long served as a brother of the order. F., the ancient *Fæsulæ*, has been an important military station from very early times. It was one of the oldest Etruscan towns, but was never a large place, and has sunk with the rise of Florence. There are parts of a Roman theatre, and remains of cyclopean walls, built with huge quadrangular stones, at F.; and various ancient relics have been found. See Freeman's *Historical and Architectural Sketches*. Pop. 14,273.

Fiesole, Giovanni da. See FRA ANGELICO.

Fife, a kind of octave or piccolo flute, used in military 'drum and F.' bands. Its tone is shrill and piercing—inspiring, but hardly pleasant. It has not keys like the piccolo used in the orchestra, and its musical capacities are thus extremely limited.

Fife-Ness, the eastmost point of land in Fifeshire, 2 miles E. by N. of Crail. From F.-N. a dangerous ridge of rocks, known as the Carr Rocks, projects a considerable way into the sea. On this a beacon, 35 feet high, has been erected.

Fifeshire, an almost peninsular county in the E. of Scotland, bounded N. by the Firth of Tay, E. by the North Sea, S. by the Firth of Forth. Its greatest length is 44 miles, and its greatest breadth 18 miles. The coast is rocky in the N. and N.E., and along the Forth is steep, often luxuriantly wooded, and studded with many thriving towns. In the N. there are low offshoots from the Ochils, separated by the strath of the Eden, or Howe ('hollow') of F., from the central range of the Lomonds, which rise in W. Lomond to 1713 feet. Largo Law, in the S., is 1020 feet high. The chief rivers are the Eden and Leven. The climate is somewhat bleak and damp in the N., but dry and mild in the S. F. is well cultivated, the richest district being a belt of loam from 1 mile to 3 miles broad, which fringes the Firth of Forth. The county is well wooded, much grain is produced, but the N.W. is mostly heathy upland and barren moor. Of the 323,802 acres, constituting the area of F., 76,854 are under corn crops (oats 42,024), 42,080 under green crops (potatoes 14,527), 63,137 under clover, sainfoin, and grasses in rotation, and 73,711 under permanent pasture or grass not broken up. Small fruit is grown over 145 acres, and 828 represent the amount of bare fallow or uncropped arable land. Mountain and heath-land, used for grazing, account for 6,582 acres, while 34 are laid out as nursery grounds, and woods and plantations cover 21,004. See also articles CATTLE, HORSE, PIG, and SHEEP. The formation is chiefly carboniferous, interspersed with trap. Limestone and freestone are much quarried, and there are valuable coal and iron mines. The principal manufacture is linen, and the most important exports are coal, lime, and fish (salmon, haddock, cod, turbot, &c.). There are also manufactures of plaids and blankets, besides salt works, tanneries, soap factories, and tile yards. The iron manufacture is much on the increase. The chief places are Cupar, the county town, St. Andrews, Kirkcaldy, Kinghorn, Dunfermline, E. and W. Anstruther, Burntisland, Crail, and Dysart. F. was anciently the most flourishing region in Scotland. Its thanes seem to have been the most powerful of Scottish nobles before the 11th c. It was styled the 'Kingdom of F.,' but does not figure greatly in Scottish history until the Reformation struggles. Objects of interest in the county are the Castle of Falkland, the crosses of Macduff and Mugdrum, Beaton's Tower, and the abbeys of Balmerino and Inchcolm. There are two parl. divs. of F., each returning one member: E. F., pop. 50,996; and W. F., pop. 58,458. Pop. of F. civ. county 187,346.

Fifteenth′, in music, an interval of two octaves.

Fifth Monarchy Men, a small fanatical sect which arose in England about 1654. They were sometimes called Millenarians, and believed that a fifth monarchy was to succeed the four monarchies of Daniel's vision—the monarchy of Christ on earth, which was to 'stand for ever,' or to remain for 1000 years. They anticipated the immediate advent of the Messiah on earth, and declared that whatever was opposed to the establishment of Christ's kingdom must be assailed by true believers. These tenets led to their conspiring to murder Cromwell in 1657, but their plot was disclosed and their leaders were flung into prison. Shortly after the Restoration they rebelled in London under one Venner, but were promptly suppressed, and Venner and others were executed. Others of the sect were executed in 1662 on a charge of having conspired to murder Charles II. The people seem to have confounded them with the early Münster Anabaptists, and their excesses drew odium on the Baptists, Quakers, and Independents, who had no connection with their risings.

Fig, a genus of Exogenous plants, belonging to the *Urticaceæ* or nettle order, but also included by some botanists in the *Artocarpaceæ*, or bread-fruit and mulberry order, and in a special section (*Moreæ*) of the latter group. The *Moreæ* have flowers in heads, spikes, or catkins; the embryo being hooked, and the albumen fleshy. In the F. the fruit is named *polygynæcial* or *anthocarpous*, and consists of a hollow 'receptacle' of fleshy nature, within which numerous male and female flowers are contained. The *receptacle* is the extremity of the peduncle or flower-stalk, which becomes hollow and modified to contain the flowers. The seeds are single-seeded carpels, embedded in the pulp of the fruit. The figs form numerous species, of which the most familiar is the common F. This plant is a native of the East, but is cultivated with success in S. Europe, and in Britain in hothouses, although sometimes figs may ripen in this country as outside-growing plants. The F. is the *teenah* of Scripture, and is the first tree mentioned by name in the Bible. The figs imported into Britain come chiefly from Turkey. They are sent in 'drums,' or small boxes, from Smyrna. Figs are eaten simply as fruits, but are also used as mild purgatives or laxatives, and in the form of cataplasms are applied to painful boils, &c. The pulp contains about 60 per cent. of saccharine substance named *sugar of F.* The common F. appears as a low shrub or tree, the leaves being palmate and deeply cleft. In the East two crops annually are yielded. Another F. yields India-rubber, and is frequently cultivated as a house-plant, on account of its green leaves and handsome appearance. The Banyan (q.v.) tree is a species of the Indian F., while another species, the Peepul-tree, is an object of veneration to the Hindus. Many other species are familiar to botanists, the juice of certain forms being acrid and poisonous.

Fig.

Fig′aro, a celebrated character introduced by Beaumarchais about the end of last century into three of his comedies —*Barbier de Seville*, *Mariage de Figaro*, and *Mère Coupable* —and adopted from them by such operatic composers as Mozart and Rossini. F. is a barber, who by his dexterity, and what is better expressed in French than in English, as an *esprit net et decidé*, succeeds in outwitting every one with whom he comes in contact. F. is also used to designate a collection of the writings of Spanish humourists, and as the name of satirical journals published in France and in England. The first French newspaper of the name was started on the restoration of the Bourbons, the second in 1854 by Villemessant.

Fi′geac, a town of France, in the department of Lot, 32 miles N.E. of Cahors, situated in a deep picturesque valley, amid rich woods and vineyards, and of a very antique aspect. Its chief buildings are the church of St. Sauveur, which dates from the 11th c., and the Château de la Baleine, an old feudal fortress now used as a courthouse. F. arose from a monastery founded here by Pippin the Short in 755. It has some trade in wine, manufacture of linen, and dyeworks. Pop. town 6680; arrond. 81,682.

Fight, Challenge to, by word or letter, is a misdemeanour, punishable with fine or imprisonment. Any direct endeavour to provoke a challenge is a misdemeanour, though mere words which may tend to that—such as calling a man a liar or rascal—are not necessarily criminal. See DUEL.

Fighting Fish, a small fish belonging to the family (*Anabasidæ*) of the Climbing Perches (q.v.), and found in rivers and lakes in Siam and other parts of S.E. Asia. It is exceedingly pugnacious, and when several of them are brought together in a confined space, they afford sport to the spectators by their combats, the exhibitions of which are said to be licensed by the state. Their hind and dorsal fins are elongated, and their colours, when they are excited, are very brilliant.

Fig-Shell, a mollusc, of the *Gasteropoda* order. Thirty-nine species exist. The shell is shaped like a pear, the spire short, and the outer lip thin. Very small tentacles are attached to the head of the animal. The foot is simple in front. The F.-S. occurs in most tropical waters, and on the shores of Panama is found in large quantity and of unusual size; upon this species the natives feed.

Figue'ras (Span. 'fig-trees'), a town in the province of Gerona, Spain, 60 miles N.E. of Barcelona. It stands in a fertile plain near the confluence of the Muga and Manol, and is defended by the fortress of S. Fernando (built about the middle of the 18th c.), which was captured by the French in 1808, 1811, and 1823, and again restored to the Spanish. F. has manufactures of paper and leather. Pop. 2931.

Fig'urantes, the name applied to the general body of dancers in a ballet—those that dance *en masse*, or are posted in the background—as distinct from the principal dancers.

Fig'urate Numbers are the numbers of a series formed from an arithmetical progression according to a certain definite rule. The *n*th number of the first series is equal to the *sum* of the first *n* numbers of the progression; and each term of the second series is formed in the same manner from the first series of F. N. and so on. *Polygonal* numbers are particular cases of F. N. Thus the series bearing the name of an *n*-sided figure in the first series of F. N. formed from the arithmetical progression whose first term is unity and whose common difference is $(n-2)$. The following are the first three series of polygonal numbers:—

Triangular	1	3	6	10	15	21	&c.
Quadrangular	1	4	9	16	25	36	&c.
Pentagonal	1	5	12	22	35	51	&c.

Pyramidal numbers are the F. N. formed from the polygonal numbers. These appellations, introduced as expressive of the properties of each class, very rarely appear in modern works. The operation is evidently the inverse of the fundamental operation in the calculus of finite differences, and is in itself of little practical importance.

Fig'ure, in geometry, is a finite space bounded by lines or surfaces. In arithmetic, it is a name commonly given to the Arabian numerals.

Figure Stone. See SOAP-STONE.

Fig'worts, the name given to a large natural order of Exogenous plants, represented by the calceolaria, veronica, foxglove, Eyebright (q.v.), Euphrasia (q.v.), and other genera. The plants of this order are herbs or small shrubs, with opposite, alternate, or whorled leaves. The calyx consists of four or five parts, and the corolla is irregular. Two or four stamens exist, five being rarely developed. The ovary is bilocular and the fruit a capsule, or more rarely a berry. The seeds are albuminous. Many of the F. are showy plants; they are found in both cold and tropical regions.

Fiji', Feejee', or **Viti Islands,** an archipelago in the S. Pacific, lying between 15° 40' and 20° S. lat., and 177° E. long. and 178° W. long. The number of islands composing it is about 518, of which only 80 are inhabited, many being mere pinnacles of rock rising out of the sea. The total area of the group, including Rotumah, where a European Commissioner resides, is about 8045 sq. miles, more than two-thirds of which are occupied by the two large islands of Viti Levu (4112 sq. miles) and Vanua Levu (2432 sq. miles). The areas of the islands of Taviuni and Kadavu, the next largest, are 217 and 124 sq. miles respectively. The archipelago was discovered by Tasman in 1643, and in 1776 was sighted by Captain Cook, though he did not touch there. In 1796 several missionaries proceeded to F., with the intention of starting a mission, but the threatening attitude of the natives caused them to abandon the enterprise without landing. In 1804 some convicts who had escaped from New South Wales in an open boat reached F., and became the advance guard of a chance white population of shipwrecked and runaway sailors. A Wesleyan mission was established in 1835, and in the same year commercial relations with New South Wales were set on foot. It was not until 1866, however, when an influx of European settlers from New Zealand began, that the trade of F. emerged from obscure insignificance. From that date settlers and capital poured into the group from the Australasian colonies, and at length, after repeated applications to that effect, both from the native king, Cakobau or Thakombau, and the European inhabitants, the islands were annexed to Britain as a Crown Colony. The annexation took place on 10th October, 1874, but it was not until 1st September, 1875, that the colony was formally proclaimed by its first governor, Sir Arthur Gordon.

F. is a Crown Colony, and the government is carried on by a Governor, appointed by the Crown and assisted by Executive and Legislative councils. The Governor is also High Commissioner and Consul-General for the Western Pacific. Twelve native chiefs and 160 subordinate native officers assist in the administration of the 16 provinces into which the islands are divided.

The F. Islands are of volcanic origin, and consist almost entirely of steep mountains sloping abruptly to the sea, and girt by coral reefs. The climate being humid and the soil fertile, the vegetation is luxuriant. Coco-nut oil, yams, tortoise-shell, and *bêche de mer* were the staple articles of native commerce; but since European settlement fairly commenced, cotton, tea, pea-nuts, bananas, sugar, tobacco, coffee, and maize have been successfully cultivated. Horses, mules, sheep, cattle, and Angora goats are reared here. The rainfall is about 96 inches annually, and the temperature varies from 62° to 94° Fahr. The chief obstacle in the way has been the scarcity of suitable labour, for the natives being indolent and inefficient, it has been found necessary to import labourers from neighbouring groups of islands. This traffic is now strictly regulated under Acts of the imperial legislature, and a number of armed cruisers are employed to see that the law is obeyed.

The aborigines of F. belong to the Melanesian race, and their colour varies from nearly black to a dark olive, which is the prevailing shade. They are a weak and cowardly race, and formerly indulged in cannibalism, which the missionaries succeeded in abolishing in 1854. In 1875 the islands were decimated by an epidemic of measles, introduced by H.M.S. *Dido*, by which it is estimated 50,000 persons were carried off.

There are two state-aided public schools—at Suva and Levuka—and the attendance at these is about 140; but the Wesleyans and Roman Catholics maintain over 2000 schools, of which 148 belong to the latter community. The government also supplies an industrial and technical school, where over 70 native youths are taught cattle-tending, house-building, boot-making, &c. No military force is employed in the colony, but the native police, numbering 100, are armed with rifles. The heathen natives, who are now confined to the more inaccessible mountain districts, are known by the name of 'devils.' They still give trouble occasionally to the government.

The capital of F. is Suva, situated on the S. coast of the island of Viti Levu. The exports of F. for 1893 were estimated at £355,632, and the imports at £276,398. Sugar was the principal export, and valued at £246,251; the others being copra, bananas, pea-nuts, desiccated coco-nut, cotton, maize, and distilled spirit. There are 11 sugar mills, and 2 tea factories in the islands. In 1881 the pop. numbered 127,486; since then a decrease has taken place, and there are now 121,180 inhabitants, of whom 2036 are Europeans, 1076 are Half-castes, 7468 are Indians, 2267 are Polynesians, 105,800 are Fijians, and 2219 are Rotumans. About 50 per cent. are Wesleyans; about 8000 are Roman Catholics, 2000 are of the Church of England, and 30 are Jews. The port of Savu is the calling place of the mail steamers running between Vancouver and Sydney. The group is advantageously situated for becoming the entrepot of a large portion of Melanesia and Polynesia; and now that a stable government exists, the islands may be expected to advance rapidly in prosperity.

File (Old Eng. *feol*, Ger. *feile*, allied to the Lat. *polio*, 'I polish'), a bar of cast steel, having one or more of its surfaces notched into teeth, which is used as a tool for making an approximately smooth surface upon metals or other hard substances. English-made files are known as Lancashire and Sheffield files, the two principal seats of their manufacture being Warrington and Sheffield. They are all made by hand, the attempts to manufacture them by machinery not having succeeded hitherto in this country. The process is as follows:—The *blank* is placed upon an anvil in front of the workman, and held in place by a foot-strap. The cutter then makes a series of nicks with a chisel in the surface of the blank, their direction making an angle of about 55° with the axis of the F. He is guided in fixing the position of each nick by bringing the chisel into contact with the burr thrown up at the last stroke; but the exact distance apart and depth of the cuts he regulates entirely by the inclination which he gives to the chisel and the weight of the hammer and the force of the blow. So wonderful is the skill of some of the F.-cutters, that Holtzapffel, a great authority on all matters connected with tools, says he has known files with *nearly three hundred* cuts per inch. When the F. has been cut upon both sides in the way described, it may be at once straightened and hardened, and will be then ready for use. A F. thus made is called 'float-cut,' or 'single-cut.' In the majority of cases, however, another series of cuts is made on each side, crossing the first, and the ordinary 'double-cut' F. is produced. In files intended for use with softer materials, such as hard wood or bone, a pointed punch is used instead of the chisel, files made in this way being called 'rasps.' Each of the three classes of files—double-cut, single-cut, and rasp-cut—is made in about half-a-dozen degrees of fineness, the coarsest being called *rough*, the medium kinds *bastard* and *second-cut*, and the finest *dead-smooth* or *superfine*. All these varieties are made of many different lengths and cross sections, for different kinds of work. Unless otherwise mentioned, a F. is understood to have two flat parallel faces; a 'half-round' has one surface slightly convex, a 'three-square' F. is triangular in section. Square and round files, and other kinds, are also occasionally used.

File-Fish, the name given to various Teleostean fishes belonging to the order *Plectognathi*, and to the genus *Balistes*, *Diodon*, &c. Their bodies are covered with numerous spines, the presence of which has suggested their popular name. They are also known as 'trigger-fishes,' 'urchin-fishes,' and 'globe-fishes,' the latter name being given on account of their power of distending their bodies at will with air.

Filia'tion, in Scotch law, means the determination of a child's paternity. The presumption of law is that he is the father whom the marriage indicates (*Pater est quem nuptiæ demonstrant*), but this presumption may be overcome by showing that it cannot be fact. Actions of F. are usually brought in the Sheriff Court, but they may be brought in the Court of Session.

Filica'ja, Vincen'zo da, an Italian poet, born of a noble family at Florence, 30th December, 1642. He was educated at the University of Pisa, and soon became distinguished as a jurist in his native town, where, in 1673, he was made a senator, and married a lady of the great house of Capponi. Six *canzoni* on Sobieski's raising the siege of Vienna by the Turks in 1683 made him known through Europe, and won him the congratulations of many sovereigns. A poem in praise of Christina of Sweden brought him liberal gifts from that queen, and in 1702 he was made one of the chief magistrates of Florence. He died 24th September, 1707. F.'s odes, which are full of deep feeling, have now fallen into neglect, but his sonnets, partly devotional, partly breathing a sad scornful patriotism, and cast in vigorous and choice language, are still popular; the two finest, *La Providenza* and *L'Italia*, being known throughout the Continent. *L'Italia* is translated in Byron's *Childe Harold*, canto iv. His private character seems to have been almost without blemish. His works were published shortly after his death; the best edition is that of Venice (1762).

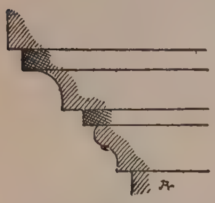
Fil'igree (Fr. *filigrane*), fine gold and silver wire twisted into elegant forms, chiefly for use as personal ornaments. F. work was practised by the Etruscans, and their gold ornaments, combining fine wire (Lat. *filum*, 'a thread') with very minute beading (*granum*, 'a grain or bead'), cannot be equalled by modern goldsmiths. In Eastern countries great minuteness and delicacy are attained in F.-work with the rudest appliances. The Chinese are extremely adroit in silver F.; so also are the natives of the Malabar coast and elsewhere in India. Durable silver F. is largely manufactured in the S. of Europe.

Filio'que is a word which was subsequently added to the Nicene Creed, and formed a bone of contention between the Latin and Greek Churches. The Nicene Council (325), being chiefly concerned to establish the deity of the Son in opposition to the Arians, merely affirmed the existence of the Holy Spirit, without defining the nature and relations of the third person of the Trinity. Macedonius, Bishop of Constantinople (342), and many others, maintained the Holy Spirit to be a created being, as the Son was regarded by the Arians, and subordinate to the Son, as the Son was to the Father. By the Council of Constantinople (381) the simple phrase of the Nicene Creed, *and in the Holy Ghost*, was expanded into *and in the Holy Ghost, the Lord and giver of life, who proceedeth from the Father, who with the Father and the Son together is worshipped and glorified, who spake by the prophets*. But as this only affirmed that the Spirit proceeded from the Father, room was left for doubt whether the Council denied the procession from the Son. If it were meant that the Spirit did not proceed from the Son as well as the Father, this favoured the notion that the Son was subordinate to the Father; if the Spirit proceeded from both the Father and the Son, this seemed to be placing the Spirit in still greater dependence, namely on two persons instead of one. Accordingly the Greek fathers merely taught the procession of the Spirit from the Father, without denying the procession from the Son. The Latin fathers, on the contrary, taught the procession of the Spirit from both the Father and the Son, and at the third Council of Toledo (589)—or, according to Bingham, at Bracara (411)—inserted in the Creed of Constantinople the phrase *F.*, making it run:—'and (I believe) in the Holy Ghost . . . who proceedeth from the Father *and the Son*,' &c. The Churches of the East refused to accept this as an addition to the faith of the Church, or to alter a single word of the Nicene Creed. This led to a schism between the two Churches, which was never thoroughly healed up, although a formal union was effected at Florence, 1439. See Blunt's *Dict. of Doctr. and Hist. Theology; Pearson on the Creed;* Neale's *Hist. of the Holy Eastern Church*.

Filipo d'Argi'ro, San, a town of Sicily, in the province of Catania, 27 miles W.N.W. of the town of Catania. It has a ruined Saracenic castle, and its church of St. Philip, whence it derived its name, was a great resort of pilgrims in the Middle Ages. F. occupies the site of the ancient *Agyrium*, one of the oldest and wealthiest cities of Sicily. Pop. 6078.

Fill'an, St., more properly **Faolan.** There were two ecclesiastics of this name who flourished in the 7th and 8th centuries, and whose memories are still preserved both in Scotland and Ireland. The *first* is called Faolan, the leper of Rath-erann in Alba, and Cill-Fhaelain in Laighis, Leinster, Ireland. His day in the Irish calendar is 20th June. Rath-erann is now known as Dundurn, in the parish of Comrie, Perthshire, and is near the E. end of Loch Erne (in Gaelic Loch Erinn), where there is also the village of St. Fillan's. There is a hill known as Dun-Fhao-lain, at the foot of which is a well dedicated to the saint, and which in 1794, when the old *Statistical Account of Scotland* was published, was visited by scores of people who had faith in the healing virtues of its waters. The *second* Faolan is known as of Strath-Fillan, likewise in Perthshire, but quite on the edge of the old Drumalba, which separated Dalriada from the Pictish kingdom, or Argyllshire from Perthshire. His maternal grandfather is said to have been king of Leinster; his mother, St. Kentigerna of Inchcailleach, in Loch Lomond. In the Irish calendar he is styled of the church of Cluain Maoscna in

Westmeath. Kilallan in Renfrew, written in old records Kilheylan, is named after him, and ought to be written *Cill Fhaolain*. In Strath-Fillan there are still some remains of a religious building consecrated to him. Some call it a priory, others a church. There is great sacredness attributed to this building, as well as to the river which flows beside it; and until a very late period frightful barbarity was practised in imparting their curative virtues to unhappy patients who needed them. Lunatics were brought by their friends and plunged in the river just at sunset, then bound hand and foot, and left all night in the ruins beside what is called erroneously St. Fillan's tomb. If in the morning they were found bound as they had been left, the case was given up as hopeless; but if the knots were untied, it was regarded as the merciful work of the saint, and the sufferers were for ever free of their malady. One very interesting relic of this second F. is still preserved, the silver head which belonged to his crosier, and known as the 'quigrich' (*coigreach*, 'stranger,' 'pilgrim'). In 1487 the right of keeping it was confirmed to Malise Doire or Dewar as its hereditary guardian. It remained in this family till 1877, when it was purchased from Alexander Dewar of Canada for the Antiquarian Museum, Edinburgh. (Dewar, originally *Deòraidh*, signifies first 'pilgrim.' It afterwards came to be applied to the bearer of the baculus or staff of a preacher; latterly it passed into a family name.) It is said by Hector Boece that Scotland owes much to another relic of St. F. At the battle of Bannockburn Bruce found himself and his companions greatly comforted and strengthened by St. F.'s crosier being carried in a silver shrine before them. After the victory he ordered the priory of the saint to be rebuilt.



Fillet.

Fill'et (Fr. *filet*, Lat. *filum*, 'thread'), a small flat face or band used both in Classic and Gothic architecture to separate convex or concave mouldings.

Fillet, in heraldry, a diminutive of the Chief (q.v.), and containing one-fourth of it. The chief, unlike other honourable ordinaries, has only one diminutive (Boutell and Aveling).

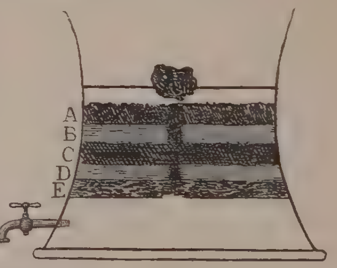
Fillibust'ers. See BUCANEERS.

Fill'more, Millard, D.C.L., the thirteenth President of the United States, was born at Summer Hill, New York, 7th January, 1800. He was apprenticed to a wool-carder, but afterwards studied law, and was admitted to the bar in 1823. He was elected to the New York Assembly in 1829, and was in Congress 1833-35, and 1837-41, where he supported J. Q. Adams on the slavery question. He was made in 1847 comptroller of New York state, in 1848 Vice-President, and in 1850 President of the United States. During his presidency a favourable commercial treaty was signed between the United States and Japan, and a treaty of non-interference in Cuban affairs was made between the United States, France, and Great Britain. After his retirement from the presidency in 1853 he made an extensive tour through the western and southern states and then sailed to Europe. He retired from public life in 1856, and died 8th March, 1874.

Filtra'tion is a mechanical process for removing substances suspended, or sometimes even dissolved, in water and other fluids. As the fluid passes through the fine pores of the filtering medium while suspended, matter is retained either on its surface or in the excessively fine meshes it presents. F. is of the greatest industrial importance in many chemical manufactures, as, for example, in the refining of Sugar (q.v.). In the chemical laboratory, also, it is continually resorted to in order to separate precipitates which would only deposit slowly by mechanical subsidence. In laboratory practice, a cone of unsized paper is usually placed within a funnel, and the fluid to be filtered is allowed to percolate slowly through it.

On a great scale F. is generally required for the domestic water supply of any community. The water is first collected into reservoirs, where all heavy impurities subside, and from these it passes by gravitation through filtering beds, which are variously formed according to circumstances. Usually they consist of a substratum of gravel from 2 to 3 feet thick, covered with fine sharp sand to a depth of from 18 inches to 2 feet. A filter of this description removes by purely mechanical sifting all suspended matter, but it has little influence on dissolved organic impurities. Thick layers of sand, however, retain a good deal of dissolved mineral matter, such as common salt, and are said effectually to separate lead in solution. The sand in such F. beds gradually becomes encrusted with matter deposited from the water, and requires repeated cleaning or renewal.

In dealing with water on a smaller scale, it is possible to adopt many other expedients for F., and among the substances employed, nothing is equal in importance and efficacy to animal charcoal. The charcoal employed is freed by the action of acid from the phosphate and carbonate of lime, and it should be so compacted that the water is kept from percolating through it too quickly. By some manufacturers the charcoal is compressed into solid blocks. Wood and peat charcoal are also employed, and the charcoal obtained in Stanford's process for treating seaweed has also been shown to be an effective filtering agent. Combinations of iron and charcoal, powdered iron ores, manganese, mixed sand and carbon, sponge, flannel, and other woolly substances, have all been used in the fabrication of filters, and numerous patents have from time to time been secured for special forms or arrangements in domestic filters. A filter in extensive use in Paris consists of a series of diaphragms of wool prepared first with alum and cream of tartar, after which they are dyed in a solution of gall-nuts, and washed with sodium carbonate. Of the numerous forms of domestic filter, none is more effective than that shown in section in the accompanying figure, and manufactured by the Port Dundas Pottery Company, Glasgow. In this filter the water passes first through a piece of sponge, which is tightly plugged into an orifice in the upper reservoir. It then meets a stratum (1) of fine gravel A, and (2) of calcined sand B, of a pure white quality, after which it passes through a layer of animal charcoal C, well compacted, and again it percolates through another bed of fine sand D, and of gravel E. For the use of soldiers in campaign, or for travellers, a capital device is the pocket-filter, a small case or box containing animal charcoal, fitted at the top with an elastic tube, and pierced beneath with numerous small holes. The water to be drunk is drawn by suction through the charcoal and tube.



Filter.

Air Filter.—Charcoal has great power of absorbing noxious gases and vapours, a property taken advantage of for catching emanations from sewers, and for disinfecting the air passing out of fever wards in hospitals. Charcoal filters for placing on the mouth are useful in presence of very impure air, as in passing through smoke in a burning house. The filter chiefly recommended for such a purpose contains a layer of pure cotton wool, next the same saturated in glycerine, then powdered charcoal, followed by cotton saturated in glycerine, and dry cotton.

Fimbriated (Lat. *fimbria*, 'a border'), in heraldry, 'edged with a metal or tincture.'

Finale, in music, the last movement in a symphony or other instrumental composition, or the conclusion of the act of an opera. In the latter case its character is determined by the nature of the action; in the former it is always a quick movement.

Fi'nal Judg'ment, a term of Scotch law denoting in its widest sense a judgment which exhausts the merits of a cause, and is not subject to review. But the term in England is more frequently used in contradistinction to the term Interlocutory Judgment (q.v.). See also APPEAL.

Final Perseve'rance of the saints or of the elect is a tenet in the Calvinistic system of theology which flows necessarily from the doctrine of Election (q.v.). The logical chain of which F. P. is the last link is as follows:—From the mass of fallen men God elected a certain number to eternal life. For the salvation of those thus chosen God gave his own Son to become man, to obey and suffer for his people, thus making a full satisfaction for sin, and rendering the ultimate salvation of the elect absolutely certain. While the Holy Spirit in his common operations is present with every man, his certainly efficacious and saving power is exercised only in behalf of the elect. This efficacious grace is irresistible, not only at the time of conversion, but subsequently amid all the frailty and corruption of human nature, because it is the exertion of almighty power carrying out the divine purpose. With these premises it is a moral impossibility that any of those for whom Christ died, and who subsequently become partakers of his grace, can fall from that grace, either totally—so as at any period of their lives to commit sins so heinous, and to persevere in them so obstinately, as to forfeit entirely the divine favour—or finally, so as not to be saved at last. See *Westminster Confession of Faith*; Hodge's *Systematic Theology*.

Finance' means the management of revenue and expenditure, whether on a large or on a small scale, relatively to each other. See DEBT, NATIONAL; BALANCE OF TRADE; BULLION; BANK, BANKING; CAPITAL ACCOUNT; and DOMESTIC MANAGEMENT. The word *finance* denotes money itself.

Finch, a term applied indiscriminately to a large number of small song-birds, belonging to the order *Insessores* (q.v.). The family *Fringillidæ* is that which includes the great majority of the typical finches. (See CHAFFINCH, BULLFINCH, &c.) The *Fringillidæ* form a family of the *Conirostres* (q.v.).

1, Mountain Finch; 2, Green Finch.

Find'horn, a river of Scotland which rises in the Monadliadh Hills, Inverness-shire, flows through the counties of Inverness, Nairn, and Moray, and after a course of 90 miles enters the Moray Firth. The scenery along the F. is very fine. The river is broad and shallow, and often dangerous in flood. The village of F. (pop. 562 as against 605 in 1881), in the county of Moray, at the mouth of the river F., has large herring-fisheries.

Finding Goods, Law Regarding. If the finder appropriate goods believing that the owner cannot be found, and believing the goods to be lost, or if he vainly endeavour to find the owner and after doing his uttermost he appropriate the goods to his own use, the act is not theft; but if he believe the owner can be found, the act is larceny.

Fine, in English law. This was an amicable composition by leave of the court, by which lands were declared to belong to one of the parties claiming them; and by it all the parties were barred who did not claim within a short period. But 3 & 4 Will. IV. c. 74 abolished fines and recoveries, and substituted more simple modes for assuring lands and barring estates tail. F. is also a sum of money paid for the grant of lands by lease, or on the admission to a copyhold interest. F. also signifies a pecuniary penalty imposed by a court of justice for an offence against the law.

Fin'gal, more properly **Fionn,** the great hero of Gaelic, as Arthur is of Cymric, romance. It is impossible to determine whether he belonged to Ireland or to Scotland, or what was the exact period in which he lived, while some even maintain that he existed in name only. But if every national hero is a real person, however much his attributes be exaggerated by popular imagination, then perhaps the historical reality of F. may be conceded. In the *Book of Deer* (12th c.) we have mention of the *Féine*, *i.e.*, the followers of Fionn; he is represented as frequenting both the N. of Ireland and the N.W. of Scotland. There are many old heroic ballads, belonging alike to Ireland and to Scotland (see Campbell's *Book of the Féine*), in which F. is celebrated both as a great warrior and as a generous man; but in Ossian (Macpherson) the Gaelic muse has adorned him with every quality which can raise admiration or call forth affection. See OSSIAN.

Fingal's Cave. See STAFFA.

Finger-Board, in various stringed instruments, a piece of wood—generally ebony—lying underneath the strings, and upon which they can be pressed by the fingers so as to give the sounding part of them the required length.

Fin'ial (Lat. *finis*, 'end'), the ornamental termination which in Gothic architecture usually surmounts and completes the design of spires, pinnacles, gables, the canopies of windows, porches, &c. By early writers the term was used to denote the pinnacle, canopy, or gable itself, as well as its ornamental termination. Finials proper first came into use in the 12th c.—although in the buildings of the ancients there are traces of foliated and other terminations surmounting the pediments—and during the 13th c. they were brought to perfection as an architectural ornament. During the 15th and 16th centuries it was customary to surmount finials with a gilded vane. Stone, wood, and metal were the materials in which these ornaments were carved; but the F. of modern times is usually a pyramidal termination in light metal-work, the designs being generally foliage and scrolls.

Fi'ning. Some liquids holding impurities in suspension are cleared by straining through a porous body (see FILTRATION); others again, such as beer and wine, are clarified by adding substances which either precipitate or raise to the surface the impure matter; the latter process is termed F. The chief finings used are albumen, gelatine, blood, lime, acids, and alcohol. Beer and wines are clarified by dissolved isinglass, which combines with the tannic acid of the liquors, and subsides to the bottom, along with the impurities, in the form of a flocculent mass. In the case of wines containing little tannic acid, such as Burgundy, extract of nut-galls is added with the isinglass to the wine, to prevent decomposition by robbing the wine of one of its natural preservatives. White wines are cleared in Spain with powdered marble; gypsum and sand are elsewhere used. Lime or alum greatly assists the precipitation of impurities in beer or cider. The juices of plants may be clarified by heat, which calls into action the albumen present in them. Syrups are fined with white of egg, which coagulates with heat, and rises with the impurities, forming a scum on the surface.

Finistère′ or **Finisterre** (Lat. *finis terræ*, 'land's end'), the most westerly department of France, once a portion of the province of Brittany, and lying between the English Channel and the Atlantic. Area, 2595 square miles; pop. 727,012. The climate is damp and dull. F. is a wild, hilly district. The coasts are deeply indented, and lined with rugged granite rocks; the interior is partly rich arable land, partly marshes and wide heaths. F. is watered by many small rivers, the chief being the Penzé and Aberbenoit, flowing into La Manche; the Odet, Arven, and Ellé, running S.; and the Aulne, Elorn, and Penfeld, flowing E. Barley, wheat, rye, flax, and hemp are largely cultivated, and much cider is made. There are valuable mines of silver and lead, iron and zinc are found, and granite, marble, and slate are extensively quarried. Bees, deer, and partridges are abundant, and salmon, lobsters, prawns, oysters, trout, and eels are very plentiful. There are several mineral springs in the department. Beer, cheese, butter, and wine are made for home consumption and are also exported in great quantity. The pilchard fisheries off the coast employ many of the inhabitants. The chief manufactures are of linen, canvas, ropes, leather, paper, pottery, sugar, soap, and tobacco; there is also some shipbuilding. F. comprises five arrondissements; the principal towns are Brest (the capital), Quimper, Châteaulin, Morlaix, and Quimperlé.

Finisterre, Cape (Lat. *finis terræ*, 'land's end'), a cape on the N.W. of Spain, in the province of Coruña. Mariners have been warned time after time to keep away from this part of the coast, as vessels are often taken out of their course by the strong current setting eastwards, and several have been lost between C. F. and Cape Ortegal; yet the desire to save time and coal induces some every year to risk destruction by steering close to these headlands. F. was the Roman *Artabrium*, from the *Antabri* who dwelt there.

Fin′land (called the Grand-Duchy of F.), the most north-westerly division of Russia, is bounded W. by Sweden and the Gulf of Bothnia; N. by Norway; E. by the Russian governments of Archangel, Olonetz, and St. Petersburg; and S. by the Gulf of F. It is about 750 miles from N. to S., and on the average about 185 miles broad. Area, 144,255 sq. miles; pop. 2,412,135, 85 per cent. being Finns, 12 per cent. Swedes, and the rest Lapps, Russians, and Germans. The northern part of F. is a portion of the ancient European division of Lapland. The shores of F. are much indented, and enclosed with belts of islands; the interior is a plateau 500-700 feet high, precipitous towards the S., more level in the W., and sloping almost imperceptibly to the N. and E. In the N.W. part there are mountains of 2000 feet. F. consists in general of a mass of granite interspersed with trap, and yields some copper and lead, and many useful kinds of stone. Nitre, sulphur, arsenic, and iron are also found. The vast number of lakes and swamps, covering 18,471 sq. miles, gave rise to the native name of F.—*Suomesimaa*, or 'fen-land.' The chief lakes are Ladoga, Saima (which drains two extensive chains of lakes, the largest among which are Kalla on the W. and Pieli), Näsi, Ulea, and Päjäne, with the Kymene as its outlet into the Gulf of F. The other chief rivers are the Tana, running into the Tanafjord in the Arctic Ocean; and the Tornea Kemi, Simo, Ijo, and Kumo, which fall into the Gulf of Bothnia. The climate of F. varies greatly, the mean temperature of Abo, under 60½° N. lat., being 40° F.; while that of Enontekis, under 68½° and 1370 feet above sea-level, is 27° F. The comparatively high summer temperature (that of Abo is 60° F.) has great influence on vegetation. F. is said to contain 1000 flowering plants. Corn is cultivated S. of the great lakes, but also to some extent in the fen-country, and even further N., and the oak thrives on the Kumo, and about Biörneborg. In the extensive woods covering most of F. are found bears, elk, wolves, foxes, martens, and wildfowl, and the rivers and lakes abound in fish. Before the colonisation of F. by the Swedes, it was inhabited by petty tribes, the names of some of which survive in the names of the old provinces—*e.g.*, Oesterbotten, at the N. end of the Gulf of Bothnia, inhabited by the Kainu or Quains; F. proper, or Suomi, by the Suomians; Tavastland, by the Tavastians or Hæmians; Savolax and Karelia, by the Savolaxians and Karelians. F. is now divided into eight governments:—Nyland, Abo-Biörneborg, Tavastehus, Vasa, St. Michel, Viborg, Kuopio, and Uleaborg. The prevailing religion is the Lutheran, but about 40,000 Finns belong to the Greek Church. There is one university in F. at which some 1700 male and 50 female students are under instruction. In other respects, the education of the people receives great attention, as there are 31 lyceums, of which 22 are supported by the state, 1 polytechnic, 7 navigation schools, 1010 normal, higher, primary, commercial, evening, &c., schools, having an attendance of some 450,000 scholars. Agriculture, dairy management, and trade have special schools. The income derived from the Crown forests is over £400,000.

In the 12th and 13th centuries F. was subdued by the Swedes, and gradually received Christianity and culture from its conquerors. While a Swedish province it often suffered from the wars with Russia, of which it was the theatre. The Peace of Frederikshamn, in 1809, gave the country to Russia, and fixed the Tornea as the Swedish boundary. Under Russian rule the ancient constitution has been slightly modified in 1869 and 1882. There are four social and political classes—nobles, clergy, burgesses, and peasants, the last mostly freeholders. Representatives of these constitute four chambers of the national parliament which is called by the Grand-Duke, who is the Emperor of Russia, to sit during four months, every four or five years. New taxes and constitutional changes require the unanimous vote of each chamber and are liable to be vetoed by the Emperor. There is a state Secretariat of F. at St. Petersburg, and a Senate sits at Helsingfors and administers most of the internal arrangements. Military service is compulsory, and 4833 riflemen and one regiment of dragoons are supplied in this way. On the whole F. has a perfectly independent internal government, with special customs-frontiers and financial arrangements. For the budget of 1894-95 the revenue and expenditure were (each) estimated at £1,791,106, with a public debt of £3,000,000, two-thirds of which was contracted by extensive construction of railways. Russian garrisons lie in the fortresses, but all public functionaries must be natives of F. There is a naval yard at Abo. The Finns are good seamen; their merchant shipping consists of 2193 vessels, representing 257,854 tons. There are 1302 miles of railway open, all but 20 belonging to the state. Canal traffic is considerable, and from this an annual revenue of £24,000 arises. The chief imports are coffee, sugar, iron and hardware, raw cotton, tobacco, corn and flour, oils, &c.; the exports are butter, timber, paper, iron goods, leather, hides, pitch, tar, cottons, &c. Wheat, barley, rye, oats, peas, sarrazin, potatoes, hemp, and flax are the principal crops; large numbers of horses, cattle, sheep, swine, reindeer, goats, and poultry are reared. The chief towns are Helsingfors (q.v.), Abo (q.v.), Viborg (pop. 20,763), Biörneborg (pop. 10,297), Tammerfors (pop. 20,132), Uleaborg (pop. 12,665), Nikolaistad, and Kuspio. See FINNS.

Finland, Gulf of, that part of the Baltic, 240 miles long, and from 10 to 70 miles wide, stretching from W. to E. between the coasts of Finland, St. Petersburg, and Esthonia. Its waters are only slightly salt. Along the Finnish coast it is studded with islands, rocks, and shoals, which render its navigation difficult. There are several excellent harbours, as Kronstadt and Revel, which, with Sveaborg, are also fortresses of the first rank.

Fin′lay, George, LL.D., a distinguished historian, was born in Scotland early in the present century, and in 1822 went out to Greece and fought in the cause of Greek independence. He then settled near Athens, and after an unsuccessful effort to better the state of agriculture in the country, devoted himself to writing the history of Greece from the time of Alexander, when he believed the history of the modern Greek nation began, down to the present day. An ardent Philhellene, he did not shrink from exposing the weaknesses of Greece in a series of shrewd, bold, and vigorous letters to the *Times*, which occasionally gave offence both in England and in Greece. His works were coldly received, but his studious zeal remained unchilled. He died 26th January, 1875. F.'s chief writings are *Greece under the Romans; History of the Byzantine Empire; History of the Byzantine and Greek Empires; History of Greece from its Conquest by the Crusaders to its Conquest by the Turks; History of Greece under Othoman and Venetian Dominion;* and *History of the Greek Revolution.* These works revolutionised our ideas of mediæval Eastern history, disclosing for the first time the true nature of the Eastern empire, and also shedding fresh light on the annals of modern Greece. They show deep, accurate learning, vivified by the author's strong practical intellect and generous love for the country, much of whose history he was the first to unfold to Western Europe.

Fin'mark, or **Finmarken,** a province (*amt*) of Norway, and the most northerly part of Continental Europe. Area, 18,296 sq. miles; pop. 29,170. F. is a high barren tableland traversed by a range of snow-clad mountains, rising to a height of 4000 feet; its coasts are thickly studded by rugged islands (terminating in the N. Cape), and indented by wild narrow fiords, of which those of Porsanger, Laxe, and Tana are the principal and most northerly. The Tana and its tributary, the Karas, and the Alten, are the chief rivers. Barley and potatoes are grown near the sea, and the uplands support large herds of reindeer. The cod-fisheries occupy most of the inhabitants, and are very valuable, above 20,000 barrels of cod-liver oil being, on an average, annually produced. The inhabitants are partly Norwegians, but mostly Finnish-Lapps. The chief town is Hammerfest (q.v.).

Finn'er Whale, a name given to various kinds of whales belonging to the family *Balænidæ* or whalebone whales, and derived from their possessing a soft dorsal fin. Finner whales are of large size—the *Physalus Boops* or rorqual sometimes attaining a length of 90 or 100 feet. They are represented by the genera *Megaptera*, *Balænoptera*, in addition to *Physalus*. They are also named 'furrowed' whales, from the fact that the skin is plaited or folded. The whalebone plates are very small and commercially unimportant.

Finn'ish Language and Literature. Finnish, the most perfect of Ural-Altaic languages, is so rich in declensions and conjugations that Schwarze and Europæus class it among inflective rather than 'agglutinating' forms of speech. But its main characteristics discountenance the theory of its Aryan origin. The noun is without inflection, cases (fourteen in all), numbers, and genders being denoted by additional words. The prepositions (none of which are of pronominal origin) take the form of suffixes; and the verb, having only two tenses, a present and a past, expresses the future by adding some word or other which can indicate futurity. The syntax is comparatively rude and formless, and in all its wealth of cases there is scarcely a definite nominative or accusative; yet the language is so musical that Rask called it the 'most harmonious of tongues,' and, with the single exception of Magyar, it is the only branch of the Ugric (see FINNS, FINNIC) stem in possession of a literature. Swedish-speaking Finns fill the chief professional and mercantile positions in Finland. The people are as much Swedish in culture as the Irish are English, a large number of the Swedish-speaking Finns not even understanding Finnish. Yet the language has not wanted cultivation; it possesses translations of the best foreign works of a religious or popular character, and has a curious and ancient folk-poetry of its own. It was long known that there lived amongst the Finns a great number of lyrics known as *Runot* ('Runic songs'). These poems, some of which are late, others are witch-songs from heathen times, are collected under the title of *Kanteletar* (Helsingf. 1840). It was also known that there were *improvisatori* among the Finns, as Paavno Korhoinen (1775-1840), whose poems have been collected from oral recitation into a volume. But in 1835 Lönnrot awoke general astonishment with the discovery that many of these *Runot* could be dovetailed into a true and noble epic, based on the old myths; it came out under the title *Kalevala;* but so many more fragments were afterwards found, that the edition of 1849 comprised thrice as many verses, divided into fifty songs. It was translated into Swedish by Castrén (1841), into French by Le Duc (1845), and into German by Schiefner (1852). In recent years the language has been much studied by the Finns themselves, and the Russian Government's careful encouragement of Finnish literature is well seconded by the eagerness of the peasantry for printed matter in their native tongue.

Finns, Finn'ic. The F. seem to be identical with the *Phinnoi* of Ptolemy and the *Finni* described by Tacitus as leading a miserable nomadic life in the N.E. of Europe, and together with the *Veneti* ('Venedi' in Pliny, the 'Wends') or Slavs (q.v.), bordering on the *Germani*. They are classed by philologists as one of the five sections of the Northern Turanian (q.v.) or Ural-Altaic family. The wide diffusion of F. races at the present day, as well as the allusions to them in Russian and Scandinavian writers, prove them to have been the oldest known inhabitants of Russia and Scandinavia. Yet, like other races composed of detached tribes, not recognising their own unity, they gave themselves no common name, *Finner* being the term applied to them by the Scandinavians and Germans, while the Russians knew them as *Tchud* (Chudians), in which some recognise the famous name of Scythians. Each branch of the F. stem formed a separate community, with its own name and customs. The people composing one of these, living in what is now called Finland (q.v.), named themselves *Suomalainen* (Suomians) or 'swamp-dwellers,' from the character of their country. Now, in the Germanic languages *fen* means swamp, and probably their German name is but a translation of their native name, which contains a word common to the F. tongues; for example, the Lapps, another F. race, call themselves *Samer* or *Sabmer*, and the same root appears in the name of the allied *Samoieds* or *Samoyedes* (q.v.). The ancient F. were in some respects superior to their more powerful neighbours, and though perhaps of shorter average stature, were strongly built and warlike. They were skilful in smelting and working metals, and especially renowned for their sorcery, a peculiar development of a mythology which influenced greatly that of the early Scandinavians, and was the origin of a rich popular poetry amongst themselves. *Fin* was a title of honour given to great Norwegians, and the leading families of Scandinavian kings and gods were traced to F. sources. But the patriarchal life of isolated tribes precluded political organization, and they were never able effectually to join in resisting the attacks of neighbours who at first invaded their lands as robbers of their costly furs, and afterwards as zealous Christian proselytizers. From a remote period Norwegian chieftains levied *Finneskat* ('Finn-tax') in Finmark, a district extending from the White Sea to the banks of the Dvina, the abode of the Bjarmians. Erik the Saint of Sweden subdued Nyland or S. Finland in 1156, and in the 13th c. Swedish Christianity and culture took firm root. After this, Russian conquest began. The princes and merchants of Novgorod penetrated into the country, and wisely developed its resources; it became, so to speak, Russianised, and missionaries gradually converted many of the inhabitants to the Greek faith. The F. were peaceful subjects, and Finland was the first and firmest foundation of the growth of Russia. The Esthonian and Livonian F. fared worse, for they fell into the hands of German nobles, who treated them as serfs. Of all the F. races, the Magyars alone attained autonomy, and that not in their native country of the Ural Hills, but in Hungary, which had a political existence before they conquered it. Generally speaking, all the other F. tribes have become scattered among greater peoples, but their dialects remain as oases of speech, though the races themselves are but fragments of what they once were. Their name has been applied with some confusion. By Norwegians it is often given to the 17,012 Lapps in Norway. Europe in general confers it only on the inhabitants of the Grand-Duchy of Finland. Ethnologically, it is used of the whole class of which the F. and Lapps are members, but philologists would now denote this class by the Russian name *Chudic*, or the also Russian *Ugric*. The latter seems preferable, from its connection with the name

Ungarn (Hungary), used in the Middle Ages to denote a great province in the N.E. of Europe and W. of Asia.

Fins (allied to the Lat. *pinna* or *penna*, 'a feather'), the structures found typically in fishes, and which are adapted for locomotion in water. They are also found in certain mammals, as in whales and *Sirenia* (q.v.), the former having in some instances (see FINNER WHALE) a back or dorsal fin, and the latter a tail-fin. The pectoral or breast fins of fishes correspond to the fore-limbs, and the ventral fins to the hind-limbs, of other *Vertebrata*. The dorsal, hind, and caudal fins have no correspondence or homology with limbs, but are to be regarded as special developments of the skin in the middle line of the body. The swimming paddles of seals, walruses, &c., correspond to the pectoral fins of fishes, and represent the fore-limbs modified for locomotion in water.

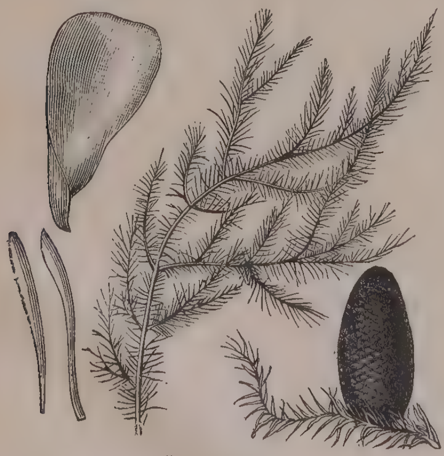
Fins'bury ('fen town'), a parliamentary borough of Middlesex, consisting since 1885 of three divisions, Holborn, Central, and East, each returning one member, and having a pop. of 70,911, 66,216, and 45,327 respectively. Pop. reg. sub-dist. 4985.—The pop. of the district or ecc. par., known as Finsbury Park, Islington, is 5988. The park itself is a fine stretch of enclosed land, laid out in grass plots, shrubberies, flower beds, recreation grounds, &c. A boating lake is in the centre, the banks of which command one of the finest views in the N. of London. The locality is exceedingly healthy, and for that reason is deservedly popular.

Fin'scale. See RED EYE.

Finsteraar'horn (Ger. 'the horn of the dark Aar'), so called because the dark Aar rises from it, the highest peak in the Bernese Alps, 14,106 or 14,026 feet high. It can be mounted from Faulberg, five miles distant from Lake Majelen. The mountain is surrounded by large glaciers.

Fin'sterwalde (Ger. 'dark wood'), a town in the province of Brandenburg, Prussia, 40 miles N. of Dresden, with manufactures of linen, cotton, flannel, and machinery. Pop. 8220.

Fi'orin. See BENT GRASS.



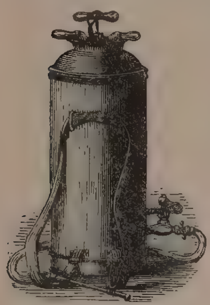
Great Silver Fir.

Fir (Old Eng. *furh*, comp. Ger. *föhre* and Welsh *pyr*), a name given generally to many species of trees belonging to the natural order *Coniferæ* (q.v.). It may be botanically restricted to the species of the genus *Abies*, which also include the Spruce (q.v.); but many pines are also so denominated—the Scotch F. being one of the most familiar examples. In the genus *Abies* the leaves are arranged singly, and are flat, whilst the scales of the cones are deciduous. Nearly allied to *Abies* is the genus *Picea*, or that represented by the silver firs, this latter genus having tetragonal leaves and persistent cone scales. Of the F. the Norway spruce or F. is a good example. This tree attains a height of from 100 to 180 feet, and has an erect stem, whilst its branches are given off in the markedly symmetrical manner characteristic of these trees as a whole. It grows in Northern Europe, Asia, and even in the Arctic circle, and lives about 400 years. It yields *common frankincense* or *Thus*, and paper has been manufactured from its wood. Like most other species of F., it also yields resin, turpentine, tar, &c. The wood is very durable, and is known as *Danzig deal* and *white Christiania deal*. The soft sapwood is occasionally eaten in Sweden. Other species belonging to the genus *Abies* are the balm of Gilead fir and the Canadian fir, from which 'Canada balsam' is obtained. The leaves of the latter, which is known as hemlock spruce, and also those of the black fir, yield the extract used in spruce beer. The silver F. affords Strasburg turpentine. The white spruce is very common in N. America. The giant pine of California thrives in Britain, and may attain a height of 245 feet with a circumference of 57½ feet at a height of 3 feet from the ground. The great silver fir occurs on the N. Pacific coast of America; it is a hardy grower and makes excellent lumber for export trade. To the genus *Pinus* belongs the typical Scotch F., a tall tree with evergreen aciculate or needle-like leaves, naked flowers, and a cone or multiple fruit. The male flowers of the Scotch F. are arranged in short catkins composed of small overlapping scales, each scale having two anther lobes on its lower surface. The female flowers are in small dense catkins, each scale of which has at the base of its upper side two inverted seeds or ovules. The ovules are not enclosed in any seed vessel, and the F. and other Conifers are thus named Gymnospermous or naked-seeded plants. The Scotch F., the only pine now native in Britain, furnishes the wood known as yellow deal. Tar is distilled from it, and pitch is the residuum after the distillation of the liquid part of the tar. The inner bark of the Scotch F. yields the 'bark bread' of Norway. The firs, which are of Arctic type, flourish under conditions which would be fatal to the growth of other trees of their size. See PINE.

Fir Bholg, signifying 'men of the quiver,' a name given to one of the various tribes who invaded Ireland in prehistoric times. The S. of Ireland is sometimes called Bolga, and it is sought to identify the people with the Belgæ.

Firdu'si, Firdousi, or **Firdewsi, Abou'l-Casim Mansour,** a great Persian poet, was born at Schadab, near Tus in Khorassan, in 940. He was called F. ('paradise') either from his father being in charge of an estate named F., or from the Sultan Mahmud saying that his poems were a true 'paradise.' F. early determined to frame an epic on the history of Persia, visited the court of the Sultan Mahmud at Ghuznee, then a famous seat of letters; and at Mahmud's request undertook to write an epic on the Persian kings from mythical times down to the 7th c., the sultan promising him a gold dirhem for each couplet. The work is said to have occupied F. for thirty years, and on its completion, Mahmud, prejudiced against F. by the poet's enemies, sent him 60,000 dirhems of silver, instead of the gold coins which he had promised. In return F. bitterly satirised Mahmud, whose resentment compelled him to wander from court to court, seeking protection which the various monarchs dared not bestow. F. seems to have died in his native place, about 1020. His life, and especially his latter years, are shrouded in legends, the stories regarding him being often very contradictory. F.'s great work, the *Shah-Nameh* ('Book of Kings'), is said to have at first contained 60,000 couplets, but no extant MS. comprises more than 56,685. The poem deals with mingled fable and history, and embraces 3600 years. It has no epical unity, being divided into separate tales, to each of which an introduction and epilogue are affixed. The chief theme is the war of Iran (Persia) with Turan (Turkestan). In the East it is regarded as of great historical value, but the only reliable portion seems to be that devoted to the Sassanids. It is one of the most interesting philological relics in Persian, is pure, though archaic, in style, with very few Arabic words. Sir William Jones says if it were understood in the original, it would 'contest the merit of invention with Homer himself.' It abounds in rich, daring, and often fantastic Oriental imagery, contains many fine passages of lofty and pathetic poetry, and its verse is softly musical. The *Shah-Nameh* was published in Calcutta in 1829, edited by Turner Macan, and at Paris in 1840, with a translation and commentary by Mohl.

Fire-Anni'hilator, a portable machine designed to extinguish fire by forcibly ejecting upon the burning mass a saturated solution of a gas or of other substances incapable of supporting combustion. The French call such a machine *l'extincteur*, a name which has been adopted by inventors in Great Britain. Phillips's F.-A. (1849), contrived to project steam, carbonic acid, and other gases, has not been much used. In 1873 W. B. Dick, of Glasgow, patented an extincteur, which consisted of a cylindrical vessel containing water saturated with bicarbonate of soda in the lower part, and in the upper of a bottle filled with sulphuric acid. The bottle may be readily broken by percussion applied to an external cap, and the ensuing chemical action of the acid on the bicarbonate produces carbonic acid, which by its own expansion is propelled through a stop and delivery hose as a supersaturated aqueous solution. Many public buildings, ships, &c., have been provided with this extincteur. A novel and ingenious plan of extinguishing fires in buildings where steam power is used was patented in 1875 by Henry Lacey of Hebden Bridge, Yorkshire. His method was to connect a branch pipe, which might be carried to any part of the building with hose attached, to the water-supply pipe leading through an injector to the boiler of an engine. By means of stopcocks, the water was cut off from the boiler; and steam, being admitted into the injector, drove the water along the branch pipe with a force regulated by the pressure of steam. Provision was also made for mixing chemicals with the water in the branch pipe.


Fire-Annihilator.

Fire'arms. The discovery of Gunpowder (q.v.) and its application to purposes of war led soon to the disuse of the old weapons of attack. The earliest form of goune (*canna*), or 'crake of war,' was probably an iron pot or 'mortar.' This gradually changed into a cylinder form, which may have been suggested by the practice of throwing 'feathered quarrels.' The early Cannon (q.v.) of the 14th c. were made of wrought-iron bars bound by iron girders, the shot used being generally stones. The larger cannon, Froissart's *grande artillerie*, subsequently called *bombardes*, of which Mons Meg at Edinburgh Castle is a specimen, projected granite balls. Some of these were breechloaders, and the largest could throw 200 lbs. It is said the Dulle Griette or Margot la Folle of Ghent, and Mahomet II.'s gun at Constantinople threw (each) 600 lbs. In the 15th c. appear primitive *mitrailleuses*, called by the Germans 'death-organs,' and the lighter pieces for field-work with trunnions mounted on carriages with trails. At the end of the 15th c. hand-guns called culverins were used, two men for each; smaller petronels being supplied to the cavalry. Gustavus Adolphus (1630) first introduced small iron cannon for field purposes. In the middle of the 16th c. Henri II. of France had cannon of 34 lbs., culverins from 15 lbs. to 2 lbs., and falcons and falconets which threw small shot of 1 lb. and ½ lb. Grooved or rifled cannon (see RIFLED ARMS) occur in the 17th c., so that Benjamin Robins, who lived in the following century, was not the author of the idea. The long harquebus, and the longer and heavier muschite, or sparrow-hawk, which was fired from a rest, were both of Spanish origin. The old matchlock gradually gave place to the clumsy wheel-lock of Nürnberg and the snaphaunces, but not till about 1692 did the developed flintlock entirely supersede the matchlock. Casting guns was introduced to England by Sebastiani, under the patronage of Henry VIII.; many of the brass 'sakers' of that period still survive. The petard of this period was a kind of iron mortar, like a truncated cone, filled with gunpowder and yellow wax, or Greek fire. It was used for blowing up gates and bridges. There was a separate tube to carry the lighted match. Bombs were known in England in the 16th c. Ricochet-firing was first tried by Vauban at Philipsbourg in 1688. The bar-and-chain shot used in naval warfare were generally fired out of the guns called 'murtherers.' Many forms of hand-F. we have not yet mentioned. The iron hand-cannon, with a small pan under the right side to hold the powder, passed into the hand-gun proper cast in brass, the first step towards the gunlock. The *arquebus-à-croc*, or with a hook, was fired from a tripod, and therefore is not properly a hand-arm. The smaller haquebut, or hagbut, had a hooked or crooked stock, which gave greater facilities for aiming than the straight barrel. The demi-haque was merely a long pistol, with a semicircular butt. The musket (literally the male young of the sparrow-hawk), perhaps so called from mousquette, or muschetta, the iron part of the small arrows fired from guns, has been referred to a Russian as well as a Spanish origin. It was first largely used by Alva. The ramrod was called 'a scouring stick' or 'scorier'; and indeed wooden ramrods were used in the British army down to 1752. The so-called Vauban lock (really much older) was an attempt to combine the action of a flint and steel with that of a matchcord. The caliver was a short musket fired by a matchlock without rest. The name really refers to the calibre or bore—the height of the bullet—and marks the important change that all the men of a regiment must use the same ammunitions. The Fusil (q.v.) was a short musket (flintlock) used by the French army from 1700; it was fired not from the breast, but the shoulder. The Carbine (q.v.) was a wheel-locked arquebus of large calibre used by skirmishers in the French army (1576 to 1665) and by the English cavalry at the end of the 17th c. The currier was longer in barrel than the arquebus, but not of so wide a bore; it was used chiefly in sieges. The musquetoon was a smaller sort of musquet, not so long as the fusil, but differing from the carbine in having a firelock, and not a wheel-lock. The Pistol (q.v.) was an arquebus in miniature, and fired by the wheel-lock. It was much used by the German Reiters, and in one form with a snaphaunce lock in the Scotch Highlands. The dag was simply a pistol with a crooked stock. The petronel or petrinal (from *poitrine*, 'breast,' from which it was fired) was a sort of arquebus, shorter than the musquet, but of larger bore, in fact very like the modern carbine. The Blunderbuss (q.v.) was very short, with a wide bore, and was charged with several balls or slugs. The dragon (see DRAGOON) was a formidable small form of the blunderbuss; it was conveniently carried on horseback, and effectively used on foot. The hand-mortar was used for throwing shells or Grenades (q.v.). The patent of Forsyth for a percussion gun (1807) was followed in 1827 by Dreyse's invention of the needle-gun, which in 1836 was converted into a breechloader. In the Minie rifle the charge in exploding expanded the head of the bullet, a result formerly obtained by the pressure of the ramrod, or more anciently in the rifled harquebus by a mallet. The chief forms of the needle-gun besides the German are the Chassepot, the Snider, the Peabody (Swiss), the Werndl (Austrian), and the Remington (Danish), &c. (See BREECHLOADING ARMS.) The recent improvements in large ordnance are noticed under CANNON. Among great collections of F. may be mentioned those of Dresden and the Musée d'Artillerie at Paris. Birmingham started one, which received help from the Government. The only large private collection in this country was that of Meyrich at Goodrich Court. As in France and Germany greater advance has been made in small arms, such as rifles, useful in war, so in England have more perfect sporting weapons been supplied. Our best rifles now carry with precision to a distance of 2000 yards or more, while the range of the ordinary shot gun is 45 yards, and that of the duck gun 140 yards. The names of the successful makers and all the little improvements within recent years in F. are too numerous for mention to be made of them in our limited space, but the reader is referred to the works of such experts as Walsh, Greener, &c., for full information on the subject.

Firearms, Law Regarding. Before firearms are sold or offered for sale they must be tested in a public proof-house. The statute does not extend to Scotland or Ireland, and arms manufactured for the Queen are exempted. See Statutes 18 & 19 Vict. c. 148, repealed by 31 & 32 Vict. c. 148, which granted more extensive powers, &c., in view of proving guns and stopping the forgery of proof-marks, to the Gunmakers' Company and Guardians of the Birmingham Proof House. Statute 33 & 34 Vict. c. 57, instituted a duty of 10s. for every license to carry a gun or pistol.

Fire'balls, hollow projectiles filled with gunpowder, sulphur, naphtha, and similar combustibles, and discharged from cannon to illuminate or ignite an enemy's work. Rockets have greatly superseded their use.

Fire'bote, in English law, is the right of a tenant to cut wood for fuel on the ground held by him. See ESTOVER.

Fire'brick. See BRICK.

Fire-Brigade'. In London up to 1825 almost the whole of the fire-engines were under the control of the insurance companies, and each company had its own brigade; but in that year some of the principal associations joined together. The advantages of conjoint action soon became so obvious that by 1833 nearly all the companies had merged their establishments in the central one, but in 1862 the Government was informed that the committee of management had determined upon relinquishing the maintenance of the brigade. The present Metropolitan F.-B. was formed in January, 1866, in accordance with the provisions of an Act of 1865, under Sir (then Captain) Eyre M. Shaw, C.B. This brigade was placed under the control of the Metropolitan Board of Works, and received support from the rates, the Treasury, and the insurance companies. The rate was ½d. in the pound on the annual value of property rateable to the relief of the poor in the Metropolis. In 1889 it comprised 591 men and 55 land engine stations, besides four floating steamers. In 1889-90 the brigade was greatly strengthened and increased. It is now under the control of the County Council.

The officers and men number 741; there are besides 17 pilots, 75 coachmen, and 137 horses. Of these 458 are on duty during every 24 hours. The *matériel* consists of 57 land stations, 4 floating stations, 52 hose-cart stations, 181 fire-escape stations, 9 steam fire-engines (barges), 50 land steam fire-engines, 95 engines worked by hand, besides 8 steam tugs, 13 barges, 12 skiffs, 221 fire-escapes, 9 ladders (extra length), 9 ladder vans, 2 ladder trucks, 105 hose-carts and hose-reels, and 34 miles of hose, &c. The area, that is so protected is 118 sq. miles, includes the city and county of London, and extends from Roehampton to Plumstead, and from Sydenham to Highgate. The stations are connected by telephone with each other, and with police stations, public buildings, and fire-alarm street instruments. The annual cost is about £130,000. The number of fires in 1894 was estimated at 3410, and of these 180 resulted in serious damage. The chief officer is Captain J. Sexton Simonds, who fills the position formerly occupied by Sir E. M. Shaw. Headquarters are in Southwark Bridge Road. In Liverpool, Manchester, Edinburgh, Glasgow, and most cities in the United Kingdom, there are now highly-trained and well-organized F.-Brigades. On the Continent the fire establishment is generally under Government control; in America there are in most cities companies of firemen, permanently employed and paid, and the system is the most perfectly organized in the world. In our smaller colonies, such as the Straits Settlements, where the number of Europeans is small, the F.-B., if any exists, is necessarily on a small scale; and consequently the services of the military are requisitioned. At Singapore the discovery of a fire at night is announced by the repeated discharge of cannon from the central fort, and the firing of several rockets in indication of the quarter where the conflagration may have arisen. To the uninitiated traveller this sudden bombardment may seem to announce the revolt of the 100,000 Chinese, or the approach of a French, or a Russian, hostile force *at last*.

Fire'clay is so named from its fire-resisting nature, which arises from the predominance of silica together with the small percentage of fluxes in its constitution. Pure F. is composed of silica, alumina, and water; but an alkali, lime, magnesia, or iron oxide is always present in variable proportions, tending to give fusibility to the clay. F. with over one per cent. of alkalies is unable to withstand very high temperatures for a prolonged period, but oxide of iron alone, to the extent of four per cent., is not detrimental. In Great Britain it is chiefly found in the coal measures, in beds of from 1 foot to 4 feet in thickness, forming the under clay of the coal seams. Valuable deposits occur at Stourbridge in Worcestershire, Garnkirk and other places in Lanarkshire, at Lilly Hill in Fifeshire, and at Blaydon on the Tyne. Stourbridge is the most celebrated of the British fireclays, and has the following percentage composition:—Silica, 63·30; alumina, 23·30; lime, 0·73; oxide of iron, 1·80; water, 10·30, with traces of titanic acid and carbonaceous matter. Gas retorts, glass-house pots, crucibles, furnace bricks, glazed drainage pipes, terra-cotta ornaments, and many other articles are made of F. When excavated, it is exposed to the disintegrating action of the weather; it is afterwards pulverized, mixed with water, kneaded in a pug-mill, then moulded by hand, and carefully dried and fired.

Fire'damp, an explosive mixture of Marsh Gas (q.v.) and air, is of frequent occurrence, and a source of great danger, in coal mines. See SAFETY-LAMP.

Fire-Eating. Conjurors have at different times professed their ability to eat fire with impunity. Richardson, an Englishman, who travelled over Europe in the 17th c., chewed burning coals, poured melted lead upon his tongue, drank molten glass, and held red-hot iron in his mouth. Sir David Brewster (*Letters on Natural Magic*), commenting on these and similar performances, says, 'That these effects are produced partly by deception and partly by a previous preparation of the parts subjected to the heat, can scarcely admit of a doubt. The fusible metal—composed of mercury, bismuth, and tin, which melt at a low temperature—might easily have been substituted in place of lead, and fluids of easy ebullition may have been used in place of boiling water.' The skin becomes horny, and therefore insensible to intense heat, by continually compressing, singeing, or pricking it, or by frequently washing it with dilute sulphuric acid. Mediæval priests were acquainted with other protective preparations, which enabled them to pass 'the innocent' through the ordeal of fire with impunity.

Fire'-Engine, a pumping-machine for extinguishing fires. A double pump apparently for this purpose is described by Hero of Alexandria (B.C. 284-221), who calls it 'the syphons used at conflagrations.' There are now no means of saying how far such a machine (which was in principle identical with those employed at present) was used in the time of its inventor. We first hear of fire-engines definitely during the latter half of the 17th c., when they appear in very much the same form as that described by Hero. Up to this time huge squirts containing a few quarts of water were the principal means of extinguishing fires in this country. Two men held one of them, and a third pressed the piston upwards. The first F.-E. of which we have a trustworthy account was made at Nürnberg by Hautsch, and is described by Gaspar Schott in 1657. It carried its own water cistern, was worked by twenty-eight men, and seems to have had a kind of a flexible discharge pipe. The general use of the leathern hose dates only from about 1670, when two brothers Van der Heide (fire-inspectors) introduced them at Amsterdam and obtained for them patent rights. Since then they have been universally employed, first of leather sewed, then riveted, and later of canvas and india-rubber, and of india-rubber alone. The first use of the *air vessel*, now an essential part of all fire-engines, is ascribed to a Frenchman, Perrault, in 1684. Subsequent improvements in the F.-E. down to 1830 were chiefly in details. In that year the first steam F.-E. was used by Braithwaite, who shortly afterwards brought out a more powerful one, and constructed also a *floating* steam F.-E. The use of steam did not make much progress at the time, and it was not until 1861 that Messrs. Shand & Mason made the first steam F.-E. used by the London Brigade. Since that time the steam F.-E. has become more and more important, there being few towns of any size without one or more. One of the largest kinds used weighs about 23 cwt., and can send a jet (200 gallons per minute) to a vertical height of 180-200 feet. These engines are specially constructed so that steam may be raised quickly—in the one just mentioned steam of 100 lbs. pressure per square inch can be obtained seven minutes after the fire is lit; of course this process may be going on as the engine is being driven to the fire, so that no time is lost. The modern F.-E. consists of one or more force-pumps (see PUMP), delivering water into an air chamber communicating with the discharge pipe and hose. By their action the air in the chamber is kept constantly compressed to any desired extent, and reacting by its elasticity upon the water, it forces it out in a continuous stream.

Fire-Escape′, an apparatus for enabling persons in burning houses or buildings to escape. The name is strictly applied to a ladder 30 or 35 feet high, with a canvas trough behind it, and smaller sliding ladders attached to it, by which its length can be increased to 45 or 50 feet, and in some cases even more. The whole is supported in a nearly vertical position on two large wheels, so that it can readily be moved. In London fire-escapes are so placed that almost any house can be reached by one of them in five minutes. They belonged until 1867 to the 'Society for the Protection of Life from Fire' (an association founded in 1836), and were then virtually presented to the new fire brigade. In 1881 a scheme was established by the Charity Commissioners under which the income from the funds of the charity is applied in rewarding persons who save life or sustain injury at a fire, and to the relations of persons who have lost their lives while endeavouring to save life from fire. In our cities, where so many houses have only one narrow stair, communication by which sometimes becomes impossible at the very beginning of a fire, fire-escapes have saved many lives.

Fire-Fish, the name given to certain Teleostean fishes from their brilliant colouration. The best-known species is the red F.-F. of tropical seas, which belongs to the family *Triglidæ* or gurnards. The body is scaly, and has many spines and rays. The dorsal and pectoral fins are especially large, and their rays are prominent. The colour is a pinky brown with dark-brown markings. The average length is 8 or 9 inches. The flesh is eaten on the Ceylon coasts.

Firefly, a name sometimes applied generally to insects with phosphorescent or luminous properties, but restricted in a zoological sense to such forms as the Cucujo or F. of Brazil, the glow-worm, and allied forms. The former insect belongs to the family *Elateridæ* of the *Coleoptera* or Beetle order of insects, and the latter is also a beetle belonging to the family *Lampyridæ*. The F. of Brazil is very luminous, the light proceeding from two spots at the base of the thorax, whilst two other shining patches exist beneath the wing-covers. These insects fly by night, and render the forests bright with their luminosity. Various other species are known. The glow-worm is familiar to all as a luminous insect or F. The females exhibit the utmost brilliance. The female glow-worm is wingless, the male being winged and of brown colour. Fireflies are most common in S. Europe and in tropical countries. How the luminosity is produced is still undetermined in an exact sense, but there appears to be little doubt that it is developed by the nerve-force acting through some special apparatus. See also LUMINOSITY and PHOSPHORESCENCE OF ANIMALS.

Firefly.

Fire Insu′rance, Law Regarding. When there has been damage by fire, notice should at once be given to the office, and an account given on oath or affirmation of the loss. Account-books and other vouchers should be shown in support of the account. To whatever amount persons insure, they can only recover the value of the loss sustained. A house being insured for £19,000 was totally destroyed by fire, but the company, though the premium on £19,000 had been paid for many years, refused to pay more than £12,000, alleging that this was ample value. And this is in accordance with the condition which is usually stated in the contract, namely, that the Insurance Company undertakes to *pay the loss*, not exceeding the sum insured. In fact, the insurer must not hope to make a profit out of his loss by fire. If a policy be effected in several offices on the same subject, they are only liable proportionally to make good the loss, and to guard themselves against a fraudulent insurer insuring for full amount in various offices, it is usually notified in the proposal that he must state any other insurance in existence on the same property, otherwise the proposed insurance will be void. However small the damage to the subject insured, the office is liable; for example, under a policy on furniture, the office is liable for damage by a hot cinder. Most offices pay for damage caused by lightning or gas explosion, but the insurer should inquire as to this. The annual premium on a *common* insurance is usually 1s. 6d. per cent.; that on a *hazardous* insurance, 2s. 6d. per cent.; and that on a *doubly hazardous* insurance is 4s. 6d. per cent. In the two latter there are, of course, many exceptions where the premium is raised; and there are cases where no reasonable premium, however large, will be accepted, the hazard being too great.

Firelock, the name given in the 16th c. to a musket or pistol with a wheel-lock, and afterwards to the musket with a flintlock, which in 1690 was introduced in place of the earlier matchlock. See FIREARMS.

Fire, Malicious Injuries by. See EXPLOSIVES.

Firenzuola, Agnolo, an Italian scholar and writer of fiction, was born at Florence, 28th September, 1493. He studied law at Siena and Perugia, but, while young, became a monk, and in 1525 was made abbot of a monastery at Spoleto. He was a friend of Aretin, is said to have lived a profligate life, and died at Prato about 1545. His chief works are a free adaptation of the *Golden Ass* of Apuleius, *Apuleio, Dell' Asino d' Oro tradotto per Agnolo F.*, which excels the original in beauty of language; *Discorsi degli Animali*, partly imitations of Æsop; *Ragionamenti Amorosi, Novelli Otto*, sportive tales in the choicest Tuscan; *Dialogo delle Bellezze delle Donne*; two comedies, some satirical verses, &c. F. is one of the masters of Italian prose. His language is clear, flowing, and full of colour. See the Life in the edition of F.'s works published at Florence in 1848.

Fire-Proof Buildings. A building is fire-proof only when, in the event of a fire in one compartment, the fire burns itself out there without communicating with another compartment, or endangering the building. Considerable attention has been given to fire-proof construction, yet we have not made much progress in the art. Many buildings believed to be fire-proof, because in their construction brick, concrete, and iron are abundantly used, and wood very sparingly, when subjected to the fiery ordeal, assuredly succumb. The destruction of the London Pantechnicon in February, 1874, is a case in point. Though constructed on the most approved principles, it was wholly consumed in a few hours. That conflagration proved the weakness of iron pillars as supports to brick arches, for they melted with the intense heat, or cracked when water was thrown upon them. In course of time we may be forced to acknowledge that the use of a metal, such as iron, is the weak spot in F.-P. constructions, and that old, well-seasoned, medically treated oak or compressed paper is a far superior material for the purpose. Absolute fire-proof construction can only be attained at a great sacrifice of space. The compartments should be small, with thick firebrick walls supporting groined firebrick roofs. Where large floor areas are required, brick pillars should support the groined roofs. For valuable information on F.-P. B. see the *Transactions of the Society of Arts*.

Fire-Proofing, the art of diminishing the destructive effects of fire on inflammable materials. Textile fabrics are rendered non-inflammable by steeping them in any inorganic saline solution, whereby the fibres are coated with a protective crust that absorbs heat and excludes air. Fabrics so treated smoulder slowly when exposed to a high temperature, but do not burst into flame. For F.-P. light fabrics, phosphate of ammonium, alone or mixed with chloride of ammonium, sulphate of ammonium, or tungstate of sodium is recommended. The last-named is most used for goods that require to be ironed. Little success has attended the efforts made to fix the protective agents in the fibre, by rendering the saline crust insoluble in water. Fire-proof clothing may be made with the fibrous mineral asbestos. The ancients were acquainted with the art of weaving it into garments. About the year 1828, Chevalier Aldini of Milan advocated its use for firemen's dress, in combination with cloth steeped in alum, and with wire-gauze. Wood is rendered incombustible, or nearly so, by painting it with silicate of soda, or by impregnating it with an aqueous solution of alum and sulphate of copper, or of common salt and alum. The following mode of F.-P. wood has been devised:—Sulphate of zinc (2½ parts by weight), American potash (1 part), ammonium alum (2 parts), oxide of manganese (1 part), are mixed in a boiler, and water (2½ parts), at a temperature of 113° F., is run in. When the solution is effected, sulphuric acid (1 part), at 60°, is gradually introduced. The wood for F.-P. is submitted for three hours to the action of the solution, which is maintained in a state of ebullition during that time.

Fire-Proof Safes and other depositories. See SAFES.

Fire-Raising is in Scotch law the equivalent term to Arson (q.v.) in England. To constitute the crime there must have been actual burning, but it does not matter how small a portion of the subject has been consumed. Ignition of furniture alone, when not a fixture (see FIXTURES) of a building, makes the culprit liable to a charge of an attempt at F.-R. Setting fire to one's own house, if so doing is not dangerous to the property of another, and if the act is not fraudulent, may probably not be indictable. Under the Procedure Act of 1887 the points raised as to the state of mind of the accused are: did he raise the fire wilfully, or culpably and recklessly, or to defraud insurers? To set on fire growing crops, or to attempt to do so, is felony by statute. See EXPLOSIVE MIXTURES; GUNPOWDER, LAW REGARDING.

Fireship, a vessel laden with combustible matters, which in maritime warfare was sailed into an enemy's fleet, set on fire, and abandoned, in the hope that it might do damage or create confusion. The F. is of very early origin; we hear of its employment more than 2000 years ago. It is not used in modern warfare by civilised nations, although the Chinese employed fireships unsuccessfully against the British fleet before Canton in 1857.

Fireworks and Squibs. See PYROTECHNY, EXPLOSIVES.

Fire-Worshippers. See GUEBRES.

Fir'kin (Old Eng. *feower*, 'four'—Dan. *fire*—and dim, *kin*), the fourth part of a barrel, equal to seven and a half imperial gallons. In the United States of America a F. means a tub, often of butter, of 56 lbs. in weight.

Fir'lot (Old Eng. *feower*, 'four'—Dan. *fire*—and Eng. *lot*, 'part or portion'), a dry measure Scots, equal to the fourth part of a Boll (q.v.).

Firm. See PARTNERSHIP.

Fir'mament is the Latin word (*firmamentum*) in the Vulgate for the Greek *stereōma* of the LXX. and the Hebrew *rakia* in Gen. i. 6, 7, &c. The literal meaning of the Hebrew word seems to be a thin solid plate which has been hammered out. Similar names for the sky, scientifically incorrect, but expressing its actual appearance, are found in other languages—Gr. *ouranos*, Eng. *heaven*, 'that which is elevated; Gr. *koilon*, Lat. *cœlum*, 'the hollow place'; Ger. *heimeln*, 'a roof.' The Hebrew F., which was supported as if on pillars by mountains (2 Sam. xxii. 8; Job xxvi. 11), served a twofold purpose—first, of supporting a reservoir of water (Gen. i. 7; *cf.* Ps. civ. 3, cxlviii. 4), which descended as rain through windows (Gen. vii. 11, viii. 2; Mal. iii. 10) and doors (Ps. lxxviii. 23); secondly, of supporting the heavenly bodies—sun, moon, and stars (Gen. i. 15). According to the Christian fathers who commented on Genesis, as late at least as the Venerable Bede (8th c.), the earth was a flat plain skirted by mountains, on which the F. was supported like a dome, or stretched like a skin. In short, the fixity of the F. was necessarily combined with the flatness of the earth, a belief in which prevailed till the end of the 15th c., when the attempt of Columbus to prove its rotundity was condemned as irreligious by the Council of Salamanca. See Draper's *Conflict between Religion and Science*.

Fir'man (Pers. *ferman*, 'a command'), the official mandate of an Oriental sovereign, and especially of the Ottoman Porte. It also signifies the passport given to a traveller in the Turkish empire, and in India denotes a certificate giving permission to trade.

Firmilian, St., a bishop of Cæsarea, who successfully opposed the Novatian doctrines and joined St. Cyprian in opposition to Pope Stephen on the question of re-baptizing heretics. An intimate friend of Origen, he was distinguished among the Christian fathers for his exemplary piety. St. F. was president of the Council at Antioch, before which Paul of Samosata was tried. Died A.D. 269.

Firminy, a town in the department of Loire, France, 39 miles S.W. of Lyon by railway. It is surrounded by extensive coal-mines and stone-quarries. Pop. of commune 14,511.

Firola, a genus of Gasteropodous Molluscs belonging to the aberrant group *Heteropoda* or *Nudibranchiata*, in which the 'foot' of other *Gasteropoda* is modified to a flattened fin-like organ, used for swimming, the animals generally moving back-downwards through the water. The shell, at most rudimentary in the *Heteropoda*, is wanting in F. The genus gives the name to the family *Firolidæ*, in which a large body exists, and locomotion is performed by the modified foot, and by a tail-fin in addition. The body in F. is 4 or 5 inches long.

First'-Born. By the common instincts of human nature, which prompt parents to give their affection most fully to their F.-B., pre-eminent importance and privileges have always been granted to the eldest son in a family. According to the laws of most nations he succeeded to the official position and authority of his father, and for the same reason, as well as to enable him to sustain that dignity, received a larger share than his brothers of his father's wealth. According to the Mosaic law he inherited 'a double portion,' *i.e.*, twice as much as any of the other sons (Deut. xxi. 15-17). With the Hebrews, also, a special sanctity attached to the F.-B. both of man and beast, as devoted to the Lord in commemoration of the F.-B. of the Israelities being spared when those of the Egyptians were cut off. (See PASSOVER.) Of the animals, the clean (see Lev. xi.), if free from blemish, were offered in sacrifice (Deut. xv. 21); the unclean, not being fit for sacrifice, were to be put to death, to be sold, and the price given to the priest, or to be redeemed by the owner with a lamb or with six-fifths of its value (Exod. xiii. 13; Lev. xxvii. 11-13, 27). The F.-B. of man were all devoted to the Lord to be priests; but as they were superseded in this office by the Levites (q.v.), it was ordained that the F.-B. of the other tribes should be redeemed (Num. iii. 11-13, 40-46, xviii. 15). This, however, was not the case in some Indian dynasties, where it was the custom for one degree to be used up before the descendant inherited; thus the next younger brother succeeded the deceased, and so on till the stock of brothers was exhausted, when a son of the original king became the ruler. Artists and writers have usually adopted the Jewish system in depicting or describing the last of ten plagues in Egypt, but there would appear to be as much presumptive evidence in favour of the theory that the children were female as against it. The position of the female in Egypt at that time was equal, if not superior, to that of the male; at all events in so far as property and its descent were concerned.

First-Born, Law Regarding. See PRIMOGENITURE, HEIR, SUCCESSION.

First-Fruits. It was a common practice in ancient times to make an offering to the gods of the first of the fruits of the ground that were ripe, as an acknowledgment of their bounty in the past, and to procure from them good crops in the future. Such offerings were made by the Egyptians to Isis, by the Greeks to Demeter, Apollo, and Diana, and by the Romans to Ceres and Bacchus. Among the Hebrews, too, it was appointed by the Mosaic law not only that the first of all the produce of the ground should be offered to Jehovah, but also the first-born both of man and beast (Exod. xxii. 29, 30; Deut. xxvi. 2-11). (See FIRST-BORN.) Special occasions for the offering of F.-F. were—(1) At the Feast of the Passover, when the first sheaf of the harvest was brought to the priest, and by him waved before the Lord (Lev. xxiii. 5-12; (2) at the Feast of Pentecost, when a similar offering was made of two loaves of bread made from the new flour (Lev. xxiii. 15-17). Besides these public or national offerings, private offerings were to be made of the first-thrashed grain, of a cake of the first-ground meal (Num. xv. 17-21), of the best of the wine and the oil (Num. xviii. 12, 13), and in short, 'of all the fruit of the earth' (Deut. xxvi. 2). All these offerings fell to the priests, as part of their living (Deut. xviii. 3-5). The amount to be given as F.-F. was not fixed by the Levitical law; in the Mishna the minimum was fixed at one-sixtieth.

In the Christian Church the practice of dedicating F.-F. to God for the support of his servants was observed from an early period. At first the fathers represented the practice merely as becoming and expedient; but as the notion grew that the clergy had succeeded to the position and privileges of the Levites, the Levitical law on this matter was represented as binding on Christians, for which conclusive proof was found in Mal. iii. Full details on the subject are given in the *Apostolic Canons* and *Constitutions*. A species of F.-F. was latterly exacted from the clergy themselves by the popes. (See ANNATES.) And in England, after the Reformation, the first year's profits of a benefice was made over to the Crown by statute 26 Hen. VIII. c. 3, and later on to the Church for the benefit of the holders of poor livings by statute 2 & 3 Anne c. 11. Smith's *Dict. of Christ. Antiquities*.

Firth or **Frith** (Dan. and Norw. *fjord*, Sw. *fjärd*), an arm of the sea or the estuary of a river—a word in common use in Scotland, as the Moray F., the Firths of Clyde, Forth, Tay, &c.

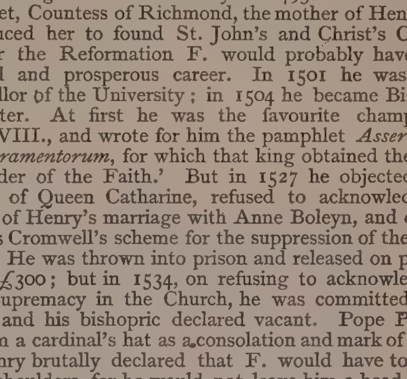
Fisc (Lat. *fiscus*, a 'money wicker-basket'), a name given to the treasure which belonged to the Roman Emperors. This was not the treasure, which belonged to the state, was vested in the senate, and was called *ærarium;* nor was it the *personal property* belonging to the Emperor. During the later empire the distinction disappeared and the imperial treasury embraced both *ærarium* and *fiscus*, and was known by either name. The F., according to the civil law, became in modern Europe the property of the state, and as it was yearly increased by *fines* paid by persons convicted of crime, such fines came to be called *confiscations*.

Fischart', Johann, a German satirist, was born at Mentz or Strasburg between 1545-50, studied law at Basel, visited England, lived as an advocate at Speier and as a bailiff at Forbach, where he died in 1589. F. was a man of considerable learning and great comic genius. He replied to the abusive attacks on Luther, which were common in his time, by fierce and telling satires and burlesques, full of rich, gross Aristophanic humour, and showing a marvellous command of language. Among his works are *Geschichtklitterung der Thaten der Helden Gargantua und Pantagruel* (1575), partly translated, partly imitated, from Rabelais; and *Psalmen und geistliche Lieder* (1576), which contain many fine sacred poems.

Fish, or **Fish-Plate,** a piece of wood or metal used in joining together the abutting ends of two members of a structure. The most familiar *fished joint* is that employed almost universally for connecting rails. Here the ends of the rails are made almost to touch, a F.-P. 15 to 18 inches long is placed upon each side of them, and the whole secured by two or three bolts through each rail. The importance of a sufficiently rigid rail-fastening is very great, not only on account of the increased comfort which it gives to travellers, owing to the smoothness of motion which it secures, but also because it greatly lessens the wear and tear of the rolling stock. Engineers have given much attention to the form and proportions of fish-plates and joints with the view of finding out the best possible arrangement, and many patents have been taken out in connection with them. Fished joints are used also for timber ties and beams, for strengthening spring spars, and many other purposes.

Fish'er, John, Bishop of Rochester, was born at Beverley in Yorkshire about 1459, and after a distinguished college career at Cambridge, became Master of Michael House College in that university in 1495. As confessor to Margaret, Countess of Richmond, the mother of Henry VII., he induced her to found St. John's and Christ's Colleges. But for the Reformation F. would probably have had a peaceful and prosperous career. In 1501 he was chosen Chancellor of the University; in 1504 he became Bishop of Rochester. At first he was the favourite champion of Henry VIII., and wrote for him the pamphlet *Assertio Septem Sacramentorum*, for which that king obtained the title of 'Defender of the Faith.' But in 1527 he objected to the divorce of Queen Catharine, refused to acknowledge the legality of Henry's marriage with Anne Boleyn, and opposed Thomas Cromwell's scheme for the suppression of the monasteries. He was thrown into prison and released on paying a fine of £300; but in 1534, on refusing to acknowledge the king's supremacy in the Church, he was committed to the Tower, and his bishopric declared vacant. Pope Paul III. sent him a cardinal's hat as a consolation and mark of respect, but Henry brutally declared that F. would have to wear it on his shoulders, for he would not leave him a head. After a short trial for treason, the old man was beheaded 22nd June, 1535. A biography of F., who was a writer of Scriptural commentaries, sermons, and controversial pamphlets, has been written by Lewis.

Fisher, The, a kind of marten, a member of the digitigrada (toe-walkers), mammalian order of the Carnivora, which occurs in N. America. From the tip of its tail to the end of its snout it measures about $3\frac{1}{2}$ feet. It somewhat resembles a fox in shape; its colour is black with grey points. It lives in trees, is nearly as agile as the squirrel, is extremely fierce and strong, and therefore difficult to catch. The origin of its name is uncertain, for it does not feed on fish but on hares, squirrels, mice, and birds.



Fisher.

Fish'eries. Under this term are generally included all the industries connected with procuring the creatures which inhabit either fresh or salt water, many of which have no connection with fish in their zoological relations. Thus the term includes the obtaining of such diverse animals and products as sponge, coral, pearl, shell-fish (including those valuable for their shells, as well as those sought for human food or as bait for other inhabitants of the sea), the crustaceans, as shrimps, crabs, and lobsters; and in the higher scale of animal life it is held to comprehend the capture of turtles, whales, seals, and their congeners. The only relation which these creatures bear to fish is the fact that they in common occupy the sea, and thus by F. are meant all animal products of the sea of whatever class. Here, however, will be noticed only the great industries for securing fish for human food from both salt and fresh water.

There is no way by which any approximately accurate estimate may be formed of the enormous value of the products annually drawn from the sea. Judging, however, by reliable statistics obtained for very limited areas, the wealth annually derived from the sea must be very great; and when the great extent of seaboard altogether neglected or only imperfectly fished is taken into account, there cannot be any doubt that F. are capable of indefinite expansion without crippling the productive resources of the sea. It is only in the case of a few minor creatures—noticeably the oyster, lobster and crab on British coasts—that overfishing, or rather indiscriminate and wasteful habits of fishing, has resulted in any decline of productiveness, such as to call for legislative interference.

Fresh-Water Fisheries.—The one fresh-water fish of paramount economic importance is the salmon, the F. of which in many Scottish rivers, particularly the Tay, are of very great value to their proprietors. While salmon fishing is the most prominent fresh-water industry, it is also highly esteemed for sport. It is prosecuted with draw nets, or in certain positions with stake nets; and by sportsmen the fish is taken with fly-hooks. The rivers of Northern Europe and America abound in salmon, and the produce of the American rivers now appears largely in commerce as 'tinned' salmon. The trout and other species of the salmon kind come next to the salmon in importance as fresh-water fish. After these may be reckoned the eel, pike, and perch; and in Russia, various species of sturgeon, obtained from the Volga and other rivers, are sources of valuable food delicacies, as well as of isinglass. It may here be stated that there is now a close season for all freshwater fish which has been provided under the Freshwater Fisheries Act of 1878 (United Kingdom).

Sea Fisheries are of much greater economic importance than fresh-water F. They are prosecuted in a variety of ways, the chief of which are:—(1) Trawling, (2) drift-net fishing, (3) line fishing, (4) sean fishing, (5) bag-net fishing, (6) kettle nets and weirs, and (7) trammel or set nets. (1) Trawling is performed with a triangular bag which has an arrangement for keeping its mouth open. The apparatus is called a trawl, and it is drawn along the bottom of the water. It is much employed by English fishers for catching haddocks, soles, turbots, plaice, and flat fish generally. (2) Drift nets are long nets having a definite size of mesh, and they are shot from boats and allowed to depend perpendicularly in the water, the upper side being kept at the surface by cork floats. They are used chiefly for the herring, pilchard, and mackerel fishing, the shoals of which, meeting these barriers in their course, attempt to push through them and so get entangled by their gills in the meshes of the nets. It is essential for the success of this style of fishing that it be conducted at night. (3) Line fishing is of two kinds—long-line fishing, in which many hooks are attached to a long central line, and baited for catching cod, ling, halibut, and haddocks; and short or hand line fishing, in which only a single hook is employed for the capture of cod. (4) The sean or sweep net is a long length of netting which is used for enclosing and sweeping a certain area of water in much the same way as in salmon fishing. It is employed for catching herrings, sprats, pilchard, mackerel, and various small fishes. (5) Bag nets are large open-mouthed bags like great trawls, used for sprat and whitebait catching, &c. (6) Kettle nets and weirs are structures placed along the coast between high and low water with the view of entrapping fish which may enter with the flowing tide, and which are secured when the water recedes. (7) Trammel nets are like drift nets in their action, but are fixed between stakes or other stays. The Cornish trammel consists of three nets set parallel to each other, the two outer having wide meshes, while that in the centre is fine in the mesh. The fish, passing through the outer net, pushes against the central net, forcing part of it through a mesh of the opposite outer net, thus forming a bag or pocket in which it is itself securely fastened.

Of all sea F. none equals in importance, extent, and value (except haddock) the herring fishery. It is most extensively cultivated along the N. and E. coasts of Scotland, the principal stations being Fraserburg, Peterhead, Wick, and Stornoway. The quantity of herrings taken annually on the Scottish coasts alone is prodigious, and there is good reason to conclude that the number taken by fishermen is but a fraction of what is destroyed by cod, dog-fish, sea-birds, and other natural enemies of the herring. Notwithstanding all these causes, there is not the slightest appearance of any decrease in the productiveness of the herring fishery, but quite the opposite. From returns which have been made by the Board of Trade it appears that of the 14,046,213 cwts. of fish returned as *landed* on the coasts of the United Kingdom during 1894, 5,869,312 were of herrings, 3,014,026 were of haddock, 104,737 were of soles, and 86,515 were of turbot; besides these, 29½ millions of oysters, 7¼ millions of crabs, and 1⅔ millions of lobsters were brought to shore. Haddock seem to have been the most valuable catch, as it is estimated at £1,503,978; herrings come next with £1,224,762; and soles, mackerel, and turbot, with £582,369, £478,148, and £313,080 respectively. One portion of the tables (1894) is very significant and it is that which points out the value of the fish landed in Ireland (£274,039) as compared with the value of that landed in England and Wales (£5,291,476) and in Scotland (£1,634,816). In 1893, it would appear, 6802 boats were registered and employed in England and Wales; 10,292 in Scotland, and 6515 in Ireland; and in the same year 42,694 men and boys were employed in the English and Welsh boats; 50,266 in the Scotch; and 27,829 in the Irish. On comparing the returns for 1889 and 1893, there is in 1893 a decrease of 683 in the number of English and Welsh boats; 647 in that of the Scotch, and an increase of 571 in that of the Irish; and there is a decrease of 779 in the number of men and boys employed in the English and Welsh boats; but, strange to say, there is an increase of 422 in the number employed in the Scotch boats. Of course, in the Irish boats we find more persons employed in 1893 than in 1889, viz., 3640, which is certainly a very encouraging circumstance as there is also an increase in the number of boats. We will now append a series of tables showing the quantity and value of the fish imported into and exported from the United Kingdom in 1894, and setting forth the comparative consumption of fish in this country during the years 1889 and 1894.

FISH IMPORTED INTO THE UNITED KINGDOM IN 1894.

Herrings, from	Cwts.	Value £.
Sweden	722,063	75,572
Norway	222,447	38,369
Other foreign countries	11,817	2,438
Total	956,327	116,379
Shell fish, from		
Norway	1906	4260
Holland	114,355	60,417
France	49,967	93,538
U.S. of America	156,632	107,441
Other foreign countries	1,502	2,155
Total from foreign countries	324,362	267,811
Total from British possessions (West Indies)	3456	11,148
Total	327,818	278,959

	Cwts.	Value £.
Other fresh fish, from		
Foreign countries (Sweden, Norway, Denmark, Germany, Holland, Belgium, France, Italy, U.S. of America)	241,084	381,888
British possessions	388	1,011
Total	241,472	382,899
Cured or salted,		
Sardines from foreign countries (France, Portugal, Spain, &c.)	104,165	339,762
British possessions (Madras, &c.)	951	2,066
Total	105,116	341,828
Other kinds from foreign countries (Sweden, Norway, Denmark, Germany, Holland, Belgium, France, Spain, Italy, U.S. of America, &c.)	577,711	763,688
Other kinds from British possessions (S. Africa, N. America, W. Indies, &c.)	347,533	763,327
Total	925,244	1,527,015

FISH EXPORTED FROM UNITED KINGDOM IN 1894.

Herrings, fresh and cured, to	Barrels.	Value £.
Foreign countries (Russia, Denmark, Germany, Holland, Belgium, Italy, Austria, Greece, Turkey, Egypt, U.S. of America, &c.)	1,377,213	1,444,786
British possessions (Malta, Australasia, &c.)	9,297	11,460
Total	1,386,510	1,456,246

Sardines, British cured, to	Cwts.	Value £.
Foreign countries	2	7
British possessions	27	76
Total	29	83

Salmon, to		
Foreign countries (France, Belgium, &c.)	2,952	18,601
British possessions	3	20
Total	2,955	18,621

Pilchards (*fresh and cured*), to	Hhds.	Value £.
Foreign countries (Italy, U.S. of America)	19,971	54,543
Channel Islands	441	1,800
Total	20,412	56,343

Other kinds, to	
Foreign countries	428,737
British possessions	93,149
Total	521,886

In the return issued by the Board of Trade and dated 15th February, 1895, we find the following tables:—

Total imported fish (1890) £2,811,455; (1894) £2,647,091.
Total exported fish (1890) £1,795,267; (1894) £2,054,047.

Herrings (1890), £1,284,946; (1894) £1,459,569.

	1889	1894
Fish, the produce of the United Kingdom fisheries (not salmon)	£6,020,000	£7,200,331
Fish, imported from abroad and retained for consumption	£2,112,000	£2,171,000
Total	£8,132,000	£9,371,331
Deduct.—Fish, exported produce of the United Kingdom fisheries	£1,767,000	£2,054,000
Total value of fish consumed in the United Kingdom	£6,365,000	£7,317,331

We also find set forth in the returns the annual value of the sea fisheries of certain countries, which we may compare with that of our own: Norway (1893) £1,312,000; France (1893) £4,582,000; Canada (1893) £4,310,000, of which Nova Scotia is credited with £1,335,000; United Kingdom (1894), £7,200,331. In the same report are stated the values of fish landed during each month in the years 1892, 1893, and 1894. It would appear that November and April were the most remunerative periods in 1892, and February the least; in September and October, 1893, the most valuable catches of fish were landed, and in January the poorest; and May and November, in 1894, turned out to be the best fishing months, and February the worst. We may therefore conclude from this that fishing in January and February is the least paying to those concerned in the actual catching of the fish, though very probably the salesmen make more money during those months than at any other time of the year.

Fisheries Exhibitions, in which all articles relating to fish and fisheries are exhibited, were originated at Norwich, England, in 1880; followed by one in Edinburgh in 1881, and by a great international one held in London in 1883, to which the United States and other countries contributed funds and exhibits. All were eminently successful.

Fishery, Free, is in England an exclusive right of fishing in a public stream. It is a royal franchise, and must be at least as old as the reign of Henry II., to grant the right being expressly prohibited by Magna Charta.

Fish'es, the lowest group of Vertebrate animals, are adapted for locomotion in water by being provided with gills for breathing, during the whole of life; by the heart consisting of an auricle and a ventricle; by possessing cold blood, which is carried in an arterial condition from the gills to the body; by the body being usually covered with scales; by the limbs being developed in the form of fins; and by the embryo possessing neither an Amnion nor an Allantois. The *form* of F. is that best adapted for easy locomotion in water. In the great majority of cases the body is pointed at each end, and flattened somewhat from side to side, whilst it is also rounded on the sides. In some F. it is apparently flattened above and below—as in the flounder, plaice, and other 'flat-F.' But in these cases, the body is greatly flattened *from side to side*, the two eyes being, through a peculiarity in development, brought round to one side of the head. The skates, rays, &c., are more truly *flat-F.* than the flounders, &c., since their dorsal or back surface really appears to be flattened, owing chiefly to the great enlargement of the pectoral or breast fins. The bodies of most F. are scaly. In some cases (such as the eels), where scales are either very small or altogether wanting, the body is generally covered with a *mucous* secretion, serving to protect it from the action of the water. The scales of F. may be *cycloid*, as in herrings, salmon, &c.; *placoid*, as in skates and sharks; *ctenoid*, as in perches, &c.; or *ganoid*, as in the sturgeons, bony pikes, &c. This last form of scale is most common in Fossil F. Along the sides of most F. a line named the *lateral line* may be perceived. This line was formerly believed to be connected with the production of the mucous secretion which protected the body or scales, but it is now ascertained to be connected with the exercise of the sense of *touch*, since the terminations of nerves have been traced to a connection with this line; and the acts of many F. in rubbing the sides of their bodies against foreign objects seem to lend support to this latter belief. The *endoskeleton* of F. may be of very varied nature. Thus in the lowest fish of all, the *Amphioxus* or lancelet, there is no skeleton to speak of, this structure being represented by a soft cellular rod, the *Notochord* (q.v.), or *chordo dorsalis*, which represents the immature and imperfectly-developed spine. In other F., such as sharks, skates, rays, the skeleton is imperfectly ossified, and is composed of *cartilage;* whilst in the great majority, including the familiar food-F., it is of bony nature. The spine of F. (save in one instance, that of the bony pike or *Lepidosteus*) is composed of vertebræ, hollow at either end, and hence named *amphicœlous*. When two vertebræ are opposed, a cavity is formed by the opposition of the vertebral bodies; and this cavity forms a kind of universal joint, permitting the freest possible motion and movement of the spine in swimming. In the bony pike the vertebræ are *opisthocœlous*, that is, hollow behind and convex in front. The spine exhibits a division into two regions only—an *abdominal* and a *caudal* region, no distinct cervical, dorsal, or lumbar portions being recognisable. The vertebræ of the abdomen possess an upper or neural canal, neural spines, and two transverse processes, to which latter the ribs are attached. The caudal or tail vertebræ have an inferior or hæmal arch, but no distinct transverse processes. The ribs are not attached below to a sternum or breastbone, but simply embedded in the muscles. The *interspinous bones* of F. are dagger-shaped bones which exist in the middle line of the body, and are attached below to the spines of the vertebræ; above they support the rays of the dorsal and hind fins. The *fins* of F. may be divided into two groups. The *pectoral* and *ventral* fins are paired, and represent the fore and hind limbs of other vertebrates respectively. The other fins are single or median, and are placed in the middle line of the body. Those on the back are the *dorsal* fins; the hind fin is placed near the *vent* in the lower aspect of the body, and the *caudal* or *tail-fin* is the chief agent in locomotion. The fins are supported by bony rays or spines, and by soft rays. The *caudal* fin of F. is always set vertically, and works from side to side, the tail-fin of the whales and Sirenia amongst mammals being placed horizontally. The *digestive system* of F. comprehends a mouth, usually provided with numerous teeth, which are replaced when lost or injured, and which are not set in sockets, but attached by a ligament to the bones of the mouth. The stomach is large, and provided at its hinder extremity with a number of blind sacs or appendages, varying from one to sixty or more in number, named *pyloric cœca*, which are supposed to represent *pancreas* or sweetbread. The intestine is shut as a rule, and is often provided with a spiral coil, serving to increase its digestive area. The liver is usually large and oily. The *kidneys* are also large. The blood of F. is cold, and contains nucleated blood corpuscles. It is of red colour in all save the lancelet. The heart is two-chambered, and consists of an *auricle*, which receives the venous blood from the body, and of a *ventricle* which propels it to the *gills* or *branchiæ* for purification. In many F. a third chamber of the heart is formed by the dilatation of the great blood vessels of the gills, this dilatation being named the *bulbus arteriosus*. In some F. (*e.g.*, sharks, &c.) this latter structure contracts in a rhythmical manner. The *gills* or breathing organs of F. consist of comb-like structures borne on branchial or gill arches, and composed of delicate filaments in which the blood is exposed to the aërating influences of the external water. In the sharks, rays, &c., the gills exist in the form of pouch-like cavities. The water for aëration is admitted by the mouth, and after passing over the gills and yielding up its oxygen, is ejected from the gill-chambers at the sides of the mouth, behind the *operculum* or gill-cover, or in the sharks, &c., by special apertures. The *air* or *swimming bladder* of F. (see AIR-BLADDER), or *sound*, as it is also called, is used for altering the specific gravity of these animals, and thus enabling them to rise or sink in the water. The *nervous system*, comprising a brain, spinal cord, and nerves, is distinct in all F. save the Lancelet (q.v.). The senses comprise large eyes, internal *ears*, touch (performed by the lateral line), and smell. The nostrils of all F., except the hag-F. (*Myxine*) and the *Lepidosirens* or mud-F., are simple closed or pocket-like sacs. F. are *oviparous* animals, producing eggs from ovaries, the young being afterwards hatched. But in some cases (skate, dog-F., &c.) the eggs may be enclosed in special cases or capsules, and in sharks there would appear to be an intimate connection between the parent and young, reminding one of the *placental* connection of *Mammalia*. As in all *Vertebrata*, the sexes are distinct. The *habits* of F. differ very widely. Migration is not uncommon with many, although the nature of the migratory movements is less susceptible of determination than in the case of land animals. An idea of the *classification of F.*, according to modern zoology, may be formed from the following table:—

Order.	Example.
1. *Pharyngobranchii* (pharynx-breathers).	The amphioxus or lancelet.
2. *Marsipobranchii* (pouch-gilled breathers).	Lampreys and hag-F.
3. *Teleostei* (F. with bony skeletons).	Cod, salmon, herrings, and all familiar F.
4. *Elasmobranchii* (plate-gilled breathers).	Sharks, rays, dog-F., &c.
5. *Ganoidei* (F. with ganoid scales).	Sturgeon, bony-pike, &c., and many fossil F.
6. *Dipnoi* (F. breathing by gills and rudimentary lungs).	Lepidosirens or mud-F.

(By the majority of naturalists the *Dipnoi* are classified as a sub-division of the *Ganoidei*, this arrangement reducing the orders of F. to five in number.)

Fossil F.—The first traces of F. which appear in the rock formations occur in the Upper Silurian strata, these traces, consisting of the fin-spines and placoid scales, belonging to F. most nearly allied to the *Elasmobranchii*. In the Devonian or Old Red Sandstone rocks, fish remains are so plentiful that this epoch has been named the 'Age of F.' The Devonian fossil F. belong chiefly to the Ganoid order. The Teleostean or true bony F. do not make their appearance until the Cretaceous epoch at the close of the Mesozoic period; and three groups of F. (*Marsipobranchii*, *Pharyngobranchii*, and *Dipnoi*) have, as far as is yet known, left no traces of their existence in any rock formation.

Law Regarding F.—They become the property of him who catches them except royal fish. (See FISHES, ROYAL.) Though it requires a royal grant to entitle a man to fish for salmon, yet the salmon when taken by a man who has no grant belong to himself. Statute 24 & 25 Vict. c. 96 imposes penalties on persons taking fish without permission from water which is private property. Persons found angling against the provisions of the Act, which does not extend to Scotland, may be required by the owner or his servant to deliver up their fishing implements. On refusal these may be forcibly seized. But if the implements are taken, there is no further penalty or damage. To destroy the dam of any fish-pond which is private property, with intent to destroy the fish, or to put lime or other noxious material into it with the same intent, is a misdemeanour and renders the offender liable to penal servitude for 3-7 years, or to imprisonment for 2 years, &c.

Fishes, Royal, are those which by common law belong to the Crown, being the whale and the sturgeon when thrown ashore or caught near the coast. The law is a little obscure, however, and is modified or altered by local custom.

Fish Hawk, a genus of the *Falconidæ*, has a short bill with a sharp hooked tip, short strong tarsi, long toes, and wings extending to the tail. It is heavier than the eagle and much slower on the wing, and occurs in temperate regions. The head and under parts are white; the upper parts being of amber brown, and the bill and claws of a blackish blue. It is gregarious and, though sometimes found at a great distance from the land, usually frequents lakes, rivers, and estuaries near the sea. No bird exhibits a greater dexterity in catching fish, which is its chief food, and with such velocity does it pounce upon its prey that it often becomes totally submerged and is sometimes drowned owing to the superior weight of the fish in which its claws and beak have become embedded.

The eggs, of a whitish yellow spotted with brown, are three or four in number. Its nature would appear to be timid, and more gentle than that of the other Falconidæ.

American Fish-Hawk.

Fish-Hooks are made by a series of hand processes. The steel wire is first cut into lengths, and then slit with a lever knife near one end to form the barb. Each length, after being filed round the point and barb, is bent to the hook form by means of an instrument with a suitable core and pin. The end of the shank is then hammered flat to enable the hook to be secured to the line. The hook is next hardened, made stiff and elastic by tempering, and finished by blueing. F.-H. are sometimes swivelled at the head to prevent the twisting of the line. Redditch, in Worcestershire, is the great place for the manufacture of F.-H., though Limerick, at one time, was notable for its F.-H. In the former place so many as four millions are said to be made every week. In the United States they are made extensively by Crosby's automatic machine, which, it is said, is capable of turning out 6000 highly-finished F.-H. every hour.

Fish'ing-Tac'kle. See ANGLING.

Fish-Lice, or **Sea-Lice,** a name given to several genera and species of lower Crustaceans, from their parasitic habits. They attach themselves to the skin, gills, and other parts of fishes and other aquatic animals. One of the best-known forms is *Cymothöe æstrum*, which adheres to fishes by means of its hooked legs and suctorial mouth. Other genera are *Achtheres*, of which *A. percarum* of the perch is a good example; *Argulus*, of which *A. foliaceus*, common on fresh-water fishes, is a familiar species; and *Caligulus*, species of which are common on marine fishes. These fish-lice belong to the Crustacean orders *Rhizocephala* and *Ichthyophthira*. In their development they pass through a metamorphosis, appearing at first as lively free-swimming bodies, but eventually losing their limbs, &c., settle down to a parasitic life.

Fish'ponds. See PISCICULTURE.

Fish-Skin Disease, or **Ichthyo'sis Ve'ra,** is a disease of the epidermis characterized by a general dryness and roughness of the skin, modified in appearance in different regions of the body. The defective nutrition of the texture of the skin is most apparent in the limbs, particularly the arms, and there is a marked deficiency of subcutaneous adipose tissue. When the skin is hard, it may be moved about on the subcutaneous fascia as if there were no binding tissue between the under surface of the corium and the structures beneath; and it remains stiff like leather, apparently depending upon the lines of motion for its power of adaptation to the movements of the joints. The skin of the face may be perfectly normal, while that of the hands and arms may be dry and wrinkled, like the withered limbs of old age. Treatment:—General hygienic measures, nutritive diet with cod-liver oil; arseniate of soda, or Fowler's solution; Donovan's solution; locally, frictions and inunctions, bathing, &c. The disease is of a very obstinate nature, and its cure is difficult and seldom complete. See *Diseases of the Skin* by Erasmus Wilson, T. Macall Anderson, and by Tilbury Fox.

Fissip'arous, a term used to describe reproduction by a process of division. It is well seen in the reproduction of many of the lower forms of animal and plant life, and it also probably takes place in the human body in the formation of colourless blood cells, pus corpuscles, modified epidermic cells, &c.

Fissiros'tres (Lat. 'split-beaked'), a sub-order of the order *Insessores* (q.v.) or Perching birds, distinguished by the so-called 'cleft' nature of the beak; the 'gape' or mouth-opening being very wide, prolonged far back on the head, and pointed with bristles, of service to these birds in the capture of insect prey. The beak itself is short. Typical examples are the swallows, the swifts, and the goat-suckers.

Fissurell'idæ, a family of Gasteropodous Molluscs including the forms popularly known as 'keyhole limpets.' The shells of these forms have an opening at the apex, which has suggested the popular name. The family belongs to the Holostomatous group of the Prosobranchiate Gasteropods. The shell is conical, and its aperture is subservient to the respiration or breathing of these forms. *Fissurella maxima* is a familiar species, and the family also includes the genera *Emarginula* and *Parmophorus*.

Fis'tula (Lat. 'a pipe'), or **Sin'us** (Lat. 'a winding'), a narrow passage, the walls of which are always indurated, consisting of a layer of imperfectly-formed granulations discharging ichorous pus. The passage, which is often long and winding, has an external orifice somewhat protuberant, situated under or in the midst of granulations. F. is, therefore, a chronic abscess without disposition to close. The causes of this non-closure may be—(1) the presence of some foreign body, such as a piece of dead bone; (2) the passage of irritating secretions; and (3) the contraction of neighbouring muscles preventing the coalescence of the sides of the abscess. The treatment of F. must have reference to its cause, and the foreign body or irritating substance must be removed. In recent cases a cure may be effected by pressure; or a healthy inflammation may be excited by injecting the F. with tincture of iodine; by means of a seton; by actual cautery, or by galvanic cautery. The treatment of F. should always be intrusted to a skilful surgeon, and in such a case a complete cure may be effected in even the most distressing cases.

Fistular'idæ, a group of Teleostean fishes, which from the prolongation of the jaws have been named 'pipe fishes,' 'tobacco-pipe fishes,' 'bellows fishes,' and the like. The genera *Centriscus* and *Fistularia* are illustrative of this group, which is distinguished by the elongated body, by the tube-like jaws and small mouth, by the scaly body, and by the ventral fins being placed on the abdomen and possessing six spines. The true pipe-fishes or *Syngnathidæ* belong to a different group, that of the *Lophobranchii*.

Fistuli'na, a genus of fungi related to Boletus (q.v.), and represented by the British species *F. hepatica*, found growing on oaks, beeches, chestnuts, and walnut trees. The specific name *hepatica* is derived from the appearance of these fungi when old; the surface becoming brown, and not unlike the liver in outward aspect. The colour is red, and the fungus may attain a size of 5 feet in circumference, and a weight of 7 or 8 lbs. Berkeley gives an instance of one which weighed 30 lbs. The F. is an esculent, and is eaten on the Continent.

Fitch'y, or **Fitché,** in heraldry, pointed at the end; *e.g., a cross fitchée* is a cross with one end sharply pointed.

Fits, a term popularly applied to any sudden seizure of disease, more particularly to those implying loss of consciousness or a change in the condition of the mind, such as apoplexy, convulsions, epilepsy, &c.

Fitz (Fr. *fils*, Old Fr. *fiz*, from Lat. *filius*, 'a son'), a prefix denoting at first merely descent, and afterwards applied to illegitimate sons of kings and princes of the blood—as *Fitzroy*, 'son of the king.'

Fitz-Gerald, Edward, Lord, a younger son of the Duke of Leinster. He lived in France from 1773 to 1779, then joined the British army, and distinguished himself at the battle of Charleston, S. Carolina (1781). Returning to Ireland in 1784 he was elected to the Irish parliament and became a determined opponent of the government. In 1788 he served again in the army in America, and in 1791 went over to Paris to consult with the republicans. There he married Pamela, the supposed daughter of Madame de Genlis, and governess to the family of the Duke of Orleans; one of her pupils being Louis Philippe. In 1796 F. joined the *United Irishmen* and took a prominent part in arranging for the insurrection of 1798. The plot was divulged before the time of the rising became due, and on certain officers attempting to arrest F., the latter resisted desperately, was wounded, and died in prison in 1798.

Fitz'roy, a name of frequent occurrence in Australian topography, and derived from Sir Charles A. Fitzroy, who was governor of New South Wales from 1846 to 1855, and under whom the colony received the boon of responsible government. After him are named the following:—1. A city in Victoria, forming a suburb of Melbourne, but under distinct municipal government, and inhabited chiefly by the more well-to-do citizens. Pop. 32,453. 2. A county of New South Wales in the Clarence (N.E.) district. Pop. 2447. 3. A river in Queensland, which rises in the Peak Range, and after a tortuous course of 300 miles, falls into the S. Pacific at Port Curtis, in 23° 30′ S. lat., 151° 50′ E. long. The important town of Rockhampton (q.v.) is situated on the F., 35 miles from its mouth.

Fitz-roy, Robert, Vice-Admiral, an eminent English navigator and meteorologist, a son of General Lord Charles Fitz-roy, was born in 1805, entered the Royal Navy in 1819, and was captain of H.M.S. *Beagle* on its voyage around the world in 1831-36, in which expedition Charles Darwin took part. An account of the survey appeared in *Narrative of the Surveying Voyages of H.M.S. 'Adventure' and 'Beagle' between* 1826 *and* 1836, *&c.* (1839). From 1841 to 1843 he represented Durham, and from 1843 to 1846 served as governor of New Zealand. In 1855 he was appointed chief of the meteorological department of the Board of Trade, and died in 1865. F.'s method of storm-warnings was the commencement of a system which has become most valuable in saving life and property.

Fitz-Stephen, William, an eminent English monk and historian of the 12th c. He witnessed the assassination of Thomas à Becket, of whom he was an intimate friend. His most important work is the *Description of the City of London*, which is one of the earliest and most valuable descriptions of the capital. This was however, simply an introduction to his *Life and Passion of Archbishop Becket*. Both were written in Latin. He died about 1191.

Fi'ume ('the river,' formerly *St. Veit am Flaum*, from the Lat. *Fanum St. Viti ad flumen*; Illyrian *Reka*), a Hungarian town of Austria-Hungary, 40 miles S.E. of Trieste. It stands on the Adriatic, in a narrow and wild pass, where the Fiumara falls into the Adriatic. Rocky heights, on one of which is the old castle of Fersata, rise behind it, and before it the Channel of Quarnero is studded with green islands. The old town, straggling and gloomy, overhangs the new town, which has many handsome, spacious, and colonnaded streets. Among the finest buildings are the cathedral of St. Veit, the nunnery, gymnasium, and hospital. Near F. is a church much frequented by pilgrims. F. has manufactures of linen, wool, leather, paper, tobacco, earthenware, sugar, wax, rope, &c., and considerable shipbuilding. The harbour has been much improved, and is now one of the best in the Mediterranean; the trade is in a very flourishing condition and there is a considerable export of wine, flour, and barrel staves; the last-named are of a peculiar sort of oak wood which grows in the neighbourhood and may be split like slate. Area 8 sq. miles; pop. 30,337.

Five-Forks, a district in Dinwiddie county, Virginia, where the Federals, under General Sheridan, won a decisive victory over the Confederates, 1st April, 1865.

Five Points is a name given to the five articles of doctrine which the Arminians presented to the States of Holland (1611), as embodying their views on predestination and grace, on which alone at that time they differed from Calvinists. See ARMINIUS.

Fives, a game played by striking a ball with the hand against a high wall, so named because the number of points, fifteen or twenty-five, necessary to score a win is a multiple of five. The 'bounds' of the game are marked by one chalk line on the wall, a yard from the ground, and a second on the ground 10 feet from the wall. The players of each side engage the ball alternately, striking it either as it rebounds from the wall, or as it springs up from the ground. Missing the ball or striking it so that it falls within the 'bounds' counts one point for the opposing side. F. is an ancient game, and in England was formerly called 'hand tennis.' In 'bat-F.' the ball is struck with a bat in place of with the hand. This is a favourite game at many of our great public schools, and at Westminster School in particular, where the boys have for years sustained a high reputation as skilful players.

Fixed Air was the name given by Black, its discoverer, to carbonic acid gas. He so named it in consequence of the power possessed by certain substances (potash, lime, magnesia, &c.) of absorbing or *fixing* it.

Fixed Bodies are those which cannot be volatilised, nor which suffer change when they are exposed to a high temperature.

Fixed Oils are such as do not evaporate at ordinary temperatures, for example, the oils of olive, linseed, and rapeseed.

Fixed Stars. See STARS.

Fix'ing, the term applied in photography to the operation following development, and immediately preceding the exposure of the picture to diffused light. It consisted in depriving the picture of the salts surrounding the image, which were still sensitive to light, by means of hyposulphite of soda or cyanide of potassium solution.

Fix'tures. Whatever is fixed or united by means of rails, cement, &c., to the soil or outhouse or farmyard wall so as to become a part of it, will at the expiration of a lease belong to the lessor, but a tenant may remove anything which he has placed, and has not fixed, for the convenience of his trade, such as engines, counters, &c., provided he does it during his term, and has not made an agreement to the contrary. Under the Agricultural Holdings Act of 1883, the tenant obtains a property in any fencing, engine, machinery, building, &c., as to which he can get no compensation, provided he remove the fencing, &c., before, or reasonably soon after, the end of his tenancy. The landlord has the option of purchase. Also things placed as ornament and convenience may be removed by the tenant on quitting, such as, beds fastened to the walls or ceiling, cupboards fixed with holdfasts, grates, stoves, pier-glasses, window-blinds, fixed coppers, furnaces, and tables, wainscoting screwed to the walls, &c., provided he remove them during his tenancy.

Flabellum, a large fan of circular shape and made of peacock's feathers, which was used as a brush in Roman houses and in Eastern churches. Until the 14th c. it still formed part of the furniture of the Latin churches, and to this day is retained in certain ceremonies at which the Pope officiates.

Flacc'us, C. Valerius, a native of Padua, who is supposed to have died about A.D. 88, is now known only as the author of an unfinished epic poem in eight books on the Argonautic expedition. 'F. has attained to somewhat of the outward form, but to nothing of the inward spirit, of his great model the Æneid.' The *Argonautica* was translated into English verse by Nicholas Whyte (1565).

Flabellum.

Flag (lit. 'that which flies or flutters,' from Old Eng. *fleogan*, 'to fly'), a light cloth worked in a specific shape or pattern, and displayed in the field or on board ship as an emblem or signal. Under this designation are included the royal standard, the colours of regiments, and all ensigns, banners, and the signals used in the army for marking off ground to be occupied by troops, and in the navy for the transmission of messages from ship to ship. The great flag of Britain is the royal standard, bearing the arms of the United Kingdom, and hoisted only in the presence of the sovereign or a member of the royal family; the next is that of the Lord High Admiral—an anchor on a red field; and the third in importance is the Union Jack (q.v.), the national flag of Great Britain. The British ensign is a red F. with the Union Jack borne as a *canton*, or occupying the upper corner next the flagstaff. In the British navy the centre squadron, commanded by the admiral, carried red ensigns at the *main*; the van-squadron, commanded by the vice-admiral, carried white ensigns at the *fore*; and the rear squadron, commanded by the rear-admiral, carried blue ensigns at the *mizen* or sternmost mast. The broad pennant was the special flag of an admiral, but every man-of-war carried a pennant, the colour of which defined the squadron to which the ship belongs. In 1864 the use of distinguishing colours was abolished, and every man-of-war in commission in the royal navy is now required to carry a white ensign with a red St. George's cross, and the Union Jack in the upper canton. An admiral carries his flag at the main top-gallant mast-head, a vice-admiral at the fore top-gallant mast-head, and a rear-admiral at the mizen top-gallant mast-head. Ships belonging to any public office or in command of an officer of the Royal Naval Reserve carry the blue ensign and Union Jack; and other British ships, which have no right to any particular flag, carry the red ensign and Union Jack. By means of flags of easily-distinguished shape and colour, each of them representing letters or numbers signifying words or sentences, and to which there is an official key, vessels can communicate with freedom, certainty, and rapidity. Nelson's famous message at Trafalgar was communicated by means of F. signals, and so rapidly, that, in recognition of it, all the ships of the fleet were manned simultaneously. In 1855 a new system of signalling for the merchant service was adopted by a specially-appointed committee, by means of which, using eighteen flags and three pennants, 78,642 signals can be made, each consisting of not more than four flags at a hoist.

Flag-Captain, the captain who sails in the flag-ship—*i.e.*, the admiral's ship in any squadron—and who relieves the admiral of many of the ordinary duties of command.

Fla'gellants (Lat. *flagellantes*, 'the scourgers'), the name given to those mediæval fanatics who believed in the possibility of expiating sin by self-inflicted castigation. This practice was not a very early one in the Christian Church, flagellation being used at first solely as a punishment. About the 11th c., however, it began to be employed as a substitute for pecuniary penance, a year of penance being commuted into the payment of 26 silver *solidi* (£4) or the infliction of 3000 lashes. It is told of one famous hermit, St. Dominic of the Iron Cuirass, that he inflicted on himself in six days so many stripes that he discharged a century of penance (Fleury's *Eccles. Hist.*, vol. xiii.). Numerous penitents of both sexes adopted this mode of self-torment, and it is said to have been a special favourite among ladies of quality (Chais's *Lettres sur les Indulgences*, vol. ii.). The practice continued down to the end of the 13th c. as one of the ordinary forms of penitential observance, but at that period there broke out in Italy an endemic of superstition, due to a belief in the approaching end of the world, which took the shape of flagellantism, and rapidly spread all over Europe. The F. became a regular society; they marched with naked shoulders through the streets of the towns, each one holding a scourge of leathern thongs, with which he lashed his back till the blood ran. Men, women, and even children of tender years joined in these processions, and all classes were represented. Sometimes the throng was led by a priest; banners, crucifixes, and at night lighted tapers, were borne before them. At times they would stretch themselves on the earth in the form of a cross, and in this attitude undergo the severest discipline at each other's hands. The chief 13th c. outbreak of this fanaticism began at Perugia in 1260, and though promptly suppressed in Italy, showed itself in various districts of France and Austria. The F. next became prominent in the middle of the 14th c., when the dreaded plague called the Black Death evoked a universal religious frenzy. This outbreak was both wider spread and more extravagant than the former. It reached as far as England, appearing in London. A band numbering 120 exhibited their self-imposed tortures in the streets of the city, but do not appear to have succeeded in making any converts (Lingard's *Hist. of Eng.*, vol. iii.). The Church, however, was at this period forced to interfere, flagellantism having been elevated by its votaries into the position of a sacrament, as a 'baptism of blood.' Clement VII. anathematized the F.; but they were not suppressed until their frequently impure excesses had overrun Germany, the Low Countries, Sweden, and Switzerland (Baluze's *Vitæ Pontif. Avenion.*, vol. i.). The third and final outbreak of the mania took place in 1414 in Thuringia and Lower Saxony. Flagellantism here assumed its wildest phase, and became distinctly heretical, rejecting all practical religion, the sacraments, purgatory, prayer for the dead, &c. Salvation was to be secured by the scourge, and that alone. The leader of these fanatics was one Konrad Schmidt of Sangerhausen, who was burned in 1414 by Schönefeld the Inquisitor, along with many of his followers. Schmidt's 'Fifty Articles of the F.' were condemned by the Council of Constance (Von der Hardt's *Acta Concilii Constant.*, vol. i.), and the heresy was thus stamped out. Flagellantism, as an excess of religious revival, did not again appear; but the Romish Church to this day sanctions a discipline of self-castigation. See Mosheim's *Church History*, Hallam's *Middle Ages*, *Mysticism and the Mystics*, and Cooper's *Flagellation and the F.*

Flage'olet, an instrument with a mouthpiece like a whistle, and fingered like a flute. It is easy to play, and the quality of its tones is pleasant, but it does not possess sufficient individuality or richness to give it a place among orchestral instruments. The Harmonics (q.v.) of the violin and other stringed instruments have sometimes been called, very clumsily, F. tones.

Flag'-Lieutenant, the officer in a flag-ship who communicates the admiral's orders, either personally or by signal, to the ships in command, and performs generally such duties as an aide-de-camp is entrusted with in relation to a general.

Flag'-Officer, in the navy, is one who has the right to carry a flag at his mast-head denoting his rank—a privilege confined to admirals, vice-admirals, rear-admirals, and commodores, or captains in command.

Flag of the Prophet, the sacred flag (*Sanjak-Sherif*) of the Moslem, and the most highly-prized of the Mohammedan relics, is a black banner formed of the curtain that hung in front of the door of Ayesha, one of Mohammed's wives; was obtained by the followers of Omar at Damascus; and is preserved in a casket in the Seraglio, where it is guarded by emirs. It is never unfurled.

Flag'-Ship, the ship in which the admiral sails, and which carries the flag. From this ship, usually the largest in the squadron, orders are signalled to the other vessels.

Flag'stones are rocks of calcareous or argillaceous sandstones and limestones, which split easily into large flat slabs useful for paving. Those of Yorkshire and Caithness are well known for their hardness and durability.

Flahau'lt de la Billarderie, Auguste Charles Joseph, Comte de, a French soldier and diplomatist, was born at Paris, 21st April, 1785, became aide-de-camp to

Napoleon, distinguished himself in the Peninsular war and at Leipzig, was made a general and count, and fought at Waterloo. In 1817 he married a Scottish heiress, Margaret M. Elphinstone, who afterwards succeeded to the baronies of Keith and Nairn and became the Baroness Keith. In 1830 he recovered his position in the French army. He was ambassador at Vienna from 1841 to 1848, and at London in 1860. He was made Grand Chancellor of the Legion of Honour in 1864, and died at Paris, 2nd September, 1870.

Flam'borough Head (Old Eng. *Fleamburh*, so named probably from its *flame* or beacon), a headland on the Yorkshire coast, on the N.E. boundary of Bridlington Bay. It is formed by a line of chalk cliffs, rising to 450 feet, and runs for 6 miles into the sea. It has a lighthouse 214 feet high, and is crossed by an old British work known as Danes' Dyke.

Flamboy'ant, the latest and feeblest style of Gothic architecture in France. It is named from the flame-like forms of its characteristic traceries—intricate reticulations of delicate gauzy texture, woven of thin, wavy lines into meshes of every diversity of size. There is good and bad F., the latter being that in which ornament is allowed to impair construction. Even good F. is Gothic without magnificence or serenity, and its restless caprice is only redeemed by endless variety and floral grace. Ruskin says, 'The F. leaf-mouldings are beautiful, because they nestle and run up the hollows, and fill the angles, and clasp the shafts' in the manner of natural leaves. A feature of the style is the twining of twigs and stalks into pillars. When mouldings meet, they are apparently interlaced or run through each other. While the windows and doors are generally large and richly carved, the wall surfaces are comparatively bare. A mark of the most debased F. is the figure of the *fleur-de-lis* in tracery bars. F., which prevailed in the 15th and 16th centuries, is well represented in the cathedral of Chartres, the pediment of the west front of Rouen, the lantern of St. Ouen (Rouen), the central tower of Bayeux, and the buttresses of St. Gervais at Falaise.

Flame (Lat. *flamma*) is the luminous appearance accompanying the gradual combustion of inflammable substances in the air. Combustion is really an evolution of heat produced by a transformation of the energy of chemical affinity existing between the combustible and oxygen; and if the heat produced be sufficiently intense, part of it will take the higher form of light. The luminosity of a F. is generally supposed to depend upon the presence of solid particles, probably carbon, which glow under the action of the intense heat; and this theory is supported by the continuous spectrum which luminous flames give. In the common gas F. the presence of such particles is little doubtful. This is readily shown by the deposition of soot upon a cold body held in the F. It is now known, however, that gases under pressure give out a continuous spectrum; and experiments of Dr. Frankland have indicated that luminosity does not necessarily depend upon the presence of solid particles. Much of the luminosity of our ordinary flames is due to imperfect combustion; and if by any means a gas jet is diminished in light-giving power, it is increased in its heating capacity. This is well exemplified by Bunsen's burner—a simple contrivance of incalculable value in the laboratory. Its construction is such that the stream of gas issuing from the jet is first made to traverse a tube of comparatively wide bore, which is perforated at its lower extremity with holes for the admission of air. The gas is thus thoroughly mixed with air before it is lighted, and a continuous draught is produced, so that the combustion is rendered perfect. The Bunsen F. is of a transparent blue colour, and in its interior is a hollow cone containing a mixture of air and gas which is not sufficiently raised in temperature to permit of combustion. The hottest part of the F. is just above this cool cone. For combustion a certain temperature is necessary—the principle upon which Davy constructed his Safety-Lamp (q.v.), whose wire-gauze covering reduces the outside atmosphere to a temperature too low for the combustion.

Flam'en, a Roman priest, so named from the band (*filum, filamen, flamen*) of white wool which he wore round his head. These priests were fifteen in number, and their services were appropriated to a particular deity, from whom they derived a special name. The three principal flamens, known as the *Majores*, were the *F. Dialis*, *F. Martialis*, and *F. Quirinalis*—the priests respectively of Jupiter, Mars, and Quirinus—and were chosen always from the patricians, while the others—the *Minores*—might be plebeians. The special dress of the F. was the apex (a cap), the læna (a cloak), and a wreath of laurel. The *F. Dialis* was the most distinguished of the flamens, and enjoyed many privileges; as, for example, he had a right to a lictor, to the curule chair, and to a seat in the senate. His wife was called *Flaminica*, and on her death the *F. Dialis* was bound to resign.

Flamin'go, a genus of birds usually included in the order *Grallatores* or Waders, to which it is allied by length of limb; but many ornithologists regard it as more appropriately ranked with Natatorial or Swimming birds, from the webbed feet. The three front toes are fully united by a web, and the bill is broad and lamellate, resembling that of the Lamellirostral *Natatores*. The bill is also of singular form, being bent abruptly downwards from the middle. The toes themselves are short, and the nostrils are placed in a groove and covered with membrane. The first and second quills are the longest of the wings. The tail is short. The typical example of the F. is the common F. of S. Europe and other parts of the Old World. It inhabits the sea-coast and marshes, and is gregarious in its habits. A sentinel bird watches over the safety of the flock. When at rest, the F. lies on the ground with its legs doubled under it, and its neck curiously bent. The nest is made of mud and earth so as to form a small hillock. The eggs are white, and number two or three. The colour is scarlet when in full plumage, the quill feathers being jetty black. The bill is orange-coloured at its base and black at the top. The average height of a full-grown F. is 6 feet. The common American species is larger and brighter in colour than the European bird. It occurs in the warmer regions of the continent and amongst the W. Indian Islands, is often met with in W. Florida and N. Alabama, but is rare further N. or W.

Flamingo.

Flamin'ia Via, the famous highway leading N. from Rome, issued from the city by the Flaminian Gate at the northern angle of the Capitoline Hill. It proceeded to Narnia, in Umbria, and thence by Fulginia to Fanum Fortunæ on the Adriatic, from which it passed on to Ariminum, beyond which it extended under the name of the Æmilian Way through Cis-Alpine Gaul. One loop-line left the main road at Narnia, and passing through Interamna and Spoletium, rejoined it at Fulginia. Another, striking off at

Nuceria, diverged to Ancona, and united with the main road at Fanum Fortunæ.

Flamini'nus, T. Quintius, the most distinguished representative of a family of the Quintian gens, was born about 230 B.C. He was elected consul, B.C. 198, and obtained Macedonia as his province. He threw himself with great ardour into the war with Philip, and in the course of the struggle both achieved military successes and displayed great diplomatic skill. After the complete defeat of the Macedonians at Cynoscephalæ, B.C. 197, terms of peace were concluded, by which Philip relinquished all his Greek possessions in Europe and Asia; and during the Isthmian games of 196 B.C., F. proclaimed the freedom of Greece. He took leave of the Greeks, B.C. 194, and on his return to Rome celebrated a splendid triumph of three days' duration. Peace was soon disturbed by the war in which the treacherous Nabis, tyrant of Sparta, was subdued. The most notable event in the subsequent career of F. was his connection with the death of Hannibal, who took poison, fearing lest he should be delivered up to the Romans by Prusias of Bithynia. F. died in 174 B.C.

Flaminio, Marcantonio, an illustrious Latin poet, was born at Seravalla in 1498. Cardinal Pole became his patron and took F. with him to the Council of Trent in 1545. Among his works are the translations of thirty Psalms and several hymns and poems, all in Latin. His composition was remarkable for elegance. He was of an amiable and gentle character. Died at Rome in 1550.

Flamin'ius, Caius, was tribune of the Roman people, B.C. 230, and carried by popular support an agrarian law for the distribution of the recently-conquered territory of the Cis-Alpine Gauls. When consul (223), F. gained a great victory over the Insubians. His censorship (220) was distinguished by the two great works that bear his name, the *Circus F.* and the *Via Flaminia.* He was elected consul for the second time (217), and immediately marched against Hannibal, who was advancing southwards. F., with the greater part of his army, perished in the battle on the shores of Lake Trasimenus, B.C. 217.

Flam'steed, John, the first astronomer-royal of England, was born at Denby, near Derby, 19th August, 1646, and at an early period showed so remarkable a power in the calculation of eclipses of the moon, that through Sir Jonas Moore, then Surveyor-General, he was appointed astronomer to the king in 1675. The same year he took holy orders, and, nine years later, was presented to the living of Burslow, in Surrey. Scientifically he is chiefly remarkable as the earliest of practical astronomers. He made the first valuable catalogue of the fixed stars, and was the first to introduce the method of simultaneously observing the right ascension of the sun and stars. F. died 31st December, 1719. The partial publication of his leading work, *Historia Cœlestis Britannica*, by Halley, against his wish, led (as was ascertained from the publication of some of his papers in 1835) to a quarrel between F. and Halley, in which Sir Isaac Newton was involved. This work, which was begun to be printed along with an *Atlas Cœlestis* in 1719, was not published till 1725. See Baily's *Account of the Rev. J. F.*

Flanch, The, in heraldry, is a segment of a circle drawn on each side of the shield, and is said to have had its origin in the dress of the 14th c. Guillin says that flanches are 'a proper reward for the services of a gentlewoman to her sovereign.'

Flan'ders (Flem. *Vlanderen*) is the name of a territory in the basins of the Scheldt and Lys which has often varied in extent, and which was formerly a powerful sovereign county. The ancient occupants of this country, whom Cæsar subdued, were the Celtic Morini, and various savage German tribes, as the Nervii and Menapii. The name F. was derived from the *Vlandergau* (*pagus Flandrensis*), but this was merely the district surrounding Sluis and Bruges. In the time of Karl the Great, F., then a region of wild morass and dense vegetation, was placed under a race of bold 'foresters,' who easily wrested the territory from his feeble descendants. By the Treaty of Verdun (843) F. and Artois were acquired by the Karolings of the newly-formed western Frankish kingdom. On the irruption of the Northmen the vassal rulers of the country were made wardens of the Frankish north-eastern coast. In 864, Judith, daughter of Karl the Bald, and widow of Æthelwulf of England, was married to Baldwin (q.v.), surnamed *Bras-de-Fer*, who subsequently was created 'Count' of F., and who laid the foundation of the industrial greatness of his 'mark' or county. Among his more prominent successors was Baldwin IV., the Bearded (988-1036), who became a prince of the empire by receiving in fief from Heinrich II. the burgrafdom of Ghent, Walcheren, and the Zeeland Islands. The son of Baldwin IV., the Pious, Baldwin V., gained a part of Lower Lothringen, between the Scheldt and Dender (the *Alosterland*), the episcopal supremacy of Cambrai, and the county of Hainaut (Hennegau), founding the Flemish-Hainaut line in 1070. Of this line, the Flemish section died out with Baldwin VII. in 1120, whereupon some six claimants strove to gain the succession, which was finally secured by Dietrich of Elsass in 1128. Grown by this time into a flourishing state, F. had given crusading dynasties to Jerusalem and to the Latin empire of Constantinople. The Flemish weavers, rapidly becoming wealthy merchants, were beginning to receive a share of the political recognition foreshadowed by the first civic charter or *keur* granted to Middelburg in 1217. During the French and English wars of the 13th c., F. aided the latter power, although nominally a vassal of the former. In 1280 Margarethe II. died, leaving two sons by different marriages, John of Avennes and Guy Dampierre, who succeeded to Hainaut and F. respectively. The revolt of Guy against Philippe le Bel (1297) led to the conquest of F. and its annexation to France; but the Flemings achieved their independence by the famous 'battle of spurs' at Courtrai in 1302. Under the oppressive rule of Count Louis I. of Dampierre, grandson of Guy, occurred the turbulent popular outbursts headed by the Arteveldes (q.v.). By the marriage of Philip I. of Burgundy the family of Valois-Burgundy replaced that of Dampierre in 1369, and F. was brought within the circle of the German empire. (See BURGUNDY.) Meanwhile F., along with Holland, was fast attaining its highest reach of material splendour; and its rich populous cities, Ghent, Bruges, Ypres, &c., were ready to resist any encroachment on their 'liberties.' After the death of Charles the Bold (1477), and the consequent disruption of the Burgundian possessions, F. went to his daughter Marie, who married Maximilian of Austria. The Treaty of Madrid (1526) formally abolished the vassalage of F. to France. On the abdication of Charles V. in 1556, F. came to the Spanish line of the House of Hapsburg with Philip II., but the territory was subsequently much diminished by the Peace of Westphalia (1648), which transferred a portion in the N. to the States-General, and by the conquests of Louis XIV. secured to France by the treaties of Aix-la-Chapelle, Nymwegen, and Utrecht. By the Congress of Rastadt (1714) the remainder of F. came again to the House of Hapsburg; but it was conquered by the French in 1794, and remained an integral part of the republic and empire till the Congress of Vienna (1814) conferred it on the kingdom of the Netherlands. It now forms the two Belgium provinces, East and West F. (q.v.).

Flanders, East (*Oost Vlanderen*), a province in the N.W. of Belgium, with an area of 1158 sq. miles, and a population of 970,398. It has a flat surface, and is watered by the Scheldt and its tributaries the Dender and Lys. The soil, which has undergone spade-culture, is very rich, yielding various grains, flax, hops, hemp, &c. Fine flax is produced in the *Land van Waes*, a region between Antwerp and Ghent, formerly a barren heath. E. F. is portioned into a great number of small farms, and is one of the most populous parts of Europe. There are large linen, cotton, woollen, lace, and silk industries, besides numerous breweries and distilleries. Ghent is the capital, and among the other towns are Alost, St. Renaix, Lockeren, and Eecloo.—**West F.,** the most westerly province of Belgium, is bounded N. by the North Sea, and W. and S. by France. Area, 1249 sq. miles; population, 755,349. It is watered by the Lys and Iser, and is level and highly cultivated, except along the coast and in the N., where there are broad, low sand-dunes, in part covered with pine-trees. The industries and manufactures are on somewhat a smaller scale than those of E. F. but are similar in character. The chief towns are Bruges, Ostend, Courtrai, and Ypres.

Flandrin, Jean Hippolyte, an eminent French historical painter, was born at Lyon in 1809 and became a pupil of Ingres, through whose influence he was appointed director of the French Academy at Rome. In 1838 he settled at Paris, where he remained till 1863, when, owing to bad health arising from excessive application, he went to Rome for change of air and relaxation. There he was carried off, in 1864, by an attack of small-pox that lasted only three days. Among his works are 'Euripides writing Tragedies,' 'Dante conducted by Virgil' (1845) and 'Napoléon Législateur' (1847). His composition and design were excellent, and his talent as a portrait painter was far above the average. His splendid frescoes, left unfinished, at the church of St. Germain-des-Près were entrusted to Cornu for completion.

Flange, in construction, a projecting rim placed round the edge of various parts of machines or apparatus. It serves commonly to afford the means of connecting (by bolts) the piece to which it belongs with other parts of the machine, but in some cases it has an entirely different purpose, as in the flanges of railway carriage wheels.

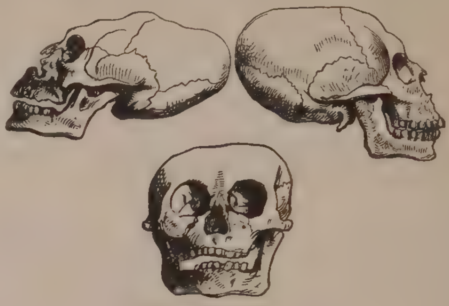
Flank (*i.e.*, 'the side'), in a military sense, means the extreme right and left of an army or encampment. To *flank* is to take up such a position as will strengthen the main body of an army or brigade, and at the same time have the men who perform the evolution well out of range of the enemy's fire. To *outflank* is to increase one's front so that by extending the line a general will be in a position to threaten or command the flanks of the opposing but less widely-extended line. *F. companies* is the name applied to the grenadiers and light infantry companies of regiments, as these generally occupy the right and left extremities when a battalion is in line. *Flanking parties* are bodies of cavalry and infantry employed to harass the flanks of an enemy. *Flanks of a frontier* are forts at the extremities of a frontier line, within which an attacking force will be careful not to enter, lest his retreat be cut off. For F. in fortification, see FORTIFICATION.

Flann'el (Welsh *gwlanen*, Fr. *flanelle*), a woven woollen fabric of a loose texture, much used for underclothing, shirting, &c., on account of its softness and warmth. Wales still sustains the reputation it early earned for the excellence of its hand-made F. Many varieties of the fabric are produced at Rochdale, Halifax, Leeds, Bury, and Salisbury.

Flat, in music (denoted thus, ♭), a sign indicating the substitution of a note a semitone lower for the note on the staff before which it is placed. See NOTATION.

Flat-Fish, the common name for the flounder, plaice, sole, turbot, brill, halibut, and other Teleostean fishes belonging to the family *Pleuronectidæ* of the section *Anacanthini*. They can only be called *flat* in the sense that their *sides* are flattened to a much greater extent than is common in other fishes. Most people mistake the flat sides for the back and belly, but an examination will show that the paired breast-fins exist one on each flattened surface or side, whilst the dorsal and hind fins fringe the back and lower surface of the body respectively. These fishes swim on the light-coloured side; and both eyes, through a curious mal-formation of the bones of the skull, come to exist on one side of the body. The two sides of the mouth are of unequal size.

Flat-Heads, signifying certain tribes of American Indians among whom exist a custom of mechanically flattening the heads of their infants. From the illustrations the reader will perceive that the top of the skull is almost a horizontal plane and the compression has the effect also of making the skull and face broader and the conformation of each side different to that of the other; the jaw will also be seen to be distorted laterally. The principal tribes which adopt this barbarous practice are the Calapuyas, Clickitats, Clatsops, Chinooks, Clatsani, and Cowalitsk. It is remarkable that the treatment does not affect the brain though it renders the deformed more liable to apoplexy. By the time the Flathead reaches adult age all traces of the distortion are lost and the skull has resumed its proper shape. The custom, which is now dying out, was prevalent in former times among the Indians of Mexico, Peru, Central America, and among the Choctaws and Caribs.



Skulls of Flathead Indians.

Flatt'ery, Cape, the name of two headlands—(1) One in the territory of Washington, U.S., on the S. side of the entrance to the strait of Juan de Fuca. (2) One on the N.E. coast of Queensland, about 30 miles N. of Endeavour Bay.

Flat'ulence (from Lat. *flatus*, 'a breathing or blowing'), distension of the stomach, &c., by the formation of gases during digestion, depends more upon a disordered condition of the alimentary canal than upon the nature of the food partaken. F. may be relieved by the use of aromatic medicines, such as anethi, carui, cinnamon, peppermint, cloves, ginger, cardamoms, &c.

Flavel, John, an eminent English clergyman, was born near Bromsgrove in Worcestershire in 1627. Having received his education at Oxford he was ordained, and in 1658 became rector of Dartmouth. He was one of the 2000 clergymen who were ejected for *nonconformity* in 1662. He, however, continued to preach in lanes, forests, and out-of-the-way places till 1687, when by royal license the restrictions enforced under the Act of Conformity were removed, and he was permitted to return to the public performance of his duties. His writings, which were highly esteemed, include *Divine Conduct* and *Method of Grace*. Died in 1691.

Fla'vine is the name given to certain commercial colouring matters obtained from quercitron. The name is also given to a totally different substance, the diphenyl urea. F. is imported chiefly from the U.S. of America.

Flax (*Linum*), a genus of Exogenous plants belonging to the natural order *Linaceæ*. It has five imbricated sepals, and five contorted petals. The ovary has five divisions, each of which is subdivided by a false septum or partition. The plants of this order are herbs with entire sessile leaves. They are found in various quarters of the world, but most commonly in Europe and N. Africa. Common F. (*Linum usitatissimum*) is the best-known and most celebrated species. It grows as a smooth annual with a fibrous root, and attains a height of about two feet. The flowers are blue. At the present time F. is cultivated in many parts of the world. F. is the Hebrew *pishtah* of Exod. ix. 31, the *linon* of Matt. xii. 20. The seeds are dark brown and of oblong shape, averaging about one line in length. A variety of the common F. named *L. humile* is grown to a large extent on the Continent. The F. plant becomes commercially of importance not only from the uses of the fibrous or woody tissue, obtained from the inner bark, in the manufacture of linen, but also from the drying oil expressed from the seeds, and known as 'linseed oil.' The crushed seeds form the 'oil-cake' so largely used in feeding cattle, and 'linseed meal' is obtained by grinding the crushed seeds after the oil has been expressed. Mixed with lime-water, linseed oil forms the 'carron oil' employed in the treatment of burns. 'Tow' is the product obtained in the process of 'heckling' the F. fibres. *F. cotton* is formed by steeping F. fibres, first in a solution of bicarbonate of soda, and then in a weak acid solution, so as to separate and break up the fibres to form a substance used in cotton manufacture. F. has been cultivated from the earliest times of which we have any authentic record. Thus F. linen was used to swathe the mummies of Egyptian tombs, and Herodotus refers to the extent of the Egyptian F. trade. In Ireland, F. is much more extensively grown than in England and Scotland, and in Belgium is cultivated to an extent probably unequalled elsewhere. *Brussels lace* is made from a fine F. grown in both W. and E. Flanders, and which sells at prices varying from £100 to £180 or more per ton. In 1894, 61,927 tons of dressed and undressed F. were imported into the United Kingdom, and the value was estimated at £2,296,365; of this amount of F., 49,869 tons came from Russia; 6815 from Belgium; 2114 from Germany, and the rest from Holland, France, Turkey, U.S. of America, Australasia, &c. In the same year 9774 tons of Tow or Codilla of F., valued at £228,830, were also imported; 6099 tons came from Russia, 1823 from Belgium, and the rest from Holland, Germany, France, &c. On the other hand we exported 36,441 tons of dressed and undressed Flax and Hemp, which were valued at £192,793. In India F. appears to be grown chiefly for the seeds, which afford oil. When sown thickly, the F. plant yields the finest fibre, as also when the plants are pulled before the ripening of the seed. The name *purging F.* has been given to the *Linum catharticum* from its purgative properties. The latter is common enough in Britain, but is only used in popular and herbal systems of medical treatment.

Flax.

Flax'-Dressing. The fibre of the flax plant is prepared for the spinners' use by the processes of seeding, steeping, rolling, drying, stacking, breaking, and scutching. Seeding is effected by quickly drawing the flax straw between the two iron rollers, so fixed as to press out the seed without injuring it. An iron comb, called a ripple, with long and closely-set teeth, was formerly used for removing the seed-bolls. Steeping, or water-retting, is carried on by immersing the flax in a stream or pool of water. Fermentation ensues, and the glutinous matter which binds the fibre to its woody core is decomposed, facilitating the separation of the fibres. In Continental countries the flax is often sparsely spread on the ground, and exposed to the decomposing influence of dew and rain. This practice is distinguished as dew-retting. Improved methods of retting by which a great saving of time is effected and the work more efficiently accomplished, are general. Schenck's plan was introduced into Ireland in 1847. The flax is placed in vats containing water, the temperature of which is raised to and maintained at 90° by means of steam-pipes placed under a perforated false bottom. The average duration of steeping by this method is sixty hours. On the removal of the flax from the vats it is passed between heavy cylinders on which a copious supply of water falls. By this rolling residual impurities are extracted and the fibres further loosened. Atmospheric drying follows, and then the straw is sheaved and stacked for two or three months to improve its quality and facilitate cleaning. Breaking and scutching, by which the fibres are cleaned of the woody part of the stem and separated from each other, are next proceeded with. On the successful performance of these operations chiefly depends the value of the flax. Breaking and scutching machines of varied construction are everywhere superseding manual labour. The woody part is crushed by passing the straw between fluted rollers, and then in the scutching machine the fibres are freed from the broken wood by beaters or brushes. The flax fibre is much injured in the last machine, which causes the production of an excessive quantity of tow. See LINEN MANUFACTURES and SPINNING.

Flax'man, John, a great English sculptor, born at York, 6th July, 1755, was the son of a figure-moulder of the Strand, London, in whose studio he learned to draw and model, entered the Royal Academy, and exhibited a figure of Neptune in wax in his fifteenth year. He married in 1782, and in 1787 set out for Italy, where he executed his fine series of illustrations for the Iliad and the Odyssey, the beautiful marble group 'Cephalus,' 'Aurora,' &c. Returning to London in 1794, he was elected R.A. in 1800, and Professor of Sculpture in the Royal Academy in 1810. He died 7th December, 1826. In his series of 109 illustrations of Dante he established his fame as a designer of noble conception and exhaustless invention. His numerous mural works, many of them in Westminster Abbey, and all inspired with noble simplicity and elevation of feeling, constitute F. one of the chief authors of the Renaissance of rilievo. Of his monuments, those in memory of Sir Joshua Reynolds (statue in St. Paul's Cathedral), Sir W. Jones (University College), Sir F. Baring's family (Micheldean church, Hants), Countess Spencer, and Mrs. Tighe, are among the most famous. A valuable collection of the models of many of his chief works may be seen in the Flaxman Museum, University College. See Flaxman's *Classical Compositions*, *Illustrations of Dante*, and *Acts of Mercy*.

Flax, New Zealand. See PHORMIUM.

Flea, a genus of Insects belonging to the Holometabolic section of the class, and to the order *Aphaniptera* ('hidden winged'). They undergo a complete metamorphosis, but have no wings, these being represented by certain of the plates upon the thorax or chest-segments. The mouth is adapted for suction. The fleas, of which the common F. is an example, are parasites. The larvæ first appear as footless grubs, which pass into a quiescent state within a cocoon in about twelve days. They emerge from the cocoon in about fourteen days. The F. bites sharply, and is exceedingly active in its movements, the legs being very long. The parts of the mouth are modified so as to provide the creature with a set of instruments admirably adapted for piercing the skin of the animals upon which it resides. Another and much more important species of F. is the Chigoe (q.v.) of the W. Indies. Fleas have sometimes been trained to perform amazing feats, such as drawing miniature carriages to which they have been attached.

Flea'bane, a genus of Dicotyledonous plants belonging to the natural order *Compositæ*, and so named from its strongly aromatic smell having been supposed to be serviceable in exterminating fleas and other insect pests. The dysentery F., a familiar species, commonly found in damp places, derives its specific name from having been used as a remedy for diarrhœa and dysentery.

Flèche, La (Fr. 'the spire'), a town of France in the department of Sarthe, on the right bank of the Loir, 24 miles S.S.W. of Le Mans. The church of St. Thomas, whose ‘spire’ gives name to the place, is a Romanesque structure of the 11th and 12th centuries. The College of Jesuits, founded by Henri IV. in 1603, is now the famous Prytanée, a military school, with accommodation for 800 pupils. In one of the squares of the town is a bronze statue of Henri IV. Descartes was born here, and within the town resided David Hume in 1735-36 while composing most of his *Treatise on Human Nature*. The principal manufactures are cloth, paper, hosiery, and glue; there are flour and bark mills, and quarries of tufa. There is a trade in cereals, wines, and fruits. Pop. commune 10,249; arrond. 91,375.

Fleck'noe, Richard, was a dramatist of the 17th c., who seems to have been originally a Roman Catholic priest, and to have come from Ireland to seek his fortune in London by his pen. F., who was born about 1610 and died in 1678, wrote a number of plays, including *Demoiselle à la Mode*, *Love's Dominion*, and *Marriage of Oceanus and Britannia*, all of which are now forgotten, and some fugitive verses which Southey has praised. F. is best known by Dryden's satire of *Mac Flecknoe*, the model of Pope's *Dunciad*.

Fleet (Old Eng. *fliet*, ‘what floats,’ ‘a ship’), now denotes a collection of vessels, but is generally applied to warships. The collective F. of a country is spoken of as its navy. The different divisions of this are known as ‘fleets,’ each being under the command of an admiral, and the portions of a F. are known as *divisions* and *squadrons*.

Fleet Prison, or **The Fleet,** for centuries a notorious London gaol, stood on the E. side of Farringdon Street, on the banks of the Fleet stream, formerly a rapid affluent of the Thames, and now embraced within the system of the sewage of the city. It was king's prison and also debtors' prison from before the commencement of the 13th c. Here the religious martyrs of the reigns of Mary and Elizabeth were confined, and later the victims of the Star Chamber. The building was several times renewed. It was destroyed in the great fire of 1666, again burnt by the Gordon rioters in 1780, and finally abolished in 1845 as a public nuisance. It was the scene of much irregularity and brutality, arising mainly from the extortions of the keepers, and of the *Fleet Marriages*, which were contracted chiefly from the middle of the 17th to the middle of the 18th c. Prior to the passing of the Marriage Act of 1754, all that was required to render a marriage valid in England was the verbal and expressed consent of the parties; and as the Fleet at the time contained a number of dissolute ex-parsons, who were ready to celebrate a secret marriage for half-a-crown, or, according to Pennant, ‘for a dram of gin or a pipe of tobacco,’ persons wishing to marry, yet to keep their marriage secret, flocked to the Fleet. The Marriage Act of the 27th March, 1754, put an end to the trade of the Fleet parsons; yet, as a sign of the popularity of the F. marriage, it is said that over 200 marriages were entered in one register on the day before the Act came into force.

Fleet'wood, a seaport in Lancashire, at the mouth of the Wyre, 18 miles N.W. of Preston, and 228 miles from London by rail. It is a handsome modern town and a favourite watering-place. The chief buildings are the Whitworth Institute, the market-house, St. Peter's church, and the Roman Catholic church. F. has spacious barracks and a fine harbour. In October, 1877, the London and N. Western and the Lancashire and Yorkshire Railway Companies opened a new dock and large timber pond at a cost of £300,000, and it was hoped that this accommodation would prove attractive to foreign trade and the traffic between England and the Irish ports. Liverpool, however, retained its popularity. There is a daily boat-service between F. and Belfast, and a considerable fleet of fishing boats belong to the port. It is a most popular and healthy resort of summer visitors. Pop. reg. sub-dist. 12,888.

Flem'ish Language and Literature. The name Flemish is now limited to the Germanic dialect of Belgium, though modern Dutch and Flemish, or *Vlaemish*, were at first the same tongue. The present Flemish speech differs from Dutch only in having fewer guttural sounds, and in having borrowed a number of French idioms; but while it has, until late years, received little cultivation, and been used almost solely for popular tales, songs, and farces, in Holland the old *Vlaemish* has long been a literary tongue under the distinct name of *Dutch*. By Flemish is now meant the language of Flanders, N. Brabant, and part of S. Brabant—the *Walloon*, a French dialect, prevailing in Walloon Brabant, Liège, Namur, and part of Limburg. Under FLEMISH LITERATURE, however, must be included the early writings in *Flemish*, whether produced in what is now Holland or in what is now Belgium, while the modern Dutch literature from the 16th c. onwards will be treated under LITERATURE OF THE NETHERLANDS. Among the earliest relics of Flemish are three works of the 12th c., *De Trojaensche Ooorlog*, a poem of above 3000 lines on the siege of Troy, by Dieregodgaf; the *Reis van Sinte Brandaen*, a wild monkish tale of the wondrous adventures of St. Brandan, full of fantastic inventiveness; and *Reinart de Vos*, a version of the famous satirical poem *Reynard the Fox*, written, according to Willems, most probably about 1170. To the 13th c. belong the poets Melis Stoke, Jan van Heelu, Heijnric van Holland, Willem Utenhoven, and Jacob van Maerlent, ‘the father of Dutch poetry.’ The civil wars of the 14th c. checked the growth of literature, but chivalrous tales, borrowed largely from France, such as *The Holy Grail*, *Lancelot*, *Roland*, &c., became popular, and in 1394 the first of the *Kamern der Rederijkern*, or Chambers of Rhetoric, was founded. These *Rederijkern* were institutions corresponding to the guilds of the German *Meistersingers*, which offered prizes for poetic competitions, and gave public representations of farces and *Spelen van Sinne*, or moralities. They were founded in imitation of the French *Colléges de Rhétorique*, and had a baneful effect on the purity and correctness of the Flemish tongue. As their members were chiefly mechanics, though at first many of them were *sprekers*, or vagrant minstrels, they kept alive a taste for literature among the lower classes, but flooded the language with corrupt phrases, and rendered its grammar lax and uncertain. The lampoons and satiric dramas produced under their influence partly fulfilled the censorial functions of the modern press, and at times displayed an almost Aristophanic heartiness and extravagant vigour of ridicule and rebuke. Among the peculiar forms of poetry developed by the Rhetoricians were the *ketendichten*, ‘chain-poems,’ in which the last word of each line rhymed with the first word of the following; *dobbelsteert*, ‘double tail,’ in which each line ended with a double rhyme; and *scaekberd*, ‘checker-board,’ poems of sixty-eight rhyming lines, so arranged as to form in every direction a strophe of eight lines. From the 14th to the end of the 16th c. was the age of the Flemish ballads and popular songs, many of the latter being religious, and comprising Christmas carols, *Ave Marias*, Easter hymns, the ballads of Sister Bertha, &c. In the 16th c. Holland, after its struggle with Spain, continued to produce a national literature, whilst the Flemish literature died away in the Belgic provinces. In the 16th c. the Flemish language received a large French infusion, and after 1694, when the French invaded Belgium, French for a time superseded Flemish in the journals, and even in polite conversation. After the annexation of Belgium by Holland, the Dutch efforts to conciliate the Flemings by favouring the Flemish language were very coldly received, and tended on the whole to strengthen a reaction against the old dialect; until, after the separation of Belgium from Holland in 1830, a strong Flemish movement, headed by Willems, arose. Since then a Flemish literary school has developed, of which the chief representatives are Willems, Van Ryzwick, Van Deyse, Snellaert, Snieders, and Conscience, several of whose works have gained a European fame. The most elegant of Belgian periodicals, the *Nederduitsch Tijdschrift*, founded in 1862, is composed in Flemish. The chief Flemish authors have now agreed to write Flemish with the same orthography as the Dutch. See Vandenhoven, *La Langue Flamande, son Passé et son Avenir*.

Flemm'ing, Paul, a German poet, born at Hartenstein, Schönburg, 15th October, 1609. He studied medicine at

Leipzig, accompanied legations to Russia in 1633 and to Persia in 1635-39, and died at Hamburg, 2nd April, 1640. F. belonged to the first Silesian school founded by Opitz, and his works *Geistliche und weltliche Poemata* (1642, 1865), were unequalled by any German poet of the 17th c. They are vigorous and graceful in expression, lofty in thought, and full of interesting allusions to F.'s times. F.'s noble hymn, *In allen meinen Thaten*, is still sung in German churches. A selection of his poems was published by Schwab (Stutt. 1820), accompanied with a memoir of the poet's life.

Flens'burg, an old town in the province of Slesvig-Holstein, Prussia, on the F. Fjord, 20 miles N. of Slesvig by railway. It is the chief trading town in Slesvig, and has steam and wind mills, large breweries, and iron-smelting works, brandy distilleries, paper factories, and shipbuilding yards, besides manufactures of tiles, machinery, glass, soap, colours, tobacco, &c. Over 1600 sailing and steam vessels of over 500,000 tons annually clear the harbour, which is capable of receiving vessels of considerable size; the entrance is, however, by no means easy. A flourishing export trade exists, consisting of brandy, tiles, fish, corn, tallow, soap, and hides. Pop. 36,816. F. is supposed to have been named from the knight Flenes, who is said to have founded it in the 12th c.

Flers, a town of France, department of Orne, on an affluent of the Noireau, 35 miles W.N.W. of Alençon, has cotton, linen, and other weaving manufactures, of the annual value of nearly £3,000,000 sterling. Pop. commune 13,860.

Flesh, Chemical Composition of. F. or muscular fibre is composed mainly of fibrine in the coagulated condition, owing to the supply of blood constantly saturating the capillaries. Ordinary F. contains a certain quantity of that fluid, and therefore of its peculiar constituents, whilst in the juice which may be expressed from F., and which forms at least three-fourths of its weight, are found phosphoric, lactic, and butyric acids, partly in the free state, partly combined with potash and soda, lime and magnesia; chloride of sodium or common salt is also present. The juice of F. also contains a peculiar saccharine substance termed *Inosite* (q.v.), and an azotized body having feebly basic properties called *Creatine* (q.v.). The composition of muscle has been given as follows:—

Water	74·0	80·0
Solid constituents	26·0	20·0
	100·0	100·0
Albuminous substances insoluble in water	15·4	17·7
Gelatine	0·6	1·9
Albuminates of soda coagulating at 113° F.	2·2	3·0
Creatine	0·07	0·14
Fat	1·5	2·30
Lactic acid	1·5	2·30
Phosphoric acid	0·66	0·70
Potash	0·50	0·54
Soda	0·07	0·09
Chloride of sodium	0·04	0·09
Lime	0·02	0·03
Magnesia	0·04	0·05

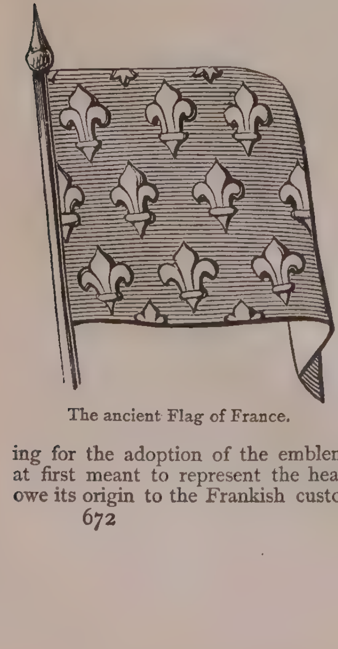
Flesh-Fly, a species of *Diptera* or flies, so named from their depositing their eggs in decaying animal matter, and from their larvæ feeding on like substances. These larvæ thus become useful in removing putrefying material. Linnæus said that three flesh-flies could devour a horse in less time than a lion—meaning that the various broods of larvæ, produced in large numbers, would in turn attack and devour quantities of the putrescent matter. The eggs are hatched within the body of the parent F.-F., and the pupæ or chrysalides are contained within the larval skin. The F.-F. is commonly called *Blue-bottle fly*.

Fleta, an important compendium of the laws of England down to the 2nd Statute of Westminster, was probably written in the year 1286 or soon after. The composition and arrangement are, considering the age, highly creditable. The work is so called from its having been written in the Fleet Prison, and is said to have been compiled by order of the king, Edward I.

Fletch'er, Andrew, of Saltoun, a Scottish patriot and political writer, was the son of Sir Robert F. of Saltoun, where he was born in 1653. After travelling on the Continent, F. entered the Scottish Parliament as member for East Lothian in 1681, but having borne part in the opposition to James, Duke of York, then Royal Commissioner in Scotland, he was compelled to retire to England, and thence to Holland. Shortly afterwards he was outlawed, and his estate confiscated, whereupon he threw himself into the patriotic intrigues of the English refugees in the Netherlands. F. returned to England in 1683, and there became intimately associated with the leaders of the malcontent party—the famous Council of Six. The discovery of the Rye House Plot (1683) scattered this party, and F. again fled to Holland. In 1685 he came back to England as volunteer in the Duke of Monmouth's invasion; but having killed the Mayor of Lyme in a private dispute, he was forced to quit the expedition at its very outset. F. then served in Hungary with distinction against the Turks. On the revolution of 1688 he came over from Holland with William of Orange, regained his lands, and again sat in the Scottish Parliament. The failure of the Darien scheme, in which F. had been a prime mover, embittered him towards King William's government, and in the Scottish Parliament he spoke violently against the projected union between England and Scotland. After the Union F. retired from public life. He died in London in 1716. F. was a passionate lover of freedom, but though a republican, was even more opposed to democracy than to monarchy. His views are set forth in several tracts—*Discourse of Government with Relation to Militias* (Edinb. 1698); *Two Discourses on the Affairs of Scotland* (1698); his *Speeches in Parliament* (1703); and *Conversation on Governments* (1704). These were reprinted at London in 1737 as *The Political Works of A. F.* There is an *Essay on the Life of F.* by the Earl of Buchan (1792). See also Macaulay's *History*.

Fletcher, Giles and **Phineas,** poets, sons of Dr. Giles F., uncle of F. the dramatist. Giles, born in 1588, was educated at Cambridge. In 1610 he published *Christ's Victory and Triumph in Heaven and Earth over and after Death*, a poem in an eight-line stanza. It is tedious and affected, but at times rises into lofty imaginative poety. F. held the living of Alderton, Suffolk, where he died in 1623.—Phineas F. was born at Wanbrook, Kent, April, 1584, was educated at Cambridge, obtained Hilgay Rectory in Norfolk, and died in 1650. His works include *The Locustes* (1627), a satire on the Jesuits; *Sicelides, a Piscatory*; and *The Purple Island*, a poem in ten cantos, in which the human body is allegorically described. It is written in a seven-lined stanza, and though grotesque and prolix, is smoothly versified, with rich descriptive and lofty moral passages. Like his brother, Phineas was an ardent disciple of Spenser. Quarles called him 'the Spenser of his age.' The poems of Giles and Phineas F. are contained in Anderson's *British Poets*, vol. iv.

Fletcher, John, one of the greatest of English dramatic poets, was born in 1576. He was the son of Richard F. who became Bishop of London, was sent to Bene't College, Cambridge, in 1591, and was left an orphan and in poverty on his father's death in 1596. Nothing is known of his life until 1607, when he produced commendatory lines on Jonson and the comedy of *The Woman-Hater*, in which he may have been assisted by Beaumont, with whom he formed the most famous of all literary partnerships. F. and Beaumont are said to have lived 'on the Banke-side, not far from the Play-house,' and to have had even 'the same cloathes and cloake in common.' We know that F. was highly popular in the literary Bohemia of his times, with which he would be more closely connected than was his aristocratic associate. Beaumont died in 1616, and F. continued to write plays, alone or with other dramatists, until he was cut off by the plague in August, 1625. Modern critics have sought to disentangle F.'s from Beaumont's writings; but while we know that a particular series of dramas was produced by F. after Beaumont's death, we must view with dubiety all attempts to separate the one poet's verses from the other's in the pieces of which it is certain that they were joint authors. Donne regards the problem of sifting Beaumont's writing from F.'s as insoluble. Ward cannot trace any essential difference between the plays ascribed to both and those attributed to F. alone, while he can detect two styles in the plays written by F. along with another than Beaumont. The assertion that Beaumont merely pruned and chastened F.'s writings is contradicted by the verses of their contemporaries, and the plays (as *The Maid's Tragedy*) in which Beaumont unquestionably shared, do not show calmer judgment than those written by F. alone. Dyce assigns the authorship thus:—By Beaumont and F.—*Four Plays in One, Wit at Several Weapons, Thierry and Theodoret, Maid's Tragedy, Philaster, King and no King, Knight of the Burning Pestle, Cupid's Revenge, Little French Lawyer, Scornful Lady, Coxcomb, Laws of Candy;* by Beaumont alone—*Masque;* by F. and Massinger—*False One, Very Woman;* by F. and Rowley—*Queen of Corinth, Maid of the Mill, Bloody Brother;* by F. and Shirley—*Noble Gentleman, Night Walker, Love's Pilgrimage;* by F. and Shakespeare—*The Two Noble Kinsmen;* and the remaining plays, except the *Nice Valour*, as to which he is uncertain, by F. alone. The plays of Beaumont and F. are marked by exuberant and fiery, joyous and wanton inventiveness, by unflagging dramatic interest, splendid rhetoric, and flowery poetic colour, and by a fascinating natural sportiveness which is found in no other Elizabethan writers. But they show little depth or subtlety of imaginative insight; they fail to portray intense passion; their characters are oftened weakened by the undue emphasis given to a leading quality; and their plots, though mostly woven with marvellous dexterity, are sometimes maimed and twisted to produce ingenious situations. So far as we can judge, Beaumont seems to have had the loftier tragic genius, F. the more active creativeness, the more sparkling wit, the nimbler and more versatile and graceful fancy. Beaumont's verse is more severe and simple than F.'s, which is distinguished by flowery volubility and liquid melody, by a sometimes too copious overflow of sweet and pellucid language. The comedies, in which Beaumont seems to have especially shared, display the parodistic vein and broad farce characteristic of Jonson, features absent from those pieces in which F.'s genius shines with the most brilliant and unborrowed lustre—his romantic comedies, plays which stand alone in our literature for a peculiar blending of varied qualities, for fluent grace of style, for tender sentiment brightened with dazzling wit, for delicate poetic beauties inwoven with humour and softly flushed with passion, for the captivating interest of the plot, and for the introduction of those pensive, aërial lyrics which are surpassed by Shakespeare's loveliest songs alone. See Dyce's edition of Beaumont and F.; W. B. Donne's *Essays on the Drama;* and Ward's *English Dramatic Literature.*


The ancient Flag of France.

Fleur-de-Lis (Fr. 'flower of the lily,' in Old English 'flower de luce'), the emblem of the French kings, whose royal banner, even in the time of the Merwings, seems to have been blue with gold lilies. Charles VI. is said to have reduced the number of lilies to three, as a symbol of the Trinity. There are many legends accounting for the adoption of the emblem; most probably it was at first meant to represent the head of a javelin, or it may owe its origin to the Frankish custom of placing a *reed* or *flag in blossom* instead of a sceptre in the hand of each newly-made king. In 1789 the F.-de-L. was displaced by the tricolour. During the Middle Ages the F.-de-L. was also the emblem of the Virgin, and was a favourite design on church decorations.

Fleuron.

Fleuron, a term in architecture signifying a small rose-like flower, with leaves around it, which was an ornament in the classic style, and most often found in the centre of the abacus of Corinthian capitals. The same ornament has been known among us as the honeysuckle pattern.

Fleuru's, a town in the province of Hainaut, Belgium, near the Sambre, 7 miles N. of Charleroi, and 2 N. of Ligny. An indecisive battle took place here between the troops of the Catholic League under Gonzalvo de Cordoba, and those of the Protestant Union headed by the Dukes of Brunswick and Saxe-Weimar, 30th August, 1622. F. was also the scene of the defeat of the Prince of Waldeck by the Duke of Luxembourg, 26th June, 1794; and of a victory of Jourdan over the Allies, brought about by the bad strategy of the Prince of Saxe-Cobourg, 26th June, 1794. Pop. 5109.

Fleu'ry, André Hercule de, Cardinal, a French statesman and ecclesiastic, was born at Lodève, in Languedoc, 22nd June, 1653. He studied at the Jesuits' College, Paris, was made almoner to the queen of Louis XIV., and, in 1699, Bishop of Fréjus. He gave up his bishopric in 1715, became tutor to Louis XIV.'s grandson, afterwards Louis XV., and insinuated himself into that prince's favour. He was elected into the Academy in 1721, was admitted to the Council of State in 1723, and in 1726 became a cardinal and prime minister of France. His administration was tolerably successful. He strove to economize and lighten taxation, and at first sought to maintain peace at almost any cost, but sacrificed the freedom of the Gallican Church to Ultramontanism, and was nerveless and vacillating in his foreign policy. In 1733 the court party forced him into the war of the Polish succession, on behalf of Stanislaus Leczinsky, Louis XV.'s father-in-law. The struggle ended in 1736, and in 1741 F. was compelled by court influence to take part in the war of the Austrian succession. He died at Paris, 29th January, 1743. F. was a well-meaning, benevolent, and peace-loving minister, but had not the energy needful in his position. He patronised learning, and added several valuable MSS. to the royal library. See St. Simon's *Mémoires.*

Fleury, Claude, Abbé, a French ecclesiastical historian, was born at Paris, 6th December, 1640. He was educated at first for the law, and is said to have been one of the ablest advocates in the Parliament of Paris, but coming under the influence of Bossuet and Bourdaloue, took priest's orders, shortly after which he became tutor to the sons of the Prince of Conti. His legal knowledge was shown in 1674 in the publication of *L'Histoire du Droit Français.* Four years later appeared his translation in Latin of Bossuet's *Exposition de la Foi Catholique,* while between 1681 and 1683 he issued three little works, *Les Mœurs des Israélites, Les Mœurs des Chrétiens,* and *Le Grand Catéchisme Historique.* Through the influence of Fénélon, F., who was a modest, amiable, and erudite man, was appointed first assistant tutor to the sons of the then dauphin, and subsequently confessor to the young king, Louis XV., as well as Prior of Argenteuil. The chief works written by F. during the latter part of his life are *Discours sur les Libertés de l'Église Gallicane,* published after his death, and his *Histoire Ecclésiastique* (1691-1720), published in twenty volumes. This work, in particular, has been much admired on account of its candour and impartiality, and F. himself, although a 'good Catholic,' was the reverse of a sectarian or a fanatic. He died 14th July, 1723. See Martin's *Œuvres de l'Abbé F.* (1837), to which there is prefixed an essay on his life and writings.

Fleu'ry, Flor'y, or **Fleurett'ée,** is applied in heraldry to an object of which the sides or ends terminate in *fleurs-de-lis.*

Flex′ure, in mathematics, is the bending or curving of a line or surface. A point of *contrary F.* or *inflexion* is the point at which a curve ceases to present convexity to a straight line without it, and begins to present concavity. Such a point cannot exist in curves lower than the third order. In engineering F. denotes the bending of loaded beams, and is of great importance in the theory of construction. See STRENGTH OF MATERIALS.

Flied′ner, Rev. Theodor, D.D., a philanthropic clergyman, born at Eppstein, near Wiesbaden, 21st January, 1800, studied at Göttingen, and in 1821 became pastor of a small Protestant community at Kaiserwerth, near Düsseldorf. F. is memorable as the founder of the Evangelical Deaconesses, who, though not a monastic body, correspond partly to the Catholic Sisters of Charity, visiting the sick and poor in their homes and in public institutions. F. laboured with great practical ability to organize these deaconesses, who have proved a boon to Germany. Institutions modelled on F.'s establishment at Kaiserwerth have been founded at London, Paris, Berlin, Alexandria, &c. F. died at Kaiserwerth, 4th October, 1864.

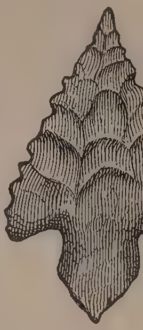
Flin′ders, Matthew, discoverer of great part of the coast of Australia, born at Donington, in Lincolnshire, in 1760, entered first the merchant service, and afterwards the royal navy. In 1798, F., in company with Surgeon George Bass, left Port Jackson, New South Wales, sailed S. along a coast previously unknown, and discovered and named Bass Strait between the continent and Tasmania. Subsequently in 1801-1803 he explored all the southern, eastern, and northern coasts of Australia from Cape Leuwen near its S.W. angle round by Bass Strait, and along by the E. coast, Gulf of Carpentaria, &c., to the Island of Timor. The voyage was one of romantic adventure as well as of great geographical achievement. On the return voyage F. was seized and retained prisoner in the Isle of France for six years. He reached England in 1810, and died there in 1814. His *Voyage to Terra Australia* (1814) is a work of high interest.

Flinder′sia, a genus of Exogenous trees belonging to the natural order *Cedrelaceæ*, or that including the mahogany trees. F. grows in Australia, and its hard wood is extensively used as a substitute for mahogany.

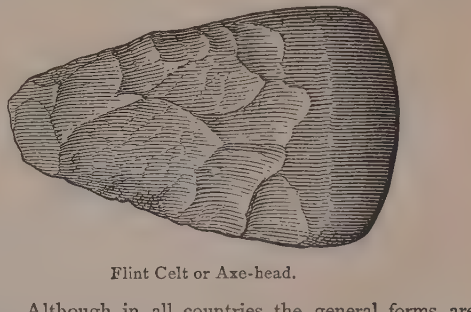
Flint is a variety of quartz, allied to chalcedony, from the purer specimens of which it differs in having usually a dark-grey or even black colour, and in being but feebly translucent. It is massive and compact, and breaks with sharp edges and a conchoidal fracture. It is found as concretionary nodules in the chalk formations, and is probably organic in its origin, Ehrenberg supposing it to consist for the most part of infusorial remains. *Hornstone* or *chert* is very similar, but is more brittle, and occurs in the limestones of older formations. The hardness and sharpness of F. ensured its early use as a material for the manufacture of knives, chisels, rasps, axes, &c.; and the facility with which it strikes fire upon steel is well known, though now of little practical importance since the invention of lucifer matches and percussion caps.

Flint, a town, formerly the county town, in Flintshire, 12 miles S.W. of Chester, on the W. bank of the Dee. Its chief buildings are a modern Gothic church, town hall, almshouse for twelve poor burgesses, schools, &c. It is a favourite watering-place, has chemical and smelting works, and exports coal and lead, which are obtained near it. The trade has increased, and F. has become to a certain extent the port of Chester, as sandbanks above it in the channel have rendered navigation up the river more or less difficult. To the N.E. of the town are the ruins of a castle built by Henry II. Many Roman remains have been found in its vicinity, and these point to the probability of F. having been a Roman station. There still exist some ruins of a castle which may have been built in the reign of Edward I. It unites with Caergwyle, Caerwys, Holywell, Mold, Overton, Rhuddlan, and St. Asaph in returning one member to Parliament. Pop. mun. bor. 5247; reg. sub-dist. 11,386; civ. bor. 4925; and dist. of parl. bors. 23,492.

Flint, a river in Georgia, U.S., joins the Chattahoochee after a course of about 300 miles, 250 of which are navigable for steamboats, from the Gulf of Mexico, as far as Albany.



Serrated Flint Arrow-head.



Flint Celt or Axe-head.

Flint Arrow-Heads, the commonest of the weapons of the Stone Age, occur abundantly in every country of Europe. They have been found also in Asia Minor and Palestine, in China and Japan, and in N. and S. Africa. They are plentifully distributed over the whole of the New World, and are still in use among the uncivilised tribes both of N. and S. America. Though varying greatly in form, they may be classified in three groups,—the triangular, the leaf-shaped, and the lozenge-shaped. The triangular group presents varieties, with or without barbs, with or without a central stem or tang, and sometimes with the base hollowed or notched for the insertion of the shaft. The leaf and lozenge-shaped forms, of which there are many varieties, were destitute of barbs and tang. They were inserted in the split end of the shaft, which was finely tapered off, so as to embrace the arrow-head almost up to its point. The grip of the split shaft on the flint was tightened by a lashing of sinew immediately behind the arrow-head, and seems in many cases to have been further strengthened by the use of gum or bitumen. Arrow-heads vary greatly in size, there being in fact no distinction between an arrow and a spear or lance-head except that of size. The smaller arrow-heads are often not more than a quarter of an inch in length, and they vary from this size up to the largest that a bow would carry. Whatever their size, they are always fashioned of chipped flint, and never finished by grinding, like axes and other such implements of flint of greater size. They are, however, by far the most symmetrically-formed and exquisitely-finished specimens of the flint-worker's art. The smallest examples, though not much thicker than card-paper, will exhibit from thirty to forty facets, each of which represents a blow so skilfully delivered as to flake off a splinter from the surface without fracturing the flint or injuring the symmetry of the weapon. Although in all countries the general forms are much alike, there are special varieties which are characteristic of special areas. The triangular variety, with barbs and blunt-ended tang, is most abundant in N. Britain, while that with a notch in the base is most abundant in Scandinavia. In France, Italy, and N. Africa the form with a pointed tang is most common. In N. America the triangular form with side notches for the reception of the sinew by which they are lashed to the shaft is the prevailing variety. Only a very small proportion of the flint implements found in the drift or in the cave-dwellings of England, France, and Belgium, and the kitchen-middens of Denmark, can be regarded as arrow-heads, but in the lake-dwellings of Switzerland they are very numerous and well made. They are frequently found in the dolmens or cairns and sepulchral deposits both of the Stone and Bronze Ages, but they are chiefly found casually embedded in the soil. It may be assumed that as arrow-heads of bronze are extremely rare, flint was used for this purpose throughout the Bronze Age as being the more accessible and less costly material. Among the savage tribes by whom it is still used, arrow-making is a work of skill in which only few attain excellence. Longfellow's description of the 'ancient arrow-maker' in *Hiawatha* has made us familiar with a phase of the life of the Stone Age continued into our time, but which is now fast passing away. Not the least curious of the phenomena connected with this passing away of an ancient art is that which is exhibited, not by the barbarian, but by the cultured and civilised sections of humanity, in the translation of these once familiar objects from the region of common life into that of the supernatural. In most of the civilised countries of Europe F. A.-H. have been for many centuries associated with supernatural powers and regarded with superstitious veneration. Even among the Etruscans this feeling seems to have prevailed, for there is in the British Museum a beautiful gold necklace from an Etruscan tomb, the central pendant to which is a flint arrow-head.

Flint Glass. See GLASS.

Flint Im'plements, the tools of times when the use of metal was unknown, or when it was too rare and costly to be applied to the commoner purposes of the useful arts, are found in every country of the world whose antiquities have been made the subject of special investigation. Not only do they occur in regions that had not emerged from barbarism in prehistoric times, but on the sites of the most ancient civilisations of historic times their occurrence bears testimony to a previous condition of undeveloped civilisation of which history knows nothing. They underlie the relics of the most ancient civilisations of Europe, Africa, and Asia, in Greece and Italy, in Egypt, in Arabia, Palestine, Asia Minor, Assyria, Babylonia, India, China, and Japan. In all countries where flint is naturally accessible, it has been used by preference for the manufacture of implements and weapons on account of the facility with which it may be flaked and chipped into the desired form. The flint tools of primitive times were principally knives, saws, scrapers, awls, axes or adzes, chisels and gouges. In the manufacture of the smaller tools a peculiar process was employed. A suitable block of flint having been selected, it was first split, and then by a series of sharp blows delivered on the fractured face of the flint long splinters or flakes were separated from the block or core in such a manner that the ridge formed by the meeting edges of the two flakes previously struck off formed the midrib or back-bone of the third. Each flake was thus triangular in section, and broad or narrow in the base opposite to the midrib, according to the purpose for which it was wanted. Knives were usually made of a long thin flake, the natural edge of which is keener than any that can be produced by grinding, so keen, indeed, that flakes of obsidian were used to shave with by the Spaniards in Mexico when their European razors went out of order, and Mariette Bey records that he once saw an Arab having his head shaved with a flint flake at Abydos in Upper Egypt. This natural edge, however, is extremely brittle, and flint knives which were intended to retain their utility, and were not merely made for the temporary occasion, were worked to a more obtuse edge than is obtained by the natural fracture. In rare cases, and probably for special purposes, the edge was ground. Practically owing to the roughness of the edge all stone knives are saws, but the true saws were beautifully and often very finely notched or toothed with the utmost regularity. Both knives and saws were small, not usually exceeding 3 or 4 inches in length. Sometimes they were set in handles of wood or stag's-horn. Specimens thus handled are found in the Swiss lakes. The 'scraper,' so called because a similar tool mounted in a bone handle is used to this day by the Eskimos for scraping the fat off skins, was made from a flake by trimming one of its ends to a semicircular bevelled edge like that of a 'round-nosed turning chisel.' Judging by the large number of these tools of all sizes, from a quarter of an inch to 3 inches in length and width, that are found on every site of human occupancy during the Stone Age, it is probable that they were used for a great many purposes in which scraping or planing was required, including the manufacture of implements of bone or wood, as well as the preparation of skins for clothing. It is also probable that many of them were used as strike-lights with iron pyrites, nodules of this substance with the marks of use having been found in barrows in association with 'scrapers' of flint. Another form of 'scraper' with a semicircular hollow was used for planing arrow-shafts. Flint axes and adzes are sometimes merely chipped into shape, but more frequently they are ground sharp and smooth at the cutting edge, and occasionally smoothed or polished over the whole surface. They are extremely variable in size, ranging from 2 or 3 inches in length to as much as 14 or 16 inches in length. Axes or adzes were often made of other materials than flint, such as diorite, nephrite, greenstone, basalt, limestone, porphyry, serpentine, jasper, sandstone, and clayslate. Some of the modern savages, as those of New Guinea and the Barbados Islands, &c., make their axes of a large shell, extremely dense in texture. Chisels and gouges of flint are usually polished. They are well-made and effective tools, varying from 4 to 6 or 7 inches in length, and are most common in Scandinavia. Awls and borers are of various forms and sizes, but usually with a flattened shoulder or butt to be held between the finger and thumb. The most curious of these are the flint drills for piercing the 'eyes' of the bone needles found in the French caves. Besides the 'implements' properly so called, because their purpose is apparent from the form and finish that have been given to them, there is a class of 'F. I.' so called because they are artificially shaped, although they are so destitute of indications of destination or design, that it is impossible to suggest any special purpose of practical utility for which they could have been intended. They are usually found associated with remains of animals that are either totally or locally extinct, such as the mammoth, rhinoceros, lion, hyæna, reindeer, Irish elk, &c., and on this account, as well as from their rudeness of form and finish, an extremely high antiquity has been claimed for them.

Flint'shire, a maritime county in N. Wales, bounded on the N. by the Irish Sea, on the E. by the Dee, and on the S. and W. by Denbighshire. F. chiefly consists of uplands, with hills of moderate height, the loftiest point being Moel-y-Famma, 1845 feet, in the S.W. The coast is low, and mostly sandy, but there are rich meadows on the estuary of the Dee. Many rivers, as the Elwy, Terrig, and Wheles, rise in F., but have their course chiefly in other counties. F. belongs mainly to the New Red Sandstone and Carboniferous formations, and has rich measures of coal, which are largely worked, and veins of iron, lead, zinc, calamine, and copper. Corn, barley, and green crops are grown in the plains and vales, and the uplands afford excellent pasture for cows which are noted for the quantity and quality of their milk. The chief industries are mining, metal-working, and agriculture. There are also cotton and woollen manufactures. F. is traversed by Wat's and Offa's dykes. Near Mold the Picts and Scots were defeated by the Britons in 340, and in 796 the Welsh were beaten back by the Saxon invaders. There is a very ancient castle at Caergwyle. Corn crops cover 25,412 acres (oats 13,111), green crops 8011 (potatoes 2434), clover, sainfoin, and grasses in rotation 16,825, and permanent pasture or grass not broken up 75,675 acres. Small fruit is grown over 110 acres, and bare fallow or uncropped arable land accounts for 536. Mountain and heath land cover 6569 acres and these are used for grazing purposes. Nursery grounds are laid out on 6 acres, and 7839 are occupied by woods and plantations. (See also articles CATTLE, HORSE, PIG, SHEEP). The principal towns are Mold (the county town), Flint, Holywell, and St. Asaph. F. returns one member to Parliament. Area 164,051 acres; pop. parl. co. 52,881; ancient co. and adm. co. (each) 77,277; and reg. co. 42,565.

Flint'y Slate, a smooth, hard, brittle, splintery black rock, the result of the metamorphosis of slate or clay by contact with a mass of igneous rock. Rocks of this nature are found in the Lower Silurian of the S. of Scotland: and Lydian stone, used as a touchstone for testing precious metals, is probably of the same origin.

Float'ing Batt'ery, a name given to large vessels or hulks heavily armed and made as far shot-proof as possible. They were not built so as to attain high speed, or to be adapted for general service at sea, their principal use being in sieges, where rapidity of movement was not required. Wooden floating batteries were used against us by the French and Spaniards in the siege of Gibraltar (1779-80), and we employed iron ones—as did also the French—with success during the Russian war. Floating batteries are now superseded by armour-clad steamships, which unite a far greater degree of invulnerability than the others, with a speed such as the fastest cruisers scarcely ever attained.

Floating Islands may be formed either by nature or art, and consist mainly of masses of buoyant spongy soil, held together by the tenacious roots of plants. Portions of river banks are occasionally torn away by floods or swift currents, and carry with them to the ocean trees, reptiles, birds, and even large animals. Such 'straggling plots' are sometimes seen as far as 100 miles from the mouth of the Ganges, and were observed issuing from the Mississippi during the floods of 1874. F. I. have thus doubtless played an important part in the distribution of animal and vegetable life. Natural F. I. occur in great numbers in the marshy lakes bordering the Gulf of Venice. The lake of Gerdau, in Prussia, contains one of the largest in the world, while that in the lake of Kolk, in Osnabruck, is clad with elms. In Derwentwater, Cumberland, there is a small island which sinks below and rises to the surface of the water periodically, like the fabled island of the Cutilian waters. This phenomenon is explained by the island rising only when the Catgill, a stream which here enters the lake, is flooded by rains. The most celebrated artificial F. I. are the *chinampas* of the native Mexicans, and the aquatic gardens of Kashmir. The former sustained small trees and huts and could be propelled about by means of a pole.

Float'stone, a light spongy-like variety of fibrous quartz, capable of floating on water, and occurring as flint incrustations in the limestones of the Paris chalk formations.

Flodd'en, Battle of, was fought on 9th September, 1513, when James IV. of Scotland, who had sided with Louis XII. of France against Henry VIII. of England, was defeated by the Earl of Surrey, at F. Hill, one of the Cheviots, in Northumberland. There were about 30,000 on either side, and the Scots lost 10,000 men, among whom were James and the flower of his nobility. Jean Elliot's exquisite ballad the *Flowers of the Forest* ('I've heard the lilting at our yowe-milking') is a lament for the calamity. The battle is described with more than Homeric fire and brilliancy in the 6th canto of Scott's *Marmion*. See Burton's *History of Scotland*, chap. xxx.

Flogging, in the British army, is mentioned 'as strappadoe for drunkenness on guard' in the articles of war put forth by Charles I. in 1629, by advice of the council of war for the government of the troops in England. In every market there was to be a strappadoe as well as a gibbet. In the codes of 1639 and 1642 ordinary whipping by the provost is distinguished in the list of punishments. These codes also contained what was afterwards called by soldiers the 'devil's articles,' viz., for punishing indefinitely crimes for which no special order had been set down. In 1666 a jurisdiction in offences involving neither life nor limb was given to the then created regimental courts, which had also a power of 'arbitrary correction.' In 1672 'running the gantlet' was added. The Mutiny Act of 12 Anne confers on courts-martial a power to inflict corporal punishments 'for immorality, misbehaviour, or neglect of duty.' The disgraceful Act of 1715 declared every offence to be capital, with a discretion to the court-martial to award such other punishment as they should think proper. In 1812 both Houses of Parliament accepted the principle that for minor offences imprisonment might be inflicted as an alternative for corporal punishment, and the limitation of 300 lashes was introduced. A keen controversy raged down to 1868, when by 31 Vict. c. 14, sec. 22, the power to sentence any soldier to corporal punishment for any offence whatever during time of peace in her Majesty's dominions was abolished. But corporal punishment might be inflicted during active service or on board any ship not in commission for mutiny, insubordination, desertion, drunkenness on duty or on the line of march, disgraceful conduct (including embezzlement, theft, malingering, maiming, or tampering with the eyes), or any breach of the Articles of War, no punishment to exceed fifty lashes, or where punishment was also awarded, twenty-five lashes. This applied only to privates and non-commissioned officers. In carrying out this sentence the culprit was tied to a gun-wheel or a triangle of wood. For this purpose halberds were once used, hence the expression 'bringing a man to the halberds.' The drummers of infantry, and the trumpeters or shoeing smiths of cavalry, were selected for the work. The cat-o'-nine-tails consisted of a drumstick with nine ends of whipcord, 16 inches long, and with three knots each. Steeping the cats in brine had been made the subject of a serious charge, and in the case of Governor Walls (28 *State Trials*), where a rope had been used, there was a conviction for murder. Flogging was totally abolished by the Army Discipline Act, 1881.

The law of F. in the navy during service is contained in the following passage of the Queen's regulations:—'It being requisite for the maintenance of the efficiency, discipline, and even safety of H.M. ships of war, that the power of inflicting corporal punishment, when absolutely necessary, should be continued, such punishment is only to be inflicted under the responsibility and authority of the Captain, who is however to exercise the power vested in him with the greatest discretion and forbearance, compatible with the discipline of the service.' No officer is subject to F., and petty and non-commissioned officers and seamen, marines, and other persons in the First Class for conduct only in case of mutiny. No seaman, marine, or other person in the Second Class for conduct, belonging to a ship, is liable to summary corporal punishment, *i.e.*, flogging (limited to 48 lashes), in time of peace unless he be guilty of mutiny, or using or offering violence to a superior officer, and even then he is not to be flogged if the offence may be sufficiently met by imprisonment and the offender can within seven days be sent to a prison or tried by court martial. Under the Criminal Law Consolidation Acts of 1861 (there are five of them), males under sixteen years of age may be flogged for certain offences; and statute 25 Vict. c. 18, limits the punishment of boys under fourteen years of age to twelve strokes from a birch rod. In Scotland, persons over sixteen cannot be flogged for crimes of violence, &c., but in England robbery with violence and attempting to choke (while intending to commit an indictable offence against the choked) may be punished by flogging, besides the other authorised punishments where the offender is a male. Females cannot be sentenced to be flogged.

Flood, Henry, son of the Chief Justice of the Queen's Bench in Ireland, was born in 1732, was educated at Dublin and Oxford, and in 1759 entered the Irish parliament, where he soon made for himself a name by reason of his eloquence and his energetic action in connection with measures for the good of Ireland. In 1775 he became vice-treasurer of Ireland, but resigned in 1781. Two years later he was returned for Winchester, in the English House of Commons, and in 1785 for Seaford, and fully maintained the reputation of being a logical and eloquent speaker. He was also the author of the *Ode to Fame*, a volume of speeches, and a poem on the death of Frederick Prince of Wales. Died 2nd December, 1791.

Floor'cloth is generally formed of strong canvas oil-painted on both sides. (See LINOLEUM and KAMPTULICON.) The canvas is chiefly woven in Dundee in pieces of great length and width. The manufacture of F. is begun by stretching a piece of canvas containing about 210 or 220 sq. yards upon a vertical open wooden frame, a series of these frames being arranged parallel to each other at a distance of

30 inches with a tiered scaffolding between them, to enable the workmen to reach every part of the canvas. The cloth is washed on both sides with weak size, and then smoothed with pumice. This 'priming' solution preserves the pliability of the cloth by filling up the meshes to the exclusion of the oil-paint, which is next applied in the form of one 'trowel' and one 'brush' colour to the back, and afterwards of three coats of 'trowel' and one coat of 'brush' colour to the face. Each layer of paint, when dry, is rubbed down with pumice. The 'trowel' colour is so called because it is worked over the canvas with a trowel-shaped implement, the thick consistence of the paint not admitting of its being spread with a brush. When thoroughly dry, the painted cloth is transferred to the 'printing-room,' where it is passed over a long narrow table, and a pattern is hand-printed on the face by means of wooden blocks. Each colour has a separate block, the impressions of all producing an appropriate and harmonious design. From two to three months are occupied in the production of good floorcloths. The full-printed cloths are hung up in 'drying-rooms' to mature and season. This measure imparts strength to the cloth and brilliancy to the colours.

Floors in houses, the horizontal partitions between the stories. In the common or 'single-joisted' floor, a series of parallel wooden beams are laid across from wall to wall; these are not less than 8 or 9 inches deep, and 2 inches thick, and commonly more, and are called *joists*. To the top of these the flooring, which consists of narrow planks placed close together, is secured, and underneath them the laths for receiving the plaster of the ceiling are attached. 'Double-joisted' and 'framed' F. are more complex in construction, and are used where for any reason special strength is required, or where the length of the room is very great. The space between the flooring and the ceiling should be filled as far as possible with cement or other substance, as 'deafening.' In this country the flooring is of soft wood, and is most frequently planed tolerably smooth and left in that condition. In most parts of the Continent, where carpets are not so much used as with us, the F. are of hard wood, carefully jointed and kept always polished. The floor thus made looks better certainly than nine-tenths of the carpets used in this country. It is both clean, convenient, and economical to stain and varnish the edge of a soft-wood floor for a distance of about 2 feet 6 inches from the wall all round, and to put a border round the carpet, making it cover only as much of the floor as is unstained. This method can be used in any house floored in the ordinary way, by having the small spaces too often left between the planks stopped first with brown putty.

Flo'ra, the goddess of flowers and spring, was worshipped at Rome from the very earliest times. Her festival, the Floralia, lasted five days, from 28th April to 1st May, and was celebrated with great licentiousness. The later Romans identified F. and Chloris, the Greek goddess of flowers. In botany the word denotes the vegetable kingdom. See Fauna.

Flor'ence or **Firenze** (Lat. *Florentia*, 'the flourishing'; Ital. *Fiorenza*, now *Firenze*, surnamed *la bella*), one of the largest and fairest cities of Italy, capital of the province of the same name (Firenze), is built on both sides of the Arno, but chiefly on the N. bank, 50 miles from the sea, and is connected by rail with Bologna and Rome. Its environs are singularly beautiful. It lies in the leafy valley of the Arno, in a gently undulating country, amid low hills covered with vineyards and terrace gardens, with white villas and old towers embosomed in groves of olives, cypresses, and mulberries, while to the N. the Apennines rise to a height of 3,000 feet. The central and oldest part of F. is a maze of narrow, gloomy streets, where the massive castellated palaces of the nobles, used as fortresses during the Middle Ages, may still be seen. The Borghi, or outer quarters, which intervene between this central part and the old walls, are more spacious and regular; and beyond the walls lie the modern suburbs, consisting almost wholly of villas set amongst gardens. F. was in 1864-70 much changed, and since then several other improvements have been carried out. A new suburb has been built on the E. of the city, with handsome squares and boulevards, and the old quarters have been pierced by wide streets. The Arno, now confined to a channel 100 feet wide, is lined by broad quays known as the Lung Arno, which form a fine promenade, with a view of the sylvan Valdarno at one end, and of the Vallombrosan hills at the other. The river is spanned by several fine bridges, of which the Ponte alle Grazie is the oldest, having been built in 1235 (restored 1835). The Ponte Vecchio, still covered with quaint shops, dates from 1362. The walls are dismantled of the seventy or more towers which once crowned them, but the old gates are extant, the most interesting being the Porta Romana, Porta S. Miniata, Porta S. Gallo, and Porta alla Croce, built in 1284, the two last displaying frescoes by Ghirlandajo. F. has above twenty squares, of which the chief is the Piazza della Signoria, once the forum of the Florentine commonwealth, and still the great seat of trade. It contains a large fountain with bronze statues by Gian of Bologna. F. is rich in graceful and imposing buildings, in picturesque and historical piles. The Duomo, or cathedral, which stands near the centre of the city, was begun by Arnolfo di Lapo in 1294, was continued by Giotto, and was finished by Brunelleschi in 1436. The dome is 384 feet high, and the walls are cased with marble. By the side of the Duomo Giotto's campanile, or bell-tower, rises to a height of 292 feet. It is covered with delicately-tinted marbles and Gothic traceries, and according to Ruskin is the one building which unites in the highest degree the characteristics of beauty and power. The church of Santa Croce, 'the Westminster Abbey of Italy,' possesses eleven chapels and the tombs of Michael Angelo, Alfieri, and Macchiavelli, while the church of San Lorenzo contains the tomb of the Medici and the statues of Giuliano and Lorenzo de' Medici by Michael Angelo. The Palazzo Vecchia or Palazzo della Signoria, built in 1285 by Arnolfo, is a square turreted pile, and was once the seat of the republic's magistrates. It has a lofty tower with the great bell which formerly called out the citizens. The Palazzo degli Uffizi possesses a library of 150,000 vols. and 12,000 MSS., and an unsurpassed collection of sculptures and paintings, amid which are the Venus de' Medici and the famed group of Niobe and her children. The Palazzo Pitti, begun by Brunelleschi, and the residence of the King of Italy when he is at F., has a library of 70,000 vols. and a magnificent collection of paintings. Near the Pitti Palace, and on the summit of a hill S. of the Arno, are the Boboli Gardens, with statued avenues, terraced walks, fine fountains, and trees cut into formal shapes. The Bargello, built in 1255 as the abode of the Podestà, and known as the Palazzo di Giustizia, but for centuries used as the public prison, has been of late carefully restored and transformed into a museum for Tuscan antiquities. It has seven great halls and a richly-carved marble staircase. The church of Or San Michele is one of the finest Florentine relics. It is adorned with statues by Ghiberti, Donatello, and Gian of Bologna, which stand in niches of white marble carved into fanciful arabesques and inlaid with gold mosaic. There are many other palaces and churches and several theatres and hospitals. The commercial greatness of F. has departed; the silk, velvet, and woollen manufactures have declined, and trade is now mostly in mosaics, jewellery, porcelain, and works of art, though carpets and straw hats are still made. F. has been compared to Athens for the turbulence, intellectual brightness, and keen political sympathies of its inhabitants, for its firm democratic leanings, and for its splendour as a home of literature and art. It was the centre of the Renaissance in Italy, and the focus of Italian culture; it gave birth to the modern literary dialect of the Italian language, produced the earliest school of political historians since the days of ancient Greece, and numbered among its sons several of the greatest names in the history of painting, sculpture, and architecture. See Renaissance, Italian Literature, and Italian Art.

F. was founded by the Romans in the 1st c. B.C., was pillaged in the dark ages by the barbarians, and was afterwards occupied by the Lombards. Karl the Great appointed a duke, afterwards called a count, over F., with officers under him chosen partly by the people, a government which seems to have been the germ of the Florentine commonwealth. The emperors, especially Otho the Great, favoured the city, which in the 10th c. had conquered several neighbouring places. F. was ruled by twelve *Angiani*, acting along with a foreign Podestà, and no distinction was made between plebeians and nobles, until, between 1282 and 1292, a mercantile commonwealth was established. It was decreed that no one could bear office who did not belong to the *Arti* or commercial guilds, and the nobles were forbidden to share in the government, which was administered by eight Priors and the Gonfalonier of Justice. These held office for two months. About 1300 party strife broke out between the Guelphs, known as the *Neri* ('blacks'), and the Ghibellines or *Bianchi* ('whites'), the latter, among whom was Dante, being in the end banished. In 1323 the constitution was changed, and Guelph citizens above 30 were alone declared eligible for the chief magistracies, and were chosen by lot. During the 14th c. a new aristocracy grew up and the Medici came into importance. In the beginning of the 15th c. the Medici dynasty was founded by Giovanni de' Medici (died 1428), who was succeeded by Cosmo; and Cosmo's grandson Lorenzo in 1480 overthrew the old democratic constitution in place of a Council of Seventy, through which he controlled the state. In 1494 Pietro Medici was banished, and Savonarola founded a theocratic commonwealth, which ended in 1498; then the old republican government was restored under Soderini until 1512, when the Medici returned to power. A free commonwealth again existed from 1527 to 1530, when the Medici despotism was forced upon the city by the Emperor Karl V. Up to this time the Medici had ruled as commercial tyrants without princely titles, but in 1532 Alessandro de' Medici was made hereditary president, and Cosmo, his successor, was declared Grand Duke of Tuscany in 1569. On the extinction of the Tuscan ducal line in 1737 F. became the appanage of the house of Lorraine, under whom, except during the episode of Napoleon's kingdom of Etruria, it remained until 1860, when Tuscany was united with the kingdom of Italy. In 1864 F. succeeded Turin as capital of Italy, but was superseded by Rome in 1870. In history F. is remarkable for her general adherence to the Guelphic party, for the instability of her government as contrasted with the permanence of the Venetian rule, for the bright, variable political activity of her citizens, and for surpassing every other Italian city in her interest in the welfare of all Italy. Area of province 2265 sq. miles; pop. town 168,407; province 820,454.

Florence of Worcester, a monkish chronicler, belonging to Worcester monastery, where he died 7th July, 1118. He wrote a chronicle from the Creation to 1117, compiled chiefly from the *English Chronicle* and the work of Marianus Scotus, with additions from Bede, the so-called 'Asser,' and the Lives of the Saints. His chronicle deals mainly with English history, but also notices events abroad. It was brought down to 1141 by others of the brethren.

Flo'res (Port. 'flowers').—1. The most westerly island of the Azores, in lat. 39° 25′ N., and long. 31° 12′ W. It is very fertile, and has a pop. of 8,838. The chief town is Santa Cruz.—2. The largest island of the chain extending E. from Java to Timor, lies 200 miles S. of Celebes. It is 200 miles long and 35 broad, is in great part hilly, and has several lofty volcanic peaks on its S. side. The exports are sandal-wood, beeswax, and rice. There are Malay settlements on the coast, but the natives are of Nigritic race.—3. An islet of Uruguay, in the Plata, 20 miles below Monte Video.

Flor'iculture, or **Flower-Cultivation,** the art of cultivating flowers for the sake of their beauty, odour, and uses, has been practised from the most ancient times. In ancient history special reference is frequently made to floral decorations and to the selection of flowers for various purposes; while in modern times, not only has the art of gardening become very highly developed, but from a knowledge of the physiology of plant-life, florists are enabled to cultivate flowers under much more favourable auspices than formerly. The art of landscape-gardening has in fact become of late years highly specialised. In great towns and cities especially, flower-growing has been much facilitated by the invention of the *Wardian case*, a closely-glazed case invented by N. B. Ward. It consists of a strong box or trough to contain earth, which is placed over a substratum of gravel and broken bricks. The soil is well watered, and over the box a glass roof of tight-fitting nature is placed, this glass roof possessing a door or aperture permitting the removal of dead leaves, &c. By means of this principle of isolating, as it were, plant-life from the surrounding atmosphere, and supplying delicate or exotic forms with the necessary conditions for growth, many plants of rare nature can be successfully grown even in a very smoky atmosphere. The cultivation of flowers for commercial purposes may be said to form the practical application of the art of F. Thus the cultivation of Lavender (q.v.) assumes a high importance from the uses of that plant in the manufacture of perfumes. At Mitcham in Surrey vast quantities of lavender are grown. Otto or attar of roses, valued in some cases at five guineas per oz., also exemplifies the extent to which the successful results of F. may be carried.

Flor'ida, the most southern of the United States of America, included chiefly in the bold peninsula projecting from the S.E. angle of the country, is bounded on the E. by the Atlantic, on the W. and S. by the Gulf of Mexico, and on the N. by the states of Georgia and Alabama. The peninsular portion is 90 miles broad and 370 miles long. The coast-line is over 1150 miles in extent, and among its numerous harbours some of the chief are Pensacola, St. Mary's, Cedar Keys, Tampa, Fernandina, Biscayne Bay, Sarasota, Charlotte, Key West, St. Augustine, and Jacksonville. The capital is Tallahassee (pop. 2934), but there are much larger towns, such as Key West (18,080), Jacksonville (17,201), and Pensacola (11,750). From Cape F., near the southern extremity of the peninsula, a great series of reefs or keys sweep round to the S. and W., and end in a group of sandbanks and islets called *tortugas*. The chief of the keys are Key Largo and Key West, on the latter of which the important city and naval station of the same name is placed. The *surface* is level, the highest elevation being a ridge 180 feet above sea-level, extending from Fernandina on the E. to Cedar Keys on the W. coast, and traversed by railway. Streams, lagoons, and marshes abound all over the country. The chief rivers are the St. John's, Withlacoochee, Kissimmee, St. Mary's, Appalachicola, Chattahoochee, and the Suwannee. In southern F. the land seldom rises to more than 6 feet above the level of the tide. The soil is usually a light sandy loam, with a substratum of clay, and is of all qualities from the sandy pine barrens to the swamp land of tropical productiveness. Nearly all the grains and fruits of temperate regions may be grown in the N., semi-tropical fruits are profitably cultivated in the eastern and central districts, tropical fruits in the S. Raising cotton and sugar-cane, for which the soil and climate of F. are especially suitable, are growing industries. The forests consist of yellow pine, live oak, hickory, magnolia, mahogany, satin-wood, &c. Though in the same latitude as the Sahara Desert and S. China, the climate of F., tempered by cool winds from the seas surrounding it, which blow from sunrise to sunset, is delightful during the greater part of the year, and in this connection F. is becoming to the northern states of America what southern France and Italy are to Europe—a national sanatorium, and a favourite place of resort for those suffering from pulmonary diseases. The cultivation and export of oranges, lemons, and citrons is the chief industry. Considerable quantities of cotton, Indian-corn, potatoes, sweet potatoes, sugar, and tobacco are grown. In 1881 the cotton production was 54,997 bales. The Indian-corn crop averages over 3,000,000 bushels, of Irish potatoes 13,000 bushels, of sweet potatoes 1,037,000 bushels, of sugar 1300 hogsheads, of molasses 500,000 gallons, of tobacco 200,000 pounds. It has been stated that F. may at no distant date grow fruit for half the world, if she can only obtain sufficiency of capital and labour. Debt of the state, less sinking fund, $1,031,912. *History.*—Poncè de Leon, in search of an El Dorado that contained also the Fountain of Life, landed here in 1513, and gave the country its present name—the feast of flowers, so called from its having been discovered on Easter-day (Span. *Pasqua Florida*, 'feast of flowers'). It was settled by the Spaniards in 1565, ceded to Britain in 1763, re-ceded to Spain in 1784, sold to the United States in 1819, and constituted a state of the Union in 1845. In 1861 F. joined the Southern Confederacy, and was the scene of many bloody conflicts until 1865. In 1868 the state was readmitted into the Union. Area 54,240 sq. miles; pop. 391,422, of whom there are 166,180 persons of African descent, 108 Chinese, 14 Japanese, and 171 civilised Indians.

Florida-Blan'ca, Don Josefo Moñino, Count of, a Spanish statesman, born at Murcia in 1728. He studied law, became ambassador at Rome, where he ably composed many differences between Spain and the Pope, and was a chief agent in the election of Pius VI. In 1777 Charles III. made him prime minister, in which office he promoted trade and science, improved the roads and beautified the cities of Spain, and allayed a dispute with Portugal. He united Spain with Russia and Prussia in an armed neutrality, of which the aim was to cripple England, but his foreign policy ended in failure. During his administration Algiers was bombarded, which checked piracy, many heavy dues were removed, and great judicial reforms were effected. F. created many powerful enemies, and in 1792 was imprisoned in the castle of Pampeluna. After several years' confinement, he was permitted to return to Murcia, where he lived in retirement until 1808, when he was called to preside over the central junta during the war with Napoleon. He died at Seville, 20th November, 1808. F. wrote several treatises on jurisprudence.

Flor'idæ. See CERAMIACEÆ.

Florida Gulf, between the peninsula of Florida and the Bahamas, is practically the local name applied to that reach of the Gulf Stream which skirts the S.W. coast of Florida. See CURRENTS, OCEAN.

Florida Keys, a crescent-shaped group of islands along the S. coast of Florida. The gulf stream does not touch them. Cayo Largo (Long Key) is the most extensive, and has an area of about 25 sq. miles; and Key West is the next in magnitude, but most of them are quite small islets. They are of a coral formation and scarcely rise above the spring tide level. Very hard wood is grown upon them.

Florid'ia, a town of Sicily, province of Siracusa, near the Alfeo, 7 miles W. of Syracuse. It has some trade in grain, wine, and olives. Pop. 10,807.

Flor'in, at first the name of a gold coin, so called either because it was made at Florence, or because on its reverse side there was a lily (Lat. *flos*, 'a flower'). The modern English coin so designated is of silver, and of the value of 2s.

Flor'ists' Flowers. These flowers are so named from having been made the subjects of special attention by the practisers of Floriculture (q.v.). The cultivation of roses, dahlias, tulips, fuchsias, hyacinths, and many other flowers, exemplifies the results of the florist's art. The liability of many flowers when cultivated to *sport—i.e.*, to produce varieties—and the knowledge that by fertilising together flowers of different species, varieties can be produced in some cases almost at will, form two facts of great importance to florists. The fertilisation of the seeds of one species by the pollen of a different species tends to produce a union, in the hybrid progeny, of the characters of the parent-species. And hence the colours of flowers and other characters can be manipulated often with great freedom. *Double flowers* result from the conversion of the stamen and pistil into whorls of flower leaves—this process resulting in the sterility of these flowers. The Dutch have long been famous for their cultivation of flowers, particularly Tulips (q.v.). In 1636-37 a 'tulip-mania' seized Holland, and fabulous prices were given for rare varieties and bulbs. In S. Holland the cultivation of roses is also carried on with vigour, and in Britain, dahlias, hollyhocks, fuchsias, and other flowers, too numerous to mention here, are successfully grown.

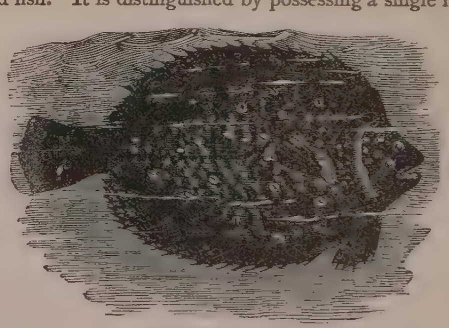
Flo'rus, L. Annæ'us, or more probably **Julius,** the reputed author of a succinct but over-rhetorical history, *Epitome Rerum Romanarum*, composed most probably in the reign of Augustus. It consists of two books, the first dealing with the foreign wars of Rome, the second with civil strifes, and ending at A.D. 20.

Flo'tant (Fr. 'floating'), an heraldic phrase applied to an unfurled flag.

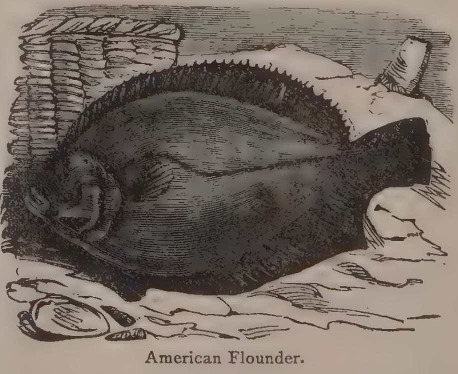
Flo'tow, Friedrich von, a German composer, born at Teutendorf, in Mecklenburg-Schwerin, 27th April, 1812. He received his musical education in Paris, where also his first successful opera, *Le Naufrage de la Méduse*, was produced in 1839. His compositions are all operatic; they are pleasant and melodious, and in many ways more like the work of a musician than those of his Italian and French contemporaries. While extremely popular, however, both in Germany and France, they are not yet, with the exception of *Martha*, so much known in this country as they deserve to be. The principal are *Stradella, Die Grossfürstin, Rübezahl, Indra, Albin, Hilan, and L'Ombri.* In 1863 F. settled at Paris, where he remained till his death, 24th January, 1883.

Flot'sam is a term of English law denoting goods floating in the sea, or goods which have been cast on shore by the sea. Where the owners are not known, F. goes to the Crown or lord of the manor. When the owners are known, they have a year and a day to claim their goods. See DERELICT, JETSAM, and JETTISON.

Floun'der, a species of *Pleuronectidæ* or flatfishes, common on the coasts of Britain and America, and esteemed as a food fish. It is distinguished by possessing a single row of teeth, the dorsal fin commencing over the eye, and the tail fin being distinct. The common F. attains a length of 10 or more inches, and a maximum weight of 5 or 6 lbs. Smaller specimens, however, are more frequently met with. The eyes are on the right side of the body, this being the upper



English Flounder.



American Flounder.

side of the animal, which swims and lies on the left side. Its colour is brown. The dab, a member of the same species, is nearly allied to the F. The common American F. is from 10 to 22 inches long, and is excellent eating in summer and autumn. The colour varies from slate to blackish-brown. The scales are small and arranged smoothly along the body.

Flour, the grain of wheat or other cereals finely ground for human food. The term is also applied to many finely-powdered substances.

Flou'rens, Marie Jean Pierre, a French scientific writer, was born at Maureilhan, Hérault, 15th April, 1794. He devoted himself from an early age to scientific study, at seventeen delivered a course of lectures on 'The Physiological Theory of Sensations,' and at nineteen obtained the degree of Doctor of Medicine, after which he went to Paris, where he made the acquaintance of St. Hilaire, Chaptal, the Cuviers, and other men of science. Admitted a member of the Académie des Sciences in 1828, he succeeded in 1832 to the professorship of natural history in the Jardin du Roi, and the following year became Perpetual Secretary of the Académie des Sciences. F. was a very voluminous writer, and from 1841 to 1851 published a number of books giving in a comprehensive form and in a singularly lucid style the 'history and philosophy' of several branches of science. F., who had been a deputy to the French Chamber for Béziers, was made in 1840 a Peer of France, and in 1864 member of the Municipal Council of Paris. He died 6th December, 1867.—**Gustave F.,** son of the above, and better known as a revolutionist than as a *savant*, was born 4th August, 1838. In 1863 he filled his father's chair in the Collége de France, published (1865) *Science de l'Homme*, and aided in the preparation of a *Grand Dictionnaire du XIX. Siècle*. From 1866-68 he took part in the Cretan insurrection, about which he wrote a book. On his return he threw himself into conspiracies against the Second Empire, aided the celebrated Rochefort in editing the *Marseillaise*, was wounded in a duel with the Bonapartist Paul de Cassagnac, and on being sentenced in 1870 to three years' imprisonment, fled to England. After the fall of the Second Empire he became commander of a regiment under the Commune, and was killed 3rd April, 1871.

Flour-Mite, a species of *Acaridæ* or mites which belong to the spider class (*Arachnida*). They exist among flour, and resemble in form the cheese-mite. The body is oval, has eight legs, and is covered with bristles. The female flour-mites are larger than the males.

Flour, St. (the ancient *Sanctus Florus*, surnamed *La Noire*), a town of France, department of Cantal, 34 miles E.N.E. of Aurillac. It stands on a basaltic highland, and is built almost entirely of volcanic *débris*. Its chief buildings are the cathedral (15th c.), the church of St. Vincent, and the corn-market. F. has manufactures of copper utensils, and trade in cattle and corn. Pop. town (which is divided into N. and S. St. F.) 5308; arrond. 51,716.

Flower (from Fr. *fleur*, Lat. *flos, floris*), the name given to the conspicuous series of organs found in higher plants, the ultimate function of which is *reproductive* in nature, and serves to mature and produce *seeds*. A perfect F. consists of four *whorls*, or concentric series of organs. Externally we find (1) the *calyx* (usually green, but sometimes coloured), composed of certain leaves named *sepals*; (2) within the calyx, the *corolla*, or showy part of the F. composed of leaves named *petals*, and coloured to attract insects to the F., for the purpose of fertilising the pistil by the conveyance of the pollen or matter of the stamens; (3) the *stamens*, forming the third whorl and existing each as a *filament* bearing a head or *anther*, consisting of two lobes, within which the *pollen*, a yellow powder necessary for fertilising the seeds, is produced; (4) the *pistil*, which is the central whorl of the F., and is composed of one or more folded leaves named *carpels*. Each carpel consists of a lower portion (the *ovary*, containing the *ovules* or *seeds*), of a neck (the *style*), and of a little head surmounting the neck, and named the *stigma*. The stigma and style may be wanting. The stigma is borne directly on the ovary (as in the poppy) when the style is wanting. The calyx and corolla are collectively named the *floral envelopes*; while the stamens and pistil are together named the *essential organs*, because they are necessary for the production of seed. Every part of the F. is a leaf more or less modified. The leaf-type of the F. may be demonstrated in cases of abnormal flowering, as in *double flowers*, where the stamens and pistil are represented by floral leaves. Conspicuous flowers are only met with in higher plants, which are hence named *phanerogamous*. In ferns, mosses, and lower plants, the reproductive organs are not conspicuous, and such plants are hence named *cryptogamous*. The F. is usually borne on a *peduncle* or F.-stalk. Where no F.-stalk is developed, flowers are said to be *sessile*. Thus in a daisy numerous sessile flowers are borne on a common receptacle, and form a F.-head or *capitulum*. When all four whorls of the F. are present, the F. is *complete*. It is *incomplete* if one or more are absent. When (as in lilies, tulips, &c.) the calyx cannot be distinguished from the corolla, or when one whorl only is present, the floral envelopes receive the name of *perianth*. A F. with calyx and corolla is said to be *dichlamydeous*; with one envelope only, *monochlamydeous*; and with no true calyx or corolla, *achlamydeous*. Flowers are *irregular* when one part of the calyx or corolla exceeds in size the other parts—as in the corolla of dead-nettle; and *regular*, when all the parts are of equal size—as in the buttercup. A F. is *symmetrical* when its parts exist in similar numbers or in multiples of one another. When flowers depart from the ordinary type of floral structure or arrangement, their modifications are due—(1) to the *absence* or *suppression* of one or more whorls; (2) to the *form* of the whorls; (3) to the *separation* or *union* of parts of whorls; (4) to the *parts* of one whorl being united to the adjacent whorl on either side; and (5) to the *position* of each whorl on the floral receptacle. Flowers are *bisexual* when each has both stamens and pistil. They are *unisexual* when each F. has one series of essential organs (stamens or pistil) only. Flowers are called *monœcious* when staminate or stamen-bearing flowers are situated on the same *plant* with pistillate flowers; and *diœcious* when staminate flowers are situated on one plant and pistillate flowers on a distinct plant. The *arrangement* of flowers on the flowering-axis is named *inflorescence*. Inflorescence is determined by the manner in which flowers open. Thus when the centre F. opens first, and the external flowers open later, the inflorescence is said to be *centrifugal* or definite; such a mode of F.-expansion is seen in buttercup, chickweed, sweet-william, &c. In wallflower, foxglove, &c., the inflorescence is *centripetal* or *indefinite*, the flowers furthest from the axis opening first. The most common arrangements of inflorescence are—(1) the *spike*, as seen in plantain, where numerous sessile flowers are arranged on a common axis; (2) the *raceme* (as in red currant, foxglove, &c.), which is simply a spike with *stalked* flowers; (3) the *capitulum* or *head* (as in daisy, clover, &c.), where sessile flowers are arranged on a common receptacle; (4) *panicle* (as in oat, horse-chestnut, &c.), which is a compound raceme, each secondary F.-stalk or pedicel again dividing; (5) the *umbel* (as in cowslip, carrot, hemlock, &c.), where the pedicels or secondary F.-stalks spring from a common point, and bring the flowers to the same level; (6) the *corymb*, where the flowers reach the same level, but where the pedicels do not spring from the same point (as in elder and hawthorn). Flowers and F.-buds spring from modified leaves named *bracts*, those of the secondary F.-stalks being termed *bractlets*. Where a circle of bracts surrounds a F.-head (as in daisy), the circle is named an *involucre*. The coloration of flowers, their physiology as concerned with fertilisation of the seed and with plant reproduction generally, and many other points, will be found treated of in other articles relating to botanical subjects.

Flowers, Artifi'cial. The art of imitating the floral beauties of nature with varied materials is extensively practised in France and Italy. The chief seat of the art is Paris, and its productions are noted for great artistic beauty. Fine cambric is mostly used for petals, and taffeta for leaves; but velvet, gauze, silk and crape are also in requisition. Stamens are represented with slender wire or stiffened silk threads, and stems are formed of stout copper wire. Veins, folds, and the peculiar markings of leaves are imitated by means of 'goffering' implements. Dyes for tinting are specially prepared. Most manufactories employ females, and produce only a component part of a flower, the parts being collected and grouped together by those who possess an intimate acquaintance with the natural objects. A. F. are much used for head-wreaths, dress-trimmings, bouquets, and table decorations. Great Britain carries on a large and annually-expanding import trade in A. F., chiefly with France. The value of the imports in 1894 were £375,366, of which £335,906 was the value of the import from France, £35,274 from Holland, £3326 from Belgium, £854 from Germany, and £6 from Canada. There would appear to be no export trade in A. F. Wax-flower making, which is almost exclusively practised in Great Britain, is quite a distinct art from the foregoing. (See WAX FLOWERS.) Other materials of the most diverse nature are employed in different countries for fabricating A. F. Feathers are widely used; the Austrians and Swiss use straw, the Brazilians gaudy insects' wings and fish-scales, and the natives of the Bahamas and Mauritius delicate sea-shells.

Flue. See CHIMNEY.

Flu'ids (from Lat. *fluo*, 'I flow') are bodies which yield without resistance to any given pressure, however small, unless they be supported by pressures in other directions. They thus embrace what are usually termed liquids and gases, and differ in this particular of non-resistance from solids, which comprehend all other known forms of matter. F., however, as we have them in nature, do not completely fulfil this condition. The *perfect* ideal fluid is not known; for in all viscosity, or what is termed fluid-friction, exists, in virtue of which work must be done to alter the relative positions of the component particles. As this viscosity gets greater and greater, the liquid fluid approaches more nearly the conditions of a plastic solid, so that in certain instances it is impossible to say whether a given specimen of matter is a solid or a liquid. See GAS, LIQUID, SOLIDS.

Fluke, the name given to various species of parasitic animals belonging to the order *Trematoda* of the class *Scolecida* (q.v.). The *Trematoda* are nearly allied to the *Tæniada*, or the more familiar tapeworms. The flukes are sometimes called *suctorial worms*, from the fact that (as implied by the name *Trematoda*) they have one or more sucker-like pores whereby they adhere to the tissues of their hosts. The flukes are found as parasites and in a mature state in birds, fishes, and other *Vertebrata*. A very familiar form is the *Distoma* or *Fasciola hepaticum* or common liver F., which inhabits the liver and biliary ducts of the sheep, and when present in numbers produces the disease in that animal known to veterinarians as 'Rot' (q.v.). In the common F. the characters of the *Trematoda* may be conveniently studied. In all the flukes, with a single exception, a digestive system is present, although no true perivisceral or body cavity is developed. The digestive system is usually of branching shape, and opens externally by a single aperture only, which therefore serves both as mouth and vent. This opening is situated within the front or anterior sucker. The *sexes* in flukes are united in one and the same individual, and a *water-vascular system* is developed. The common F. attains an average length of an inch or more, and has a body of an oval and flattened conformation. The hinder sucker is not perforated, and between the two suckers the *generative pore* is placed. The water-vascular system itself opens externally by a small aperture. The nervous system exists in the form of a ring of nerve-matter surrounding the gullet. The flukes pass through a complicated development. The young flukes appear to pass into water and gain access to the bodies of such forms as fresh-water snails. In this situation they develop into peculiar bodies called *Cercariæ* and *Cercaria-cysts*, each of which consists of a head extremity and a tail. In some cases the *Cercariæ* appear to produce other *Cercariæ* like themselves. These latter, after some further changes, escape into the water, and gain access to the bodies of sheep along with the water used for drinking. The flukes are not common parasites in man, although occasionally they are found in the human liver and its large veins. *D. lanceolatum* is another familiar species; and an Egyptian one, *D. hæmatobium*, occurs more frequently in man, and is dangerous to human life. An allied genus is *Diplostomum*, which occurs in numbers in the eyes of perches, and other fresh-water fishes.

Fluores'cence, an optical phenomenon observed in certain substances (solution of sulphate of quinine, tincture of turmeric, uranium glass, &c.), which emit a diffused blue or green light when placed in the path of dark actinic rays of high refrangibility. Professor Stokes explains it as due to the degradation of the highly refrangible actinic rays into luminous rays of less refrangibility. It suggests a method for investigating the absorption lines of the ultra violet rays of the spectrum, and is further a beautiful example of dissipation of Energy (q.v.) without the performance of useful work.

Flu'orine is classed amongst the elementary substances (see ELEMENTS, CHEMICAL). Its existence is surmised from the analogies existing between its compounds and those of chlorine, bromine, and iodine. It is, therefore, ranked with these substances, and they are called collectively the *haloids*, or salt-producers. F. occurs most abundantly combined with the metal calcium, as fluoride of calcium or fluor spar, and from this substance all compounds of F. are obtained. The only one of these of any practical importance is hydrofluoric acid, a compound of hydrogen and F., employed to etch glass. To prepare it, powdered fluor spar is heated with sulphuric acid in a leaden retort, when the gaseous hydrofluoric acid is disengaged, and may be used in this state, or conducted into water contained in leaden vessels, in which it is abundantly soluble. Solution of hydrofluoric acid must be preserved in leaden or gutta-percha vessels, as it attacks all others. The atomic weight of F. is 17, and the symbol for its atom is F.

Fluor'otype, a photographic process published in 1844 by R. Hunt. Paper is sensitised by means of a solution of bromide of potassium and fluoride of sodium, and afterwards with nitrate of silver. In developing, protosulphate of iron and weak hydrochloric acid are used; and in fixing, hyposulphite of soda is had recourse to.

Flu'or Spar, or **Derbyshire Spar,** a mineral of frequent occurrence in Derbyshire and Saxony, crystallizes in the monometric system, and is usually found in veins, often as a gangue of galena and other ores, in granite, gneiss, mica-slate, clay-slate, limestone, &c. It is the fluoride of calcium, is commonly greenish, violet blue, or topaz yellow in colour, though also found colourless, rose, crimson, or brown. It is transparent or translucent, is brittle, and of degree 4 in hardness. It is used as a flux for reducing metallic ores, and when heated with sulphuric acid yields hydrofluoric acid.

Flush, a nautical term applied to a ship's deck when it stretches from the bows to the stern in a uniform level, instead of curving upwards fore and aft.

Flush'ing (Dutch, *Vliessingen*, Fr. *Flessingue*, the town on the 'vliess' or 'channel' of the Scheldt), a fortified seaport of the Netherlands, province of Zeeland, on the island of Walcheren, at the mouth of the Western Scheldt, 4 miles S. of Middelburg and 35 W. by S. of Bergen-op-Zoom by railway. It is one of the strongest maritime forts in the Netherlands, commanding the entrance to the Scheldt, and has large harbours, dry docks, good roads, dockyards, arsenals, magazines, &c. There is a considerable Indian trade, besides active fisheries, and numerous regular steam-lines. Opposite F. is the fort of Breskens. F. was the first town that declared against the Spaniards in 1572. It was pledged by the Prince of Orange to Queen Elizabeth in 1585, and remained with the English till 1616. At the beginning of the 19th c. it was taken by the French, and was stormed and captured by the English under Chatham in 1809. In the same year it again fell to the French, who held it till 1814. Pop. 13,634.

Flus'træ, or **Sea-Mats,** a genus of *Polyzoa* (q.v.) or *Bryozoa* (q.v.). They are frequently cast ashore in great quantities on the English coasts, and present the appearance of masses of pale-brown seaweed. When microscopically examined they are seen to consist of a colony of animal forms, each member of the colony or *polypide* being enclosed in a little cell. The cells exist on both sides of the structure, and their tough outer wall or *ectocyst* remains, after the delicate living parts of the organisms have disappeared. Each little member of the colony possesses a mouth, surrounded by retractile tentacles, a digestive system, and male and female generative organs. The colony springs from a single egg, and is produced by a process of continuous *gemmation* or *budding*. The tentacles of *Flustræ* are arranged in an *infundibulate* or funnel-shaped manner. Hence *Flustræ* are included among the Infundibulate *Polyzoa* or *Gymnolæmata*.

Flute (Old Fr. *flaüte*, from *flaüter*, and that from Lat. *flatare*, 'to blow'), a wind instrument of ancient origin. It remained for a long time a very defective instrument, but recent improvements (especially those of Boehm) in the size and position of the holes, and in the fingering mechanism generally, have removed most of its imperfections. The natural scale of the concert F. is that of D major, and its compass is nearly three octaves. It is sometimes called a 'C' F. because its lowest note is C. The *piccolo*, or octave F., has nearly the same range as the concert F., but an octave higher. The sounds of the F. are produced by the vibration of the column of air in the tube, the length of that column being determined by the fingering. They are very nearly Simple Tones (q.v.), and therefore somewhat wanting in richness.

Flute, in classical architecture, is a vertical channel or hollow moulding on the shafts of columns. In a horizontal section of a fluted Doric column, the flutes, twenty in number, are segmental concaves, and sharply intersect each other. In Doric, also, the F. is not terminated before reaching the base and capital, as in the other orders. The Tuscan is the only column that is never fluted; the Ionic, Corinthian, and Composite have each twenty-four flutes. In Romanesque the F. was bent from the perpendicular into curved and twining forms. See CABLING.

Flute'work, a general name given to those stops in organs in which the sound is not produced or qualified by the vibrations of a metal tongue or *reed*.

Flux (Lat. *fluxus*, from *fluo*, 'I flow'), a substance easily fusible added to assist the fusion of refractory materials. Limestone, fluor spar, borax, nitre, sal-ammoniac, common salt, crude tartar, and glass are used as fluxes. *Black F.* is used in the reduction of metallic ores. It is formed of two parts of tartar to one of nitre, mixed in small quantities in a red-hot crucible. *White* or *refining F.* is composed of equal parts of the same ingredients.

Flux (Lat. *fluxus*, from *fluo*, 'I flow'), an extraordinary issue or evacuation, generally from a mucous membrane. Formerly the term was applied to a variety of diseases, such as diarrhœa, dysentery, cholera, bilious attacks, &c., but it is now seldom used. Dysentery was long known as *bloody F.*

Flux'ions, the mathematical method invented by Newton which corresponds to our modern Calculus (q.v.). It is founded upon the kinematical considerations of the motion of a point, a manner of procedure fundamentally identical with that of *limits*, which is now generally recognised as the only true logical method of establishing the first principles of the differential and integral calculus. The *fluxion* of x was written $\dot{x}$, and corresponds to $\frac{dx}{dt}$, the differential coefficient of x with respect to time; $\ddot{x}$ corresponds to $\frac{d^2x}{dt^2}$, and so on. The notation, though now superseded in investigations in pure mathematics, is yet very convenient in many physical problems, where time is the only independent variable. $\dot{x}$ was the *fluxion* of x, and x was the *fluent* of $\dot{x}$; and the integral $\int z\,dx$ was written by Newton $\boxed{z\dot{x}}$ and called the fluent of z.

Fly, a name given popularly to many insects, but zoologically restricted to members of the order *Diptera* (q.v.), or flies in which only two wings—the front pair—are developed, whilst the metamorphosis is perfect, and the mouth suctorial.

Flycatcher, the name given to a large family (*Muscicapidæ*) of Insessorial birds belonging to the section *Dentirostres*, and also to various typical species of the family. The characters of the family are found in the bill being curved above and compressed at the tip. The tail and toes are long, and the tarsi short. The flycatchers are usually of small size, and their colours sober but pleasing. The familiar flycatchers of Britain are the pied F. and the spotted F. The former is found mostly in the N.W. of England, and appears to visit Norway and Sweden in summer. The colour of the female is a delicate brown above, and greyish beneath; the male being coloured dark brown above, the forehead having a white patch; while the tail is black, and the under parts white. The average length is 5 inches. The spotted F. arrives in England in May. It has been seen in S. Europe and S. Africa. Its general colour is a light brown above, the breast being white, and the sides yellowish brown. Its song is very feeble. The nest is ingeniously constructed of long hairs, grasses, mosses, &c.; and the eggs, numbering five, are bluish-white spotted with red. Exotic species are the paradise F. of India and the fork-tailed F. of tropical America.

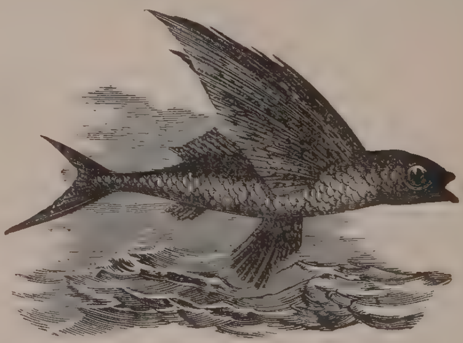
Fly'ing is the motion through the air of birds, insects, and bats. It does not include the leaping of fish, reptiles, and small quadrupeds, which is frequently assisted by membranes or fins acting as parachutes. As compared with walking and swimming, F. obviously is accompanied by the minimum of resistance from the atmosphere and the maximum of displacement. The travelling surfaces or wings have therefore to be greatly increased; they act like twisted inclined planes. When the wing ascends and descends, it rotates within the *facettes* or depressions situated on the scapula and coracoid bones. The curves described by the wing and body in F. form waved lines intersecting at each beat of the wings. Bell Pettigrew maintained that walking, swimming, and F. all take place in figure-of-8 curves; that wings (consisting of arm, forearm, and hand) are really screws, and reverse their planes at every stroke; and that they act not merely as elevators, but as buoys after the manner of kites. His experiments have been continued by Marey, Senecal, Ciotti, and others. The muscles being arranged in a certain cycle, the shortening of the flexor halves and the lengthening of the extensor halves diminish the angles formed by the lever bones, and by the opposite muscular actions these angles are increased, and this alternation makes F. The power of F. varies with the size of wing, the dragon-fly and the albatross being conspicuous examples. The weight of the bird is indispensable to flight, the body by its fall elevating the wings, which are opposed obliquely to the air. A good deal of exaggeration occurs in the descriptions of the air-sacs and hollow bones found in some flying animals. The fifteen air-sacs described by Sappey are more probably connected with respiration; they do not occur at all in the bat. The rapidity of vibration in wings has also been exaggerated; it has been said that the blow-fly vibrates its wings 300 times per second. The actual velocity of the wing is probably greater in the case of insects, as it arises from the thoracic muscle, while birds have muscles distributed upon the pinion. The *libellulæ* of the dragon-fly, however, enter the root of the wing. The buzzing, whirring, and whistling noises produced by wings have some relation to the rapidity of stroke. In the case of birds which skim, sail, or glide, the pinion is greatly elongated and ribbon-shaped, but generally there is a relation between the weight of the animal, the area of its wings, and the rate of oscillations. Most flying animals seem to have much more wing than they absolutely require, as considerable portions have been detached without seriously affecting F. It is maintained by De Lacy that the larger the animal the smaller relatively are its flying surfaces. The pigeon weighs eight times less than the stork, and has twice as much surface. A singular mode of F. is that practised by the large-winged oceanic birds, which begin by beating the water with the tips of their wings so as to force the body up. An account of the manner in which the feathers are arranged to make the wing impervious to air in the down stroke, and to increase or diminish its area, is given in Pettigrew's *Animal Locomotion*, p. 180. By the flexing of the wing in flight the *remiges* or 'rowing feathers' are opened up and the air permitted to escape. The wing is elevated by the muscle *pectoralis minor*, and depressed by the *pectoralis major*. Professor Pettigrew is of opinion that the effective stroke is given downwards and forwards, but the weight of observation seems to be against this view. Attempts have been made to fly, not by a machine specifically lighter than air, but by the use of rigid inclined planes driven forward in a straight line, or revolving planes (aërial screws), and also by the vertical flapping of wings. The *aërostat* of Henson and Stringfellow was invented in 1843. Its vanes or paddles were driven by a small steam-engine one-third of a horse power. It had huge fixed bamboo frames covered with canvas, and a rudder also made of canvas, but movable within limits. Its weight was 12 lbs. (including superimposed planes of canvas, or aëroplanes, added by Wenham in 1867), and its sustaining area 36 feet. This machine was started by being run rapidly down hill, the sails being set at a small angle to the ground. Sir George Cayley's *aërial screw* consisted of two corks, in which wing feathers were stuck. The corks were connected by a shaft, and a thread wound on to a bow of whalebone caused the corks to rotate in opposite directions. Phillipps, also, made a small metal steam-engine with fans (weighing 2 lbs.), which flew across several fields. In 1863 the Frenchmen, Nadar and De la Landelle, completed several clockwork models (*orthoptères*), but their chief success was in the *helicopteric*, in which the steam-driven screws were arranged in tiers upon two masts. As regards artificial wings, the earliest (not reckoning mere parachute falls) seem to be those constructed by Borelli (*De Motu Animalium*, Prop. 196, 1680). The wings consisted of a rigid rod in front, and flexible feathers behind. He conceived that the air's pressure drove the bird forward like a wedge in the direction of its base. It is generally admitted that the horizontal impulse depends on the yielding or *elevation* of the free extremities of the quills in the downward stroke. Marey further says that the converse takes place in the up stroke, the posterior margin of the wing in both cases making an angle of 30° with the horizon (*Méchanisme du Vol chez les Insectes*, 1869). The wings constructed by Marey and Straus-Durckheim do not seem to differ in principle from Borelli's. Pettigrew's wave wing, on the other hand, closely resembles the actual construction of a bird's wing. It has no rigid margin, is twisted on itself, and tapers from the root to the tip. Elastic reeds or fine steel rods are covered with silk, india-rubber, linen, &c. The wing is valvular, so that during the up stroke the superimposed air passes through, and it is made to vibrate obliquely, not vertically. The experiments made seem to destroy Chalvier's theory that all the work of F. was done by the depressor muscles, the air forcing the wing upwards to its original position. Recently a F.-machine was put forward by Maxim as likely to solve the problem of artificial locomotion through the air. Experiments were made, and were deemed to be so far satisfactory, but no further steps would appear to have been taken in the matter. The chief difficulty which inventors have to contend against is the impossibility of reducing the weight of a machine to the required minimum.

Flying Bridge, a ferryboat attached by a long chain or rope to a buoy anchored in the centre of a river or to the opposite bank. The position of the buoy depends upon the width of the river and the rapidity of the current, but when properly chosen the action of the current, combined with the resistance of the chain, causes the boat to move across the river. By setting the boat obliquely to the current, by the help of the rudder, the action of the current is resolved into two forces—one tending to separate the boat from the chain, and the other to move it at right angles to the chain. The resistance of the chain to breaking counteracts the first of these, and the second only takes effect, the boat thus sweeping across the stream in an arc of a circle of which the buoy or the middle of the stream is the centre. Flying bridges are often used for military purposes.

Flying Drag'on or **Lizard,** a species of *Lacertilia*, or lizards, found in the E. Indies and Indian Archipelago, and so named from the possession of a *patagium* or wing-like membrane, enabling the animal to take flying leaps from tree to tree. The skin on each side of the body is extended and supported on six of the anterior ribs, which extend in a straight manner from the spine. This apparatus acts merely as a kind of parachute, and can in no sense be said to represent wings or organs of true *flight*. The colour of the F. D. is an olive brown, and the average length about 5 or 6 inches. An allied species is the fringed dragon of Sumatra and Java. (See DRAGON.) These lizards form the modern representatives of the great extinct reptiles known as *Pterodactyles* (q.v.).

Flying Dutchman, The, like many other mediæval legends, is a growth by accretion rather than a single independent creation. It is traceable to the 16th c., and is typical of a time of rude religious feeling and of wild seafaring adventure. The germ of the story, in its varied forms, is akin to that of Odysseus and the Wandering Jew. For some great sin an accursed mariner is doomed to perpetual and aimless cruisings. In modern forms of the legend he is rescued from his fate by some holy interposition—a religious amulet or a faithful woman's love. According to a late version, the F. D. was an Amsterdam vessel, the master of which, Van der Decken, swore on a certain tempestuous night to make the Cape or to be 'eternally damned,' and 'though he should beat there till the day of judgment'; and there he is still to be seen, with crowded sail, tearing along in the wildest weather. Heine has made the legend the subject of a beautiful tale; Wagner weaves it into one of his finest operas, treating it as symbolical of the universal longing for rest from the storms of life.

Flying Fish, a name popularly given to all fishes which, from the large development of their pectoral fins, possess the power of leaping from the water and of supporting themselves for short distances in the air. The typical F. F. is the Teleostean species *Exocœtus volitans*, belonging to the family *Esocidæ*, or that of the pikes. In this fish, found in warm seas, the pectoral fins are elongated, as is also the lower lobe of the tail-fin. No teeth are borne on the palate. The swimming or Air Bladder (q.v.) is of very large size. The 'flight' of the F. F. is short and imperfect, and appears to result in greater part from the impetus which the fish gains in its primary rush from the water, though the distance covered by a series of flights is sometimes hundreds of yards, the fish striking the surface of the water and darting upward and forward without becoming submerged. In this way escape from its enemy is often attained. Scores are caught every night on the main decks of steamers and ships crossing the Indian Ocean. Another species also known by the name F. F. is the Flying Gurnard (q.v.). The true F. F. swim in large shoals, and form the prey of other fishes. They are much esteemed on account of the delicacy of their flesh, and



European Flying Fish.

may be caught at night by exhibiting a torch or other light, this process seeming to attract them. The dolphin-fish or *Coryphæna* is the natural enemy of the F. F., and pursues them with great dexterity.

Flying Fox. See KALONG.

Flying Gur'nard, a species of *Triglidæ* or Gurnards (q.v.), so named from the large development of the pectoral or breast fins, by aid of which they are enabled to raise themselves from the water. The common F. G. is the *D. volitans* of naturalists, and is very common in the Mediterranean Sea. It attains a length of from 10 to 15 inches, and is of a brown colour above, variegated with bluish hues. The under parts are rose-coloured, and the fins are black and spotted with blue. An allied species is the Indian F. G. of the Indian Ocean, which is distinguished by the possession of two elongated filaments placed in front of the dorsal fin. Like the true flying fish it is pursued by the dolphin-fish.

Flying Le'mur, or **Colu'go,** a peculiar genus of *Mammalia*, so named from the possession of an expansion of the skin along the sides of the body, uniting the fore and hind limbs, and also extending between the hind-limbs and tail. The possession of this membrane enables the animal to effect springing leaps from tree to tree, but does not confer upon it any power of true flight. The flying lemurs have been by some naturalists associated with the lemurs or lower *Quadrumana*, or monkeys, while other authorities have regarded them as forming a connecting link between the order *Insectivora* (moles, shrews, &c.), and that of the *Quadrumana*.

Flying Lemur.

The F. L. of the Eastern Archipelago is the most familiar species. The toes are free, and not united by or connected with the membrane. Each foot has five toes, but neither the great toes nor the thumbs can be opposed to the other digits, so as to convert the feet into hand-like organs, as in many monkeys. The teeth resemble in many respects those of *Insectivora*. There are four upper and six lower incisors, and two canines, four præmolars, and six molars in each jaw. The six lower incisors are divided into narrow strips or portions, like the teeth of a comb. The flying lemurs average in length about $1\frac{1}{2}$ feet, are nocturnal in habits, and live chiefly on fruits, small birds, and insects.

Flying Mouse. See FLYING PHALANGER.

Flying Phalan'ger or **Oposs'um,** a group of Marsupial (q.v.) mammals, allied to the kangaroos, &c., and included in the family *Phalangistidæ*, or that of the phalangers. The most familiar examples are the flying-squirrel, the great F. P., the Ariel P., and the Taguan. The opossum mouse, or flying mouse, is also nearly allied. Like the Flying Lemur (q.v.), the F. P. has a fold of skin along each side of the body, uniting the fore and hind limbs. It is nocturnal in habits, and its *patagium* or fold of skin enables it to take flying leaps among the trees. The tail is not prehensile. The F. P. is confined in its distribution to Australia. The flying mouse attains a length of about $3\frac{1}{2}$ inches, while the other species vary in length from $1\frac{1}{2}$ to 2 feet. The prevailing colour is brown, and the fur is soft and glossy.

Flying Squid, a genus of *Cephalopoda* (q.v.), or cuttle-fishes. These animals derive their popular name from their habit of leaping from the water, sometimes with force sufficient to land them on the deck of a ship. They belong to the Dibranchiate cuttles, and to the section *Decapoda* ('ten-armed'). They are included in the family *Teuthidæ*, or that of the Squids. The flying squids are most frequent in tropical seas, but are also found in temperate regions.

Flying Squirr'el, the name given to various genera of Rodent *Mammalia*, resembling the Flying Lemur (q.v.), and Flying Phalanger (q.v.), in that the body is provided with lateral expansions of the skin, forming a kind of parachute serving to sustain the animal in its flights from tree to tree. The flying squirrels occur in S. Asia, Polynesia, N.E. Europe, N. America, and Siberia. They belong to the genera *Pteromys* and *Sciuropterus*, and are included in the squirrel family (*Sciuridæ*). The Taguan F. S. has no relationship with the phalangers. It inhabits India. The Assapan is an example of the second genus, this form occurring in N. America, and attaining a length of 5 or 6 inches. The colour is brownish grey above, and white below. The fur is not of high value, but is frequently used along with that of other species of Squirrels (q.v.).

Flying Squirrel.

Fly-Pow'der is the name given to a compound of metallic arsenic and arsenious acid sold on the Continent for the purpose of killing flies. Such a dangerous compound should never be used for such a purpose. Flies and gnats are repelled by the odour of the oils of turpentine and rue, and quassia acts upon them as a poison.

Fly'trap. See DIONÆA.

Fly'wheel, in mechanism, a wheel fixed upon a revolving shaft and having a heavy rim, its use being to equalise the motion of the shaft, which without it would at some times rotate much faster than at others. Its theory can be most easily explained by reference to the F. of a steam-engine driving the machinery of a factory. Here, in ordinary cases, the resistance (due to the machinery) which has to be overcome by the engine changes continually throughout the day, but for any small interval of time (as that in which the engine makes one revolution) it is practically constant. The mean effort exerted by the engine in that period has been equal to the mean resistance to be overcome; but instead of being constant, it has varied continually, being at one instant smaller and at another greater than the resistance. *Of itself*, therefore, it could not drive the machinery continuously, but only by jerks. A heavy F. placed upon the shaft, however, entirely obviates this difficulty, and by its means any required degree of steadiness can be obtained. The engine expends energy, at starting, in accelerating the velocity of the mass forming the F., and this energy remains stored up in the wheel after it has attained the required velocity. When the resistance becomes greater than the effort, the deficiency is supplied from this storehouse of energy, the velocity being retarded in consequence; when the effort exceeds the resistance, the surplus is absorbed by the F. again with a corresponding acceleration. By making the F. heavy enough, the proportion borne by this surplus and deficiency to the whole energy stored up may be made as small as we please, and thus the fluctuations of speed may be made correspondingly small. In ordinary machinery the ratio borne by the difference between the maximum and minimum velocities to the mean velocity is about 30 : 1.

Any machine (as a punching machine, for instance) in which the resistance varies very greatly periodically should be fitted with a F. of its own besides the one on the engine. It may be mentioned that in certain cases flywheels, or their equivalent, are employed to store up energy in order that, by being brought suddenly to rest, they may be able to exert an enormous pressure through a very small distance, as in stamping a coin.

Foch'abers (Gael. *Faichaber*, 'the plain of the confluence'; anciently *Beul-ath*, 'the mouth of the ford'), a neat, well-kept village of Elginshire, on the Spey, 9 miles E. of Elgin. F. is beautifully situated in a valley, and consists chiefly of a square and four main streets. The principal buildings are the Established, Free, and Episcopalian churches; and the Milne Free School, founded by A. Milne, a native of F., who died at New Orleans, U.S., and left 100,000 dollars for the purpose. Near F. is Gordon Castle, a seat of the Duke of Richmond and Gordon. Pop. 1101.

Fo'cus (Lat. 'a fireplace'), in physics, is the point at which rays of light, heat, or sound meet after reflection or refraction. From certain important geometric properties of the conic sections with respect to certain points, the name was applied to these points, and has now undergone a much wider extension of signification in mathematics.

Fodd'er (Old Eng. *foder*, Dutch, *væder*, Ger. *futter*), a name given to the food of cattle. The term is vaguely employed, but generally it is restricted to such plants and crops as are consumed in a green or fresh and succulent condition. F. is also an obsolete term for a weight of lead or other metal in England, the precise amount of which varied in different localities.

Fœ'nus Naut'icum (Lat. 'interest on ships') is the rate of interest proportioned to the risk which a person lending money on a ship, on Bottomry Bond (q.v.), as it is called, is entitled to demand.

Fog (of Danish origin), or **Mist** (Old Eng. *mist*, 'darkness') is produced by the condensation due to cooling of the aqueous vapour in the air into the form of minute drops of water. The direct cause of its presence may therefore be either the indraught of a cold current into a warm mass of air, or of a warm current into a cold mass of air. The rapid cooling of the ground in contact with air is also frequently attended with the appearance of F., as in the case of the evening mists. Morning mists are often vaporised and dispelled as the day advances by the heat of the sun.

Fogarasy, János, a Hungarian scholar and lawyer, was born at Käsmárk in 1801. He gained considerable reputation for his works on jurisprudence, filled several public offices, and in 1848 was made a member of the financial council of Pesth. F. zealously studied the Magyar tongue, and made important contributions to philology. Among his writings are *A' Magyar nyelo' metaphysicája* (1834), *A' Magyar nyelo szelleme* (1845), a Magyar-Latin dictionary (1855), and various legal and linguistic works. F. and another eminent Hungarian scholar, Czuczor, are the authors of the Dictionary of the Hungarian Academy.

Foggia, a town in the S. of Italy, in the province of the same name, 80 miles E.N.E. of Naples, on the river Cervara. It is the commercial centre of Apulia, and has great cornstores, and a trade in cattle and wine. It possesses several fine squares and churches, a cathedral, theatre, library, botanic garden, museum, &c. F. is said to have been built from the remains of the old Arpi. The Emperor Friedrich II. held a parliament here in 1240. It was the scene of his wife's death in 1241, and of Manfred's victory over the Pope's troops in 1254. In 1731 F. was almost destroyed by an earthquake. Towards the end of the 18th c. it was the seat of the court of Ferdinand I. Pop. 41,125.

Fog-Signals, audible signals used on board ship, on the sea-coast, on railways, and elsewhere during fog or mist, when the ordinary visible signals cease to be of use. The signals commonly used at sea are the striking of a bell or gong, or the blowing of a horn or steam-whistle; the latter, where it can be used, being probably the most effective. Fog and mist very greatly interfere with the transmission of sound through the air, but further experiments are required in order that precise conclusions may be arrived at on this subject. Experiments made by Tyndall have shown that an optically clear atmosphere is not always the best for transmitting sound, and that the report of a gun in certain circumstances is superior as a fog-signal to a horn or steam-whistle. Such signals as are mentioned above do no more than announce the presence, and approximately the position, of a vessel. In the navy a code of F.-S. is in use, by which the ships of a fleet can communicate in thick weather; there does not seem any reason to prevent the use in the merchant service of an alphabet 'of longs and shorts' (like the Morse alphabet), which would render communication, at present impossible, very easy. The F.-S. used on railways are small packets of detonating material, placed upon the rails and exploded by the wheels of the engine passing over them.

Föhr, one of the North Frisian islands belonging to Denmark, lies off the W. coast of Slesvig, in the North Sea. Area, 28 sq. miles; pop. 4150, mostly Frisians. It exports to Hamburg large quantities of oysters, cheese, and hosiery. Wyk, the chief town, is a bathing-place, and has had steamboat communication with Cuxhaven on the Elbe since 1833.

Foil, a sword-like weapon used in fencing, is a pliable, highly-tempered bar of steel, from 31 to 38 inches long. The blade is edgeless, and is protected at the point by a 'button.' The F. is used only for thrusting.

Foil (Fr. *feuille*, Lat. *folium*, 'a leaf'), in the arts, plates of metal beaten or rolled out to a state of great tenuity. Tin-F. not exceeding $\frac{1}{1000}$th of an inch in thickness is much used for lining boxes and packages in order to exclude moisture, or to preserve the flavour and aroma of their contents. When covered with mercury it is also employed for silvering looking-glasses. Till 1840 tin amalgam was exclusively employed for that purpose, but the pernicious effects its preparation had upon the health of the workmen has chiefly led to the adoption of other methods of silvering. F. of copper and its alloys has long been manufactured at Nürnberg and Fürth in Bavaria; hence it is sometimes called *German F.* The manufacture of bronze powders is simultaneously carried on there in order to utilise the F. waste. Highly-polished thin sheets of silvered copper constitute jeweller's F., which is coated with transparent-coloured varnishes, and placed under precious or factitious gems to enhance their brilliancy and colour.

Foils, in architecture, are the compartments of an arch or spandril formed by arcs of circles in Moorish and Gothic styles. The foils in an Arabian arch are always uneven in number.

Foils.

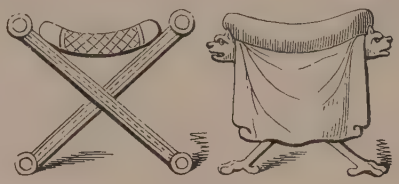
Foix (Lat. *Fuxum*), a small French town in the department of Ariège, 467 miles S. of Paris. It stands on the Ariège, is very irregularly built, and is overlooked by three towers, part of the old château of the Counts of F. The chief building is the Gothic church of St. Volusien. F. has ironworks and some trade in pitch. Pop. commune 7568; arrond. 77,030.

Foix, Comtes de, an old French family which arose in the 11th c. Among its chief members are **Roger**, who received from his uncle, Comte de Carcassonne, the lands of F., now the department of Ariège, whence he took the title Comte de F. He died in 1064. His nephew, **Roger II.**, joined the first crusade, and died in 1125. Roger II.'s grandson, **Roger-Bernard I.**, received large additions to his estates from Raymond V. of Toulouse, and in 1185 obtained the marquisate of Provence from Alfonso II. of Aragon. His son **Raymond-Roger** was the ally of Raymond VI. of Toulouse in the Albigensian crusade, and after a determined resistance to Simon de Montfort, in which he proved himself a brave and skilful soldier, died in 1223. He was a patron of the Troubadours, and wrote several poems. **Roger-Bernard II., the Great,** was the sole ally of Raymond VII. of Toulouse against the forces of Northern France. He was twice excommunicated, and died in 1241. His grandson, **Roger-Bernard III.**, one of the best French poets of the 13th c., fought against the house of Armagnac, a feud maintained after his death in 1302 by his son **Gaston I.**, and ended at the time of his grandson, **Gaston II.**, who contributed greatly to the victory of the Navarrese over the Castilians at Tudela in 1335, did good service against the English in France, and died in 1343. He was succeeded by **Gaston III.**, who was born in 1331, and surnamed *Phœbus* from his beauty. He was made king's lieutenant in Gascony and Languedoc, married a daughter of the King of Navarre, served against the Sclavic heathens of Prussia, rescued the royal princesses when they were shut up in Meaux during the Jacquerie, and died in 1391. He was famous for his chivalrous courage and devotion to the chase. He is said to have kept 1600 dogs, and wrote a work, *Phèbus des deduitz de la Chasse des Bestes sauvaiges et des Oyseaulx de Proye*, which remained popular with the great nobles and gentry long after the Middle Ages had expired. Froissart, who spent a considerable time in Gaston III.'s residence of Orthes, where he picked up many of the most interesting tales in his Chronicle, has given a careful but over-flattering portrait of this prince. On his death the F. estates passed to another branch of the family. **Gaston IV.**, ably opposed the English in Guienne, received the seignory of Carcassonne and the counties of Roussillon and of Cerdagne from Louis XI., and died in 1472. His grandson, **Gaston de F., Duc de Nemours,** was the most famous of the family. He was a son of Jean de F., Vîcomte de Narbonne, and of Marie d'Orléans, sister of Louis XII.; was born in 1489; was made Duc de Nemours in 1505, and in 1511 commander of the French in Italy. He defeated the Swiss at Como and Milan by his brilliant strategy, routed the besiegers of Bologna, beat the Venetians near Brescia and routed that city, and on 11th April, 1512, gained the crowning victory of Ravenna over the Spaniards, but was killed through his rash daring, and his death rendered the success fruitless. He was surnamed the *Thunderbolt of Italy*, and is almost unsurpassed as an example of youthful military genius. On his death the estates of F. passed to the King of Navarre, and in the time of Henri IV. were united to the French Crown.

Fok'shan, Fokchani, or **Focsani,** a town of Roumania, on both banks of the Milkova, which partly separates Moldavia and Wallachia, 45 miles W.N.W. of Galacz. It is larger on the Moldavian side, and has a total pop. of 17,039. There is an active river trade, chiefly in corn, with Galacz, and in the vicinity is produced the best wine of Moldavia. The Turks, who were defeated at F. with great loss by the Greeks, 1st June, 1821, set fire to the town in September, 1822.

Folc'land, or **Folkland,** was the land belonging to the state, corresponding in the old English constitution to the Roman *ager publicus*, and opposed to *bocland* or hereditary estate. With the growth of the kingly power the people's land changed into the king's land, and, after the Norman conquest, the F. became the *terra regis*, the personal estate of the sovereign. When the hereditary nature of the English monarchy was established, any private estates which might belong to the several rulers were fused with the F., which from William I. to William III. was viewed as the king's personal property. Now, however, it is placed at the disposal of Parliament, to be used in the people's service in the same manner as the other state revenues. See Freeman's *Growth of the English Constitution*, chap. iii.

Folding-Stool, or **Faldstool,** a chair or stool which folded up like our camp-stool, and was made of metal or wood, and covered with silk or any other rich fabric. Formerly the bishops carried about folding-stools, and used them as their seats in any church other than their own.



Folding-Stool.

Földvar (Magyar, 'land-fortress'), or **Földvar Duna,** a town of Hungary, on the right bank of the Danube, in the county of Tolna, 80 miles S. of Buda-Pesth. It is strongly and beautifully situated on a hill, is noted for its sturgeon-fishery, and has trade in wine, corn, and salt. Pop. 13,728.

Foley, John Henry, R.A., a sculptor of rare force of genius and artistic accomplishment, born in Dublin, 24th May, 1818, distinguished himself in the drawing and modelling schools of that city, and, removing to London, entered the Royal Academy at the age of sixteen. He was elected Associate in 1849, and R.A. in 1855. He first exhibited in 1839, when his two models, 'Innocence' and 'Death of Abel,' attracted favourable notice. His 'Ino and Infant Bacchus' (1840), purchased by Lord Ellesmere, his 'Death of Lear' (1841), 'Lear and Cordelia' (1842), 'Venus rescuing Æneas' (1843), bear witness to the industry with which he followed up his first success. He afterwards produced 'Prospero and Miranda,' 'The Mourner,' 'Egeria,' &c. He was chosen by the Queen to execute the figure of the Prince Consort for the Albert Memorial in Hyde Park. His fame, indeed, most securely rests on this magnificent statue, his fine marble statue of 'Hampden' in Westminster Palace, his 'Lord Hardinge,' now at Calcutta, and the magnificent equestrian statue of 'Sir James Outram'—a work inspired with vigour and heroic feeling, and the artist's masterpiece. Like the 'Hardinge,' the 'Outram' is now in Calcutta. F. died in London, 27th August, 1874.

Folia'tion, in geology, is, according to Sedgwick, a 'separation into crystalline layers of different mineral composition,' differing thus from cleavage, which is merely a disposition to *split* without mineralogical changes. Darwin gives many fine examples in his *Geology of South America*, and suggests that F. and cleavage are really parts of the same process.

Folign'o, a town in the province of Perugia, Central Italy, on the Torpino, 15 miles S.E. of Perugia by railway. Walls surround the town, but are no longer used as fortifications. It has a fine cathedral, a Palazzo Communale, a theatre, promenades, &c. The 'Madonna di F.' by Raphael is now in the Vatican. The chief manufactures at F. are parchment, wax-candles, woollens, silks, and playing-cards. There is considerable trade in cattle, and the neighbourhood is plentifully covered with vineyards, and olive and mulberry groves. The waterfalls of the Torpino near the town are very fine, and there is a splendid cavern of stalactites. F. is the Umbrian Fulginii and the Fulignum of the Middle Ages. It was partly destroyed by an earthquake in 1832. Pop. 23,202.

Folkes, Martin, F.R.S., an English antiquary, was born in London, 29th October, 1690, studied at Cambridge, was elected Fellow of the Royal Society in 1714, and in 1741 became its president. He was afterwards president of the Antiquarian Society, and a member of the Academy of Sciences at Paris. Oxford honoured him with the degree of D.C.L., and his own university with that of LL.D. He died 28th June, 1754. F. contributed many dissertations to the *Transactions* of the Royal and Antiquarian Societies. One of these, *A Table of English Gold Coins*, was reprinted in 1745 with additions, and a new edition appeared in 1763 under the title of *A Table of English Silver and Gold Coins, new reprinted with Explanation* (2 vols.).

Folkes'tone (Lat. *Lapis Populi*, 'the stone or fortress of the people'), a thriving seaport and a fashionable bathing-place in the S.E. of Kent, lies in a hollow at the base of high cliffs, 5 miles W.S.W. of Dover, and 83 E.S.E. of London by railway. It has a good harbour and a pier, from which a view may be had of the French coast, and coastwise from Dover to Hastings. There is a considerable trade and regular steam communication with Boulogne, distant about 30 miles. The fine parish church occupies the site of the ancient church of the priory of St. Eanswith, founded in 1095, which in its turn had succeeded the nunnery of St. Eanswith, the first house established in England for female devotees. The harbour has been greatly extended and improved, and the esplanade, promenades, and terraces of houses are spacious and well built. Harvey, whose statue has been placed here, was born at F. The imports in 1894 were considerable, the chief of which were 553,881 lbs. of leather, 187,068 pairs of leather gloves, 483,158 great hundreds of eggs, 413,583 gallons of wine, and £5,762,883 worth of silk goods. F. forms part of the Hythe parl. district, which returns one member. Pop. mun. bor. and civ. par. (each) 23,905; and reg. sub-dist. 30,293.

Folk'-Lore (Ger. *Volks-Lehre*), a term borrowed from the German to describe that floating mass of legendary narrative, song, and saying which takes its rise during the early life of a nation, and exists solely in the memory of the people, unless at a later date its remains be gathered up and preserved in literary form. F.-L. in its wide sense belongs to anthropology and antiquarianism as much as to literature, since religious myths, ethnic peculiarities, physical conditions, mental characteristics, and social customs, all come within its scope. The term is, however, generally restricted to the literature originating in that period of national history which the Germans call *sagenzeit*, or tradition-time, a period through which all peoples pass. In regard to these early sagas, it must be noted that they are not, even in their most fantastic dress, deliberate fictions, but are believed by teller and hearers; and that they grow insensibly by a very natural process of accretion, until what has been a legend or a ballad may result in a complete cycle of connected traditions. There is a further tendency in many cases to group a set of tales and poems round the centre figure, such as Beowulf was to the Low German, Karl the Great to the Frank, Arthur to the Briton, Fingal to the Gael, the Cid to the Spaniard, or Hiawatha to the American Indian. F.-L. is seen at its perfection in Hesiod and Homer, in the poetical traditions of the Greeks, 'the abundance, the beauty, and the long continuance' of whose early literature Grote pronounced a 'phenomenon which has no parallel elsewhere.' The F.-L. of Rome, if less rich and splendid, is even more eminently national than that of Greece; her early history is but a collection of F.-L. recast by subsequent historians. Modern Italy has produced another legendary growth of a different character, exhibited in the collection of Busk (*Roman F.-L.*). The literary history of Oriental nations is marked by a F.-L. equally abundant, of which the Arabian or Arabico-Egyptian *Thousand and One Nights*, the Persian *Sindibad Nameh*, the *Pantschatantra*, and the Hindu Vedistic and Brahmanical legends present distinctive phases, while the Slavic races have also their stock of popular traditions. (See Eichhoff's *History of Slavic Literature*, Ralston's *Russian F.-L.*) Among the Gothic peoples of early Europe, however, their F.-L., which flourished with great luxuriance, exercised an influence on the formation of national character not equalled in the case of any other people. Tacitus mentions the 'old songs' of the Germans, and Jacob Grimm (in his *Deutsche Mythologie*) has thoroughly investigated the growth of these ancient traditions, which comprise, among many others, the *Niebelungen Lied*, the *Volsunga Saga*, the *Eddas*, and the *Lay of Beowulf*. (See also Murray's *Manual of Mythology*, Baring-Gould's *Myths of the Middle Ages*.) The Welsh *Mabinogion* is a collection of Celtic F.-L. As specimens of French F.-L. may be mentioned the *Amadis de Gaul*, the *Chronique de St. Denis*, *Chronique de Turpin*, *Roman de Garin le Loherain*, and the *Chansons de Geste* (Fauriel's *Origine de l'Epopée Chevaleresque*, Paris's *Romans des Douze Pairs de France*). In this country the antiquarian side of F.-L. has been treated of by such writers as Browne (*Antiquitates Vulgares*), Brand (*Observations on Popular Antiquities*), Hone in his *Every-Day Book*, Chambers in his *Book of Days*, and Swanson in his *Handbook of Weather F.-L.* English F.-L. in its purely literary aspect, is of great antiquity and interest. Geoffrey of Monmouth's *Chronicle* is apparently constructed of F.-L.; while *King Horn*, the *Romance of Alexander*, *Guy of Warwick*, *Bevis of Hampton*, *Havelok the Dane*, the *Proverbs of Hendying*, the *Robin Hood Ballads*, and *Chevy Chase*, are well-known instances of English popular traditions and ballads. See Percy's *Reliques*, Campbell's *Tales of the W. Highlands*, Warton's *History of English Poetry*, Scott's *Border Minstrelsy*, &c.

Folk'mot (Old Eng. *folc-gemot*, 'meeting of the folk or people'), the name given in early English times to the popular assembly of the shire, which was composed of representatives from hundreds and townships. The scirgerefa or sheriff presided over the F., by which he was at one period probably elected, though not within historical knowledge. The F., according to Edgar's law, was held twice in the year, but it assembled in arms on any occasion of emergency. It is incorrect to suppose, as Kemble does, that this was the origin of the Witenagemote, since the F. exercised no legislative authority, but only judicial functions, and the Witan was at no time a representative body. See Stubbs's *Constitutional History*, vol. i., Freeman's *Norman Conquest*, vol. i.

Folk'right or **Folcright**, an old English law term denoting the rights of the people by common law. F. would seem to have been first mentioned in the laws of Eadward the Elder.

Fomenta'tion (Lat. *fomentatio*, from *foveo*, 'I keep warm'), an application of warmth and moisture to a diseased or painful part. This may be done by means of a cloth moistened with water and covered with gutta-percha cloth, to prevent evaporation; or by cloths wrung out of hot water, and frequently renewed. The water may be medicated with vegetable infusions, and in this manner opium, belladonna, camomile, turpentine, &c., are used as topical applications.

Fonblanque', Albany William, a journalist of high ability and character, was born in London in 1797. His father was an equity barrister of Huguenot descent, and F. was for a time a pupil of Chitty, the special pleader; but before he was twenty years of age took to journalism. From 1820 to 1830 he wrote for the *Times* and *Morning Chronicle*, while he contributed to the *Examiner*, the *London Magazine*, and the *Westminster Review*. From 1830 to 1847 he edited the *Examiner*, and showed a humour and a trenchancy of style which have been compared to those of Swift. F. was a singularly conscientious and honourable, as well as an able, writer. In 1847 he retired from the *Examiner*, and in 1852 was appointed to the post of statistical secretary to the Board of Trade, but continued to write at intervals for journals and magazines. He died 13th October, 1872. In 1837 a number of his articles from the *Examiner* were reprinted under the title *England under Seven Administrations.* See *Life and Labours of F.*, edited by his nephew.

Fon'di, a decayed town in the province of Caserta, S. Italy, 50 miles S.E. of Rome, near the miasmic *Lacus Fundanus*, and on the Appian Way, which is here in a very perfect state. It is enclosed in part by cyclopean walls, and has a fine cathedral, while the vicinity still produces the *vinum Cæcubum* of classic times, though, it is to be feared, of somewhat poorer quality. Pop. 7731.

Fond du Lac (Fr. 'bottom,' *i.e.*, 'inner end of the lake'), the capital of a county of the same name, Wisconsin, U.S., on Lake Winnebago, at the mouth of F. du L. River, 148 miles N.N.W. of Chicago. It is the junction of several railways, and has regular steam communication with the ports on the lake. There are some fine churches, a public library, public gardens, &c. Water is supplied by about 1000 artesian wells, and is noted for its mineral properties. Among the principal works are steam saw-mills, planing-mills, flour-mills, foundries, waggon and carriage factories, paper-mills, and cigar factories, besides large blast-furnaces and tanneries. Pop. 12,024.

Fonseca, Bay of, or **Gulf of Concagua,** a Central American inlet of the Pacific, between San Salvador on the N.W., Honduras on the E., and Nicaragua on the S.E. It is 50 miles long from S.E. to N.W.

Font (Lat. *fons*, *fontis*, 'a spring or well') is the name given to the receptacle for the water used in Christian baptism. As this was performed in the early centuries by immersion, the F. was a large basin in the centre of the Baptistery (q.v.), generally about 6 feet across, and 3 or 4 deep, and below the level of the floor, like a tomb, with symbolic reference to the believer's being buried with Christ by baptism. The descent into it was generally by three steps, symbolical of the believer's renouncing the world, the flesh, and the devil; and the ascent by three, symbolical of his professing belief in the Trinity. The step on which the bishop stood celebrating the rite made up the sacred number, seven. When the innovation of baptism by aspersion was introduced in the Western Church, the F. took the form of a small vessel, such as is used at the present day. The *material* as a rule was stone, the basin marble. In *form* fonts were originally merely circular basins. In the 13th c., however, they were made octagonal, probably with reference to the eighth day of the child's life being the proper time for baptism, as it was for circumcision, between which and baptism the early Church held there was a strong analogy, the eighth being regarded as the first day of independent existence (*cf.* Gen. xvii. 12; Lev. xxii. 27). In the 14th c. and 15th c. they were richly sculptured. They were not at first raised on supports, but were afterwards supported on pillars, usually five, to represent our Lord and the four Evangelists. A F. at Hildesheim of the 13th c. rests on personifications of the rivers of Eden, for the four cardinal virtues; one at Salzburg, on four lions, and one at Liège, like the brazen sea of Solomon's temple, on twelve oxen. Latterly, too, the supports rested on a pedestal of three steps, for the same reason, as there were three steps in the old immersion F. As regards its *position*, as baptism is the rite of admission into the Church, the F. properly stood not far from the entrance of the church. Originally a F. was placed only in the bishop's church, which was therefore called 'the mother-church,' but latterly in all churches.

Fon'tainebleau, a town and château in the department of Seine-et-Marne, France, 2 miles from the left bank of the Seine, and 35 miles S.S.E. of Paris. The town owes its origin to the château, which is one of the most magnificent buildings in France. As early as the time of Louis VII. it was a fine feudal structure, and it has been splendidly remodelled or extended by almost every succeeding king. It is a *mélange* of styles, and among its more interesting portions are the chapel of the Sainte Trinité, erected by François I., the gallery of frescoes of the 16th c., the gallery of Diana, restored by Napoleon I., the hall of council, decorated with pictures by Boucher, the ornate throne-room, and, grandest of all, the gallery of Henri II., containing a fine series of mythological pictures. The château, with its beautiful gardens, courts, and fountains, is surrounded by the grand old forest of F., which covers an area of 65 sq. miles. Of the historical events connected with the château, the more important are the execution of Monaldeschi in the Galerie des Cerfs by order of Christina of Sweden; the signing of the revocation of the Edict of Nantes by Louis XIV. in 1685; the celebration of Napoleon's marriage with Marie-Louise; and the imprisonment of Pope Pius VII. in 1816. The town has, among other good buildings, two large hospitals, one the gift of Madame de Montespan. There are large manufactures of porcelain and crockery, and an active trade in sandstone, grain, grapes (the famous *chasselas de F.*), and other fruits, horses and cattle. Pop. commune 14,222; arrond. 86,291.

Fonta'na, the name of several Italian painters in the 16th and 17th centuries, of whom the most famous is **Domenico F.**, who was born at Mili, on Lake Lugano, in 1543. Trained to the profession of an architect at Rome, F. became the favourite of Cardinal Montalto; and when the latter succeeded to the popedom as Sixtus V., he was made papal architect, and as such completed the cupola of the basilica of St. Peter, placed on its piazza the obelisk which had been brought from Egypt in the reign of Caligula, designed the library of the Vatican, and restored the columns of Trajan and Antoninus. The successor of Sixtus V., Clement VIII., disgraced F., who took the post of architect to the King of Naples, and designed a royal palace and harbour, which, however, he did not live to complete. F. died in 1607.—**Giovanni F.**, brother of the preceding (born 1540, died 1614), distinguished himself by his skill in hydraulic architecture.—**Carlo F.** (born 1634, died 1714) was also papal architect.

Fontanelles, membranous intervals or spaces found in the skulls of infants and of young animals, which the process of ossification has not reached. See SKULL.

Fontanes', Louis, Marquis de, known for his style of rhetoric and poetry as 'Racine's latest descendant,' belonged to an old Protestant family of Languedoc, and was born at Niort, 6th March, 1757. He first became known in literature as the translator of Pope and Gray, and as the writer of two original poems, *Le Cri de mon Cœur* and *Le Verger*, both published in 1778. In politics F. was originally a royalist, then a republican, although of a very moderate type, editing, during the Revolution, a journal entitled *Le Modérateur*. Compelled to take refuge in England after the 18th Fructidor, he there made the acquaintance of Chateaubriand. Returning to France after the 18th Brumaire, he became an ardent admirer of Napoleon, on whose fall he transferred his service to the Bourbons, and was raised to the peerage under Louis XVIII. His later years were devoted to an epic, *La Grèce délivrée*. His death took place 17th March, 1821, in which year also a collection of his speeches was given to the public. A collection of his works both in prose and verse was edited by Sainte-Beuve in 1839.

Fon'tenay is the name of thirty-four places in France, of which the most important is **F.-le-Comte** (called during the Revolution *F.-le-Peuple*), a town in the department of Vendée, France, on the river Vendée, 25 miles S.E. of Napoléon Vendée. It has a fine Gothic church, with a crypt dating from the 11th c., a church of St. Jean, notable for the beauty of its spire, a Renaissance fountain, some manufactures of linen and coarse cloths, and a trade in timber, grain, hemp, wine, &c. F., which owes its origin to the château of the Comtes de Poitou, was ceded to the English, from whom it was taken by Du Guesclin after a heroic defence. It suffered ten sieges during the religious wars, and was dismantled under Louis XIII. The Vendéens gained one of their greatest victories here over the Republicans. Pop. commune, 9864; arrond. 143,578.

Fontenelle', Bernard Le Bovier de, a once famous French author, born at Rouen in 1657, was the son of a local procurator and of Martha, a sister of Pierre and Thomas Corneille. He began literary life at Paris under the auspices of his uncle. Here he made the friendship of St. Pierre, and soon joined in the great literary quarrel of Moderns *versus* Ancients, vehemently criticizing the masterpieces of Greek art, held up as models by Racine and Boileau. Of Theocritus he said, 'Ses bergers sont trop bergers,' a phrase which has become classical. A few operas, his *Dialogues des Morts*, the *Entretiens sur la Pluralité des Mondes* (the speculative part of which is based on the Cartesian hypothesis of *vortices*), a translation of Van Dale's *History of Oracles*, in which and in his *Doutes sur le Système Physique des Causes Occasionelles* (of Malebranche) there is much covert scepticism, were the chief products of his pen down to 1688, when his *Poésies Pastorales* appeared. These were highly artificial in tone, and by no means justified his hard words against the great poets of antiquity. In 1699 he became perpetual secretary to the *Académie des Sciences*, of which he wrote a history; and during the next forty years he composed and pronounced those *Éloges des Académiciens*, which are the real monument of his literary fame. The range of knowledge required for the task may be inferred from the fact that the list includes Vauban, Malebranche, Leibnitz, Newton, Boerhaave, &c. His judgments, generally just, are always expressed with marvellous clearness and grace. He died in his hundredth year at Paris, 9th January, 1757, a living connection between the 17th and 18th centuries of French literature. F.'s *Œuvres Complètes* have been frequently published, the best edition being that of Paris (1818).

Fon'tenoy, a village (pop. of commune 703) in the department of Yonne, Burgundy, France, 18 miles S.W. of Auxerre, has, among several places of the same or similar name in that department, the best claim to be considered the old *Fontanetum* or *Fontanidus in pago Ætiodorensi*, where, on the 25th July, 841, was fought the memorable battle between the sons of Hlodowig the Pious, which finally severed the connection between the Western and Eastern Franks and from which we begin to date the separate existence of 'France' and 'Germany.'—F. is also the name of a village in the province of Hainaut, Belgium, 4 miles S.E. of Tournay, where was fought 'the battle of F.,' a decisive contest in the war of Austrian succession, in which the French under Marshal Saxe, defeated the English, Dutch, and Austrian allies, 11th May, 1745. The forces were each some 60,000 strong, and the total loss amounted to about 7000 men. Pop. of commune 818.

Fonte'vrault (*Fons Ebraldi*), a small town in the department of Maine-et-Loire, France, 35 miles S.E. of Angers. It was formerly the seat of a celebrated abbey, the nucleus of the rich, influential order of F., founded by a Breton monk, Robert d'Arhissal, in 1099. The rule of the order was that of Benedict, but the monks were placed under abbesses, who were generally of illustrious family. In the 18th c. it had lost much of its wealth and power, but even at the time of the first French Revolution, when it was abolished, it held fifty-seven priories. The abbey is now occupied as a central prison. At F. are the tombs of the English Henry II., of his queen Eleanor of Guienne, and of Richard I. Pop. of commune 2698.

Fontina'lis, a genus of *Musci* or mosses distinguished by possessing the fructification within the leaves. The best-known species is the greater water-moss, found growing on rocks and stones in the neighbourhood of water.

Food is whatever goes to the building up of the tissues and substance of a living being, and enables it to perform its necessary functions of life. All organisms, vegetable and animal, have their proper food which is essential to their existence. As a rule, vegetables build up, from the unorganized elements of the mineral kingdom, those compounds which serve for the nutrition of the animal kingdom. Animals, on the other hand, by feeding on the substances thus elaborated, decompose them, and return their constituents to the mineral kingdom; and thus the cycle of inter-dependent existence continues. Animals are classed according to their diet, as graminivorous or vegetable-eating, carnivorous or flesh-feeding, and omnivorous or eaters of both vegetable and animal F.; but primarily all animal F. is obtained from the vegetable world, carnivorous creatures only taking it at second-hand through the bodies of the animals on which they prey.

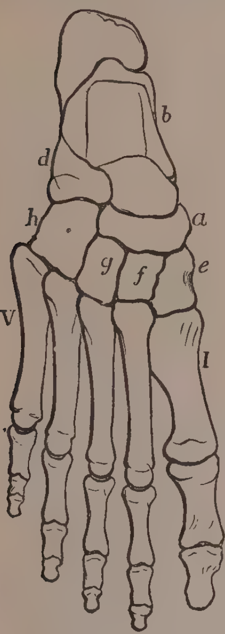
Human F. is frequently classified in a popular way under the two heads, F. and drink, which are regarded as functionally distinct, but such a subdivision is altogether fallacious, as there is no physiological or chemical ground to warrant the separation. Man is of all animals the most thoroughly omnivorous, drawing his F. from an endless variety of sources, and this he further varies indefinitely by cooking and compounding in every fashion that art can suggest. Notwithstanding this incalculable variety, the F. of man, as of every animal, is composed essentially of a limited number of alimentary principles. Analysis shows these principles to be—(1) Nitrogenous compounds, represented by casein in milk, and analogous substances found in cereals, peas, beans, &c., with a small proportion of albumen and other albuminates; (2) fat or butter; (3) a carbo-hydrate; (4) water; and (5) saline substances or ash, consisting of combinations of calcium, magnesium, sodium, &c., with chlorine, phosphoric acid, and other acid substances. Each of these five classes must be represented in every proper form of diet, and for the purpose of adequate nutrition they must be consumed in certain proportions, varying with conditions of climate and habits of life. The peculiar function of each has, however, not yet been definitely determined. The nitrogenous substances, the fats, and the carbo-hydrates, become oxidized within the human body, and are thrown out as effete matter in the form of urea and carbonic acid. In becoming oxidized they give off within the human body the stores of energy which they contained, and that energy is manifested as vital heat, nerve and muscular action, &c. Water and saline substances, and the oxygen of the air inhaled by the lungs, are essential as oxidizing agents. In addition to these principles there are, however, a variety of other substances taken into the human body, the functions of which obviously do not depend upon their being oxidized. They are various in their constitution, and are to be regarded as regulating the nutrition, or as having certain specific auxiliary or medicinal effects upon the essential ingredients of F. All kinds of F. thus come under one or other of the following heads, which are modified from a physiological and chemical classification of F. drawn up by Huxley and Frankland:—Class I., Alimentary or necessary F. containing the five groups given above; and Class II., Medicinal or auxiliary F., subdivided into four groups, namely—(1) alcoholic substances, represented by beers, wines, and spirits; (2) spices and condiments, containing volatile oils, such as pepper, cinnamon, cloves, nutmegs, and mustard; (3) acid substances, such as apples, oranges, rhubarb, &c.; and (4) substances containing alkaloids or special active principles which act upon the nervous system as stimulants or sedatives, a most important group, embracing tea, coffee, and cocoa, with the various narcotics habitually indulged in by almost all races of mankind. See COOKERY DIETETICS.

Fool. See COURT-FOOL.

Fools, Feast of (Lat. *Festum Stultorum*, *Festum Fatuorum*), was a festival instituted by the early Christian Church to take the place, in the people's regards, of the Roman Saturnalia (q.v.) or New Year festival. The great peculiarity of that festival, besides an unbounded extravagance of merriment, was that while it lasted all the ordinary conditions of society were reversed, *e.g.*, slaves taking the place of their masters, arrayed in their clothes, and waited upon by them. And a similar inversion of the ordinary relations between the clergy and laity formed the principal feature in the F. of F. The festival extended from Christmas to the last Sunday of Epiphany, but the chief celebration was on Innocents' or New Year's Day. At first only the choristers took part in the ceremonies of the day, which consisted of the performance, with mock solemnity, of the ordinary religious rites, while the clergy formed the audience or part of it. But latterly all the servants of the Church, and even laymen, took part, and as time went on extraordinary license was introduced. A president being elected under the name of Pope of Fools, Archbishop of Dolts, Abbot of Unreason, Lord of Misrule, &c., the performers repaired to the church, where, dressed in the priests' vestments outside in, they read prayers from books turned upside down, with spectacles of orange-peel, and burned an old shoe or filth in the censer; or, not sparing even the Church's most sacred rite of the Mass, ate sausages and puddings off the altar, or played at dice upon it. During and after the mock service, the church, which was thronged with a motley crowd of spectators, was a scene of the wildest riot and confusion, the maskers leaping and dancing like madmen, and singing obscene songs, some of them being dressed up as dragons, hobby-horses, &c. Long before the Reformation the F. of F. had become such a scandal from the way in which everything sacred was turned to ridicule, that the clergy, who had themselves set the stone rolling, did everything in their power to put a stop to it; but all their attempts were unavailing, till the institution got its death-blow at the Reformation.

Fool's Pars'ley, a species of poisonous *Umbelliferæ*, so named from its producing narcotic symptoms, and from its having been sometimes eaten in mistake for Parsley (q.v.). F.P. is a common British weed. It is distinguished from other and allied *Umbelliferæ* by its flowers having deflexed *involucres* or circles of *bracts*. Probably, as is the case with 'dead-tongue,' a near ally of F.P., the poisonous properties of the plant depend greatly on the locality and mode of growth.

Foot. This important part of the body is formed of (1) the tarsus; (2) the metatarsus; and (3) the phalanges. The *tarsus* is composed of seven bones, namely, the os calcis (*d*), astragalus (*b*), cuboid (*h*), scaphoid (*a*), and the three cuneiform, internal (*e*), middle (*f*), and external (*g*). The astragalus articulates with the lower end of the tibia and fibula. The *metatarsus* is formed of five bones (I. to V.), which are shafted bones, like those forming the metacarpus, or palm of the hand. The *phalanges* are attached to the extremities of the metatarsal bones, and are usually numbered first (1), second (2), and third (3), from behind forwards. It will be observed that the great toe has only two phalanges. Structurally the F. is an arch supported on three piers, two in front and one behind. The posterior pier of the arch is formed by the heel, and the anterior piers by the balls of the great and of the little toes. The weight of the body is transmitted to this arch from the tibia to the astragalus. The F. is also slightly arched transversely. These characteristics of the F. of man adapt it to the support of the body in the erect position, and to biped progression. It wants the prehensile power seen in the F. of the anthropomorphic apes. On the whole the human F. is, in proportion to the size of the whole body, larger, broader, and stronger than that of any other mammal save the kangaroo. The plane of the F. is at right angles to that of the leg, its sole is concave, its great toe is usually unopposable, and the upper surface of the astragalus looks almost vertically upwards. All of these peculiarities distinguish the F. of man from that of the ape. The great toe, though in man one of the largest digits, is rudimentary or entirely absent in many mammals. In climbing animals it is considerably developed, and has prehensile characteristics, as in the gorilla and orang.



Bones of the Foot.

Foot, a measure of length, in almost universal use, and doubtless derived from the length of the human foot. The numbers expressing the length of the English foot in terms of the corresponding measures in other European countries and states were as follow:—Austria, ·964; Baden, 1·016; Bavaria, 1·044; France (Paris F.), ·938; Prussia and Denmark, ·971; Russia, 1; Saxony, 1·076; Würtemberg, 1·064. The metrical system is now followed in most countries. An English mile contains 5280 English feet. The actual length of the English F. is the distance between two gold pins in the bronze bar, called 'Bronze 19, No. 1,' which is measured when the bar is at a temperature of 62° Fahr. The F. of the U.S. of America was taken from the old English standard.

Foot, in organ-building, is sometimes used to qualify the word *tone*, as '4-foot tone,' '8-foot tone,' &c. It here indicates the length of an open organ-pipe which would produce the required sound. Thus middle C is 2-foot tone, &c. The expression '4-foot,' '8-foot,' &c., applied to an organ-stop indicates the length of the lowest C pipe in that stop.

Foot-and-Mouth Disease (synonyms, *Eczema contagiosa* or *E. epizootica*, *Epizootica Aphtha*, and *Murrain*), a contagious disease of a febrile nature, chiefly affecting cattle and sheep, and characterized by the presence of a vesicular eruption in the mouth, between the toes, and around the coronets. The mouth or feet alone may be affected. In cows, the eruption may extend to the mammary gland, and necessarily affects the milk. Pigs, poultry, dogs, and more rarely man, are subject to F.; but horned cattle are the chief sufferers. The temperature first increases, and a vesicular eruption appears after an incubatory period of from three to four days. The animal exhibits great restlessness and uneasiness; saliva runs from the mouth, and a watery discharge from the eyes. The disease is one of a specific type caused by the presence of a specific poison. Pasture lands receive the contagious material or virus, and the disease thus spreads. One attack is not a protection against a subsequent attack, but the animal is usually attacked only once in a season. Microscopic examination of the discharges has as yet failed to detect any specific form of fungus or other parasitic organism which might be credited with causing the disorder. The febrile symptoms may cease in a week; but if the weather be unfavourable or the animals be exposed, a rough tracheal cough with expectoration may persist for a long time. The treatment consists in giving the animals plenty of cold water to drink, in which nitrate of potash (one ounce to a bucketful) may be dissolved. Soft food—mashes, &c.—should be given, and the sores on the feet should be dressed with a mild astringent solution—*e.g.*, by one ounce of carbolic acid lotion (made by adding one part of pure carbolic acid to sixteen of hot water) added to twelve ounces of white lotion or a solution of acetate of lead. Stimulants may be demanded in extreme cases of prostration, but bleeding and purging are carefully to be avoided. Sheep, as a rule, suffer most violently in the feet, and require more careful watching and treatment than cattle. An affected flock should be made to walk or wade once or twice daily through a shallow trough containing the solution of acetate of lead and carbolic acid above mentioned. Contagious diseases, such as pleura-pneumonia, sheep scab, F.-and-M. D., which affect animals, are now dealt with by various statutes with a view to preventing their spreading. Importation of animals from affected districts and countries may be forbidden, and animals affected must be slaughtered; and there are many other provisions.

Foot'ball, a popular national sport, played during the winter months in the British Isles, but all the year round in many of our colonies. There are two distinct types of game played, and some public schools in England have their own peculiar modifications. Both types make use of a ball and two goals, each of which consists of two upright posts with a cross-bar or tape at the height of about ten feet. The goals are placed at the extremities of the course, which has fixed boundaries. If the ball is sent beyond these boundaries it is for the time out of game, and must be returned according to rule. In the *Association* game, the ball is round, and must not on any account be touched with the hand, except by the goal-keeper of each side or when it is 'dead.' One goal is scored when the ball is sent through the posts beneath the tape, each side working the ball towards the adversary's goal. In the *Rugby* game the ball is oval; and any player, if *on-side*, is entitled to catch or pick up the moving ball, and run with it towards the adversary's goal. If stopped, however, he has to relinquish the ball, and put it *down* to ground, when a *scrimmage* takes place, each side striving to drive it through towards the other's goal. A goal is won when the ball is kicked *over* the cross-bar between the goal-posts or the goal-posts produced. International matches, between chosen teams of English, Scotch, Welsh, and Irish are yearly played according to both Association and Rugby rules, and excite great interest in F. circles.

Football is a very ancient game, and seems to have been as widespread as it was popular. But, although reference is made to it in the Greek classics, the writers have not handed down to us any information concerning the rules under which it was played. We know that a game somewhat resembling F. has been popular for centuries among the Malays, and that another, in some way a combination of cricket and F., has been a pastime among the Esquimaux from time immemorial. In the reign of Edward II. F. would appear to have rivalled archery in its attraction both for men and boys. Not a hundred years ago in some of our counties an inter-village F. match was an annual affair, at which all the villagers, headed by the parsons, assembled at some central position between their villages, where the ball was 'kicked off,' and forthwith *en masse* strove their very uttermost to force it through hedges and streams, across fields, woods, and ditches, towards the goal posts, to wit, the churchyard of their opponents. Then there were no such terms as *offside, time, umpire, referee, touch, back, half-back*, &c., for the game, as thus played, recognised no such paltry distinctions as to whether a player lay up too close beside his opponents' church steeple with no adversary between him and the churchyard; as to time, the ball was started soon after early breakfast and it must have been a bad business indeed if neither side should prove the stronger before sun-down. The presence of the clergy in the ranks of the players was understood to be sufficient guarantee of fair-play on both sides, and therefore neither umpire nor referee was required; and as for expecting a man to keep to one particular part of the field when the field could be measured by miles and contained every possible natural obstacle; why, the bare idea of such a thing would have been laughed to scorn, had anyone ventured to suggest it, and that indeed with much reason, as the course taken by the ball was as uncertain as it was wide, and might upon occasion even extend into a neighbouring parish, whereupon the outraged inhabitants of the third village would at once join issue and the game, already somewhat confused, would become still more confounded.

Until 1870 few clubs existed besides those at the larger public schools and universities. But in 1871-72 the English F. Association Cup was offered as a prize, and forthwith F. clubs started up on all sides. In 1873-74 competitions became an established fact in Scotland, and Wales followed the example in 1877-78, and Ireland in 1879-80. The principal schools where the rules were nearest to those adopted by the Association were Westminster, Charterhouse, and Harrow; and, perhaps, Eton should also be included, although the game at Eton, quite apart from the *wall*, is peculiar to the school and not played anywhere else except among old Etonians.

In the North and Midlands professionalism was soon introduced, and though the south country clubs opposed the practice of paying players for services rendered, the practice spread and has now become general, with, it is to be feared, most injurious effects upon F. as a game and a pastime, since it has become more or less a purely business transaction, and the best professional assistance may be obtained by the clubs that offer the highest salary. That the skill of the players has become greater since men took to the game as a livelihood, no one can well deny, but F. of all athletic games is, in our opinion, the best able to dispense with *mercenary* help, and the sooner the clubs all round view the matter in the same light, the better, we venture to think, for F. At the present time there is no more popular game than F. among our Indian, Malay, and Chinese fellow subjects. The last-named have developed considerable skill at the game and are now competing with other local clubs, Indian and European, and that often successfully. The Malays are very expert in kicking, and will pass a 'wickerwork' football from one to another, in a party of six and more, for a long time without touching the ball with the hand and without letting the ball fall to the ground.

Foote, Andrew Hull, rear-admiral in the American navy, was born at New Haven, Connecticut, 12th September, 1806. He entered the navy 4th December, 1822, became a commander in 1852, and a captain in 1861. In February, 1862, he received the command of the western flotilla, took Fort Henry, on the Tennessee River, without waiting for the land co-operation of General Grant, attacked Fort Donelson, where he was wounded, and on 7th April took Island No. 10. He received the thanks of Congress, and was made rear-admiral in July, 1862. F. was appointed to relieve Admiral Dupont, at Charleston, but died at New York, 26th June, 1863. Admiral F. was not only a gallant, chivalrous naval officer, but a man of singularly strong moral character. He wrote *Africa and the American Flag* (1854) and *Letters on Japan* (1857).

Foote, Samuel, a famous English wit and dramatist, was born at Truro, Cornwall, in 1720, and entered at the Temple, but finding the law uncongenial, went on the stage, and made his *début* as Othello in 1744. He was a comic writer as well as an actor, and led a brilliant and dissipated life, until in 1766 he lost his leg by falling from his horse. This misfortune did not extinguish his mercurial gaiety. He appeared in parts which turned the want of his limb to stage account, and remained to the last recklessly improvident and irresistibly vivacious. He died at Dover, 21st October, 1777. F. was an admirable mimic, and the cleverest manufacturer of *bon-mots* of his day, but many of his witticisms are vulgarly broad and personal, and would no longer be tolerated in society. Among the pieces are some of the most amusing farces in the English language, but it is a sort of profanity to call him 'the modern Aristophanes.' A collection of his dramatic works appeared at London (1778-97). They were translated into German (Berl. 1796-98). See Clarke's *Memoirs of Sam F.* (Lond. 1805).

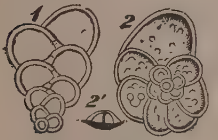
Foot-Guards. See GUARDS.

Foot-Pound is the work required to raise the weight of one pound through the distance of one foot at the surface of the earth; or it is the work which such a weight could perform in falling through the same distance in the same circumstances. The corresponding French unit of work is the *kilogrammètre*, which equals 7·233 foot-pounds.

Foot-Rot, a disease of sheep, characterized by the presence of cracks or fissures in the hoof, and by the subsequent appearance of ulcerated sores arising from the irritation consequent on the presence of dirt, sand, and other foreign particles. Occasionally the ulcerated action may proceed to a very great extent, the lesion being then termed 'foul-foot.' The milder forms of F.-R. appear to arise from unequal development or wearing of the hoof, consequent on the sheep being enclosed in soft meadow-lands where the hoof is subjected to the least amount of attrition. But in the more severe forms, F.-R. is probably connected with, and arises from, constitutional causes; and in the latter case, great attention to the general health is necessary, as well as the adoption of local treatment. The latter consists in the use of astringents and caustics where the ulceration is of any great extent. In mild cases, tar is a safe application, and butter of antimony, or a paste of flowers of sulphur and sulphate of copper in equal weight mixed with lard, is also to be recommended as useful in this complaint.

For'age (Low Lat. *foragium*, from the Goth. *fodur*, 'fodder'), the food of horses. In the army, field-officers, surgeons, and adjutants of infantry regiments receive an allowance in lieu of F. for every horse allowed by the regulations. The ration allowed for horses is 10 lbs. oats, 12 lbs. hay, and 8 lbs. straw in barracks; and 8 lbs. oats, 18 lbs. hay, and 6 lbs. straw in quarters. The troops in Great Britain and Ireland are supplied with F. under contract entered into by the commissariat department. The forage, paillasse, straw, and stable allowance provided for in the Estimates for 1895-96 is £436,000 for both the home and colonial services.

Foraminif'era (Lat. *foramen*, 'an opening,' and *fero*, 'I carry'), an order of *Protozoa* (q.v.), or lowest animals, included in the class *Rhizopoda* (q.v.). The F. are distinguished by the possession of a shell or test of carbonate of lime, although the structure may occasionally be composed of sandy or *arenaceous* particles. Through holes or *foramina* in the shell the soft protoplasmic matter of their bodies can be protruded in the form of delicate interlacing filaments or *pseudopodia*. From the interlacing nature of these filaments, the name *Reticulosa* was given to the F. by Dr. Carpenter, who described the appearance of the pseudopodia as resembling 'an animated spider's web.' These filaments are used for grasping food-particles, and also subserve locomotion. In some cases (*e.g.*, *Miliola*) the pseudopodia are emitted, not through foramina, but by the mouth-opening or single aperture of the shell. The shells of F. have been divided into (*a*) the *porcellanous*, or those in which there are no foramina in the shell-wall; (*b*) the *arenaceous* shells, consisting of sandy particles; and (*c*) the *vitreous* or *hyaline* shells, which are glassy, transparent, and have their walls perforated. The shells of F. may be also divided into those consisting of a single chamber (*Monothalamia*), and those composed of many chambers (*Polythalamia*). The latter are originally single-chambered, and are produced by budding. If the budding of new segments proceeds in a straight line, a shell like that of *Nodosaria* is produced; whilst the spiral form of this process gives rise to a test like that of *Rotalina* or of *Discorbina*, &c. The shell-wall of F. appears to be perforated by a system of canals in addition to the foraminal apertures. The living matter of their bodies is of the simplest character, their protoplasm being destitute even of the nucleus and other structures found in most *Protozoa*. The F. are for the most part of microscopic size, and require the microscope for their investigation and recognition. Some extinct forms—notably the Nummulites (q.v.) —attained a larger size, the latter being found as large as a shilling, and frequently attaining even larger dimensions. The F. are found in the present day in waters of the sea, and in the bed of all our oceans, and most notably in those areas traversed by warm currents. Their shells form a thick layer of calcareous matter in the sea-bed. True chalk is a Foraminiferous deposit which was formed in this way in an ancient sea-bed. F. first appear as fossils in the Laurentian rocks where *Eozoon* (q.v.) is found. They occur in all the stratified formations up to the present day. Some species (*e.g.*, *Miliola* in Eocene rocks and *Nummulites* in the Middle Eocene) have attained a vast development in certain geological epochs.



Foraminifera.

1. Textiraria globulosa.
2. Rotalia globulosa.
2'. Side view of Rotalia boucana.

Forbach, a town of Alsace-Lorraine, about 11 miles N.W. of Saargemünd. The fight, which took place on the height of Spichern on 6th August, 1870, has been called by the French the battle of F. Steinmetz, and Prince Friedrich Karl defeated the French under Frossard, and since then the town has been held by the Germans. The neighbourhood is rich in coal. Pop. 9580.

Forbes', Duncan, of Culloden, one of the ablest and best men that Scotland has produced, was the second son of the proprietor of the estate of Culloden, and was born at Bunchrew—another estate belonging to the family—10th November, 1685. His father, a staunch Presbyterian, had suffered much at the Restoration, and finally received a strange compensation in the privilege to distil whisky, under a merely nominal duty, on a third estate called Ferintosh, which privilege he used so extensively that to this day, 'Ferintosh' in many parts of Scotland is synonymous with whisky. Duncan was sent to Edinburgh University when nineteen years of age, and lost his father the same year. Next year he was sent to Leyden, where he studied both law and Oriental languages. He returned home at the end of two years, passed as advocate in Edinburgh, was, through the influence of the Duke of Argyll (both a patron and a relation), appointed sheriff of Midlothian, and married Mary, a daughter of Rose of Kilravock. In 1715 he exerted himself to the utmost in suppressing the insurrection headed by the Earl of Mar; and when it was brought to a close, he showed the most active kindness in mitigating the fate of the unfortunate prisoners, who were treated with utmost rigour by the Government. He collected money for their defence, and publicly remonstrated with the Government on the cruelty they displayed. Some time after he proposed the plan, which Pitt sixty years later adopted with entire success, for the pacification of the Highlands, viz., restoring to the chiefs their forfeited estates, and employing the people in the service of the country. In 1716 F. was appointed depute to the Lord Advocate; in 1722 he was returned to Parliament for the Inverness burghs, and three years after was raised to the office of Lord Advocate. While in London he was on intimate terms with Lords Mansfield, Lyttelton, and Hardwicke, as well as Sir R. Walpole, and was a valued member of the literary society in which Pope, Arbuthnot, and Swift held sway. In 1734, owing to the death of his elder brother, he succeeded to the family estate, and in 1737 was appointed President of the Court of Session. According to his best biographer, Dr. Hill Burton, he effected a thorough and most beneficial change in the proceedings of this court, having raised it to a state of efficiency which it has never surpassed. But it was in connection with the rebellion of '45 that he rendered the most important services to the state. The members of the Government were singularly destitute of all resource, and for a length of time anything that was done in Scotland to save the country was mainly the work of Forbes. He kept the more reasonable of the Jacobites from rising, especially the great MacDonald and MacLeod clans in Skye and the islands, who themselves could have brought 8000 men into the field; and having restrained these, he may be said in a certain sense to have saved the Hanoverian throne. He gave not merely his great influence to this work, but he expended on it all the money he could raise, straining his credit to the utmost, yet the Government refused to repay him any portion of what he thus expended; and he died 10th December, 1747, pressed by creditors whose claims he was unable to meet. Bishop Warburton calls him 'one of the greatest men that ever Scotland bred, as a judge, a patriot, and a Christian.' See Hill Burton's *Life of Duncan F.*

Forbes, Edward, a British naturalist, was born at Douglas, in the Isle of Man, 12th February, 1815. At an early age he showed a bent towards the natural sciences, and when only seven had made a small collection of zoological and botanical specimens. In 1831 he entered Edinburgh University as a medical student. Here he studied till 1839, ultimately concentrating his whole attention on botany, zoology, and geology, to the exclusion of medicine, adding meanwhile to his stores of knowledge by excursions to Norway, the Alps, Austria, Algeria, and Southern Europe. In 1834 he became a member of the British Association, and in 1836 was one of the founders of the Edinburgh Botanical Society, to both of which he contributed many valuable papers and reports. In 1841 he accompanied the *Beacon* in its surveying expedition to Asia Minor as naturalist, and from numerous dredging operations showed that the laws of geographical distribution in the depths of the sea were similar, and depended upon conditions similar, to those which held on land. On his return in 1842 he found that he had been elected Professor of Botany at King's College, London. In 1844 he became curator of the museum of the Geological Society, and palæontologist to the Ordnance Survey. In 1853 he was President of the Geological Society, and in May, 1854, succeeded Professor Jamieson in the natural history chair at Edinburgh. This position he filled with great ability for only one short summer course, since his death occurred on 18th November of the same year. The peculiar merit of F. lay in his wide grasp of the whole range of the natural sciences, no one department being his peculiar study to the relative exclusion of the others. To a quick perceptive faculty of observation, and a retentive memory, he added a rare power of abstraction and generalisation, which is perhaps best displayed in his beautiful theory of the derivation of the present flora of the British Islands. His chief works are a *History of British Starfishes* (1841), *Travels in Lycia, Milyas, and Cibyratis* (1846), and, with Hanley, a *History of British Mollusca* (1850-53); but his great services to science can only be estimated from a consideration of his numerous memoirs on the classification of medusæ, mollusca, &c., on geographical distribution, and on subjects connected with every phase of natural science, all of which teem with novel and accurate information of varied description. He also drew up the valuable maps on distribution in Keith Johnstone's *Physical Atlas*. See *Memoir of Edward F.* by G. Wilson and A. Geikie.

Forbes, James David, was born at Edinburgh, 20th April, 1809, and passed most of his early life at his father's residence at Colinton, where he received private tuition along with his brother Charles. From 1825 to 1830, with the break of one year, he studied for law at Edinburgh University, devoting every spare moment, however, to astronomy, meteorology, and the physical sciences. In 1833 he threw up all legal pursuits, and was elected the successor of Sir John Leslie in the chair of natural philosophy at Edinburgh, a position which he resigned on account of failing health in April, 1860, four months after he had become Principal of the United College in the University of St. Andrews. He died at Clifton, 31st December, 1868. F. was a member of numerous scientific societies at home and abroad, and received the Royal and Rumford medals from the Royal Society of London, and two Keith medals from the Royal Society of Edinburgh, for his contributions to science. The most important of these are the discovery in 1836 of the polarization of heat by refraction and reflection, the subsequent investigations in its refrangibility and depolarization, the observation in 1846 of the conditions of temperature at different depths in the soil, and experimental inquiry into the laws of thermal conduction in metal bars in 1861 and 1865, besides numerous valuable papers on climate, meteorology, and geology. His most famous work, however, is in connection with the motion of glaciers. The results of his investigations (see GLACIERS) are given in his *Travels through the Alps* (1843), *Norway and its Glaciers* (1853), *Tour of Mont Blanc and Monte Rosa* (1855), and *Occasional Papers on the Theory of Glaciers* (1859). These works display at once his high faculty as an observer of natural phenomena, his rare skill as an experimentalist, and his literary power as a graceful and lucid writer. His *Life and Letters* has been published since his death.

Forbes, Sir John, a very able and successful physician, was born 18th October, 1787, at Cuttlebrae, Banffshire. Educated at the universities of Aberdeen and Edinburgh, he was first a naval surgeon, but leaving the service in 1816, graduated at Edinburgh, and practised as a physician there, in Chichester, and finally in London, where he rose so much in favour with society that he was knighted and became Physician in Ordinary to the Queen in 1853. His death took place at Whitechurch, Oxfordshire, 13th November, 1861. F., besides being a very successful practitioner of medicine, was a zealous man of science. He may be said to have introduced the stethoscope into this country, was one of the editors of the *Cyclopædia of Practical Medicine* (1835), translated the works of Auenbrugger and Laënnec on auscultation, helped to found the British Medical Association, and started the *British and Foreign Medical Review*, editing it for twelve years. Among the other works of F., who during his latter years was one of the most distinguished and popular members of his profession, may be mentioned his *Physician's Holiday* (1849), and *Nature and Art in the Cure of Diseases* (1857).

Forbes, Sir William, Bart., of Pitsligo, was born at Edinburgh, 5th April, 1739, became a partner in the bank at Edinburgh of Messrs. J. Coutts & Co. in 1761, and in 1773 rose to be head of the eminent firm of F. Hunter & Co., eventually converted into the Union Bank of Scotland in 1830. He purchased the estate of Pitsligo, forfeited by Lord Forbes during the rebellion of '45, and erected the village of New Pitsligo. Often residing in London, he was one of the earliest members of the Literary Club, along with Johnson, Burke, Reynolds, &c. He wrote a life of his friend Dr. Beattie, printed with a 4to edition of his works in 1805, and the *Memoirs of a Banking House*, published in 1860. His nobility and rectitude of character are happily delineated in one of the introductions to *Marmion*. He died 12th November, 1806.

Forbes Macken'zie Act. This is the title of a very stringent 'Act for the better regulation of public-houses in Scotland' (Statute 16 & 17 Vict. c. 67). It is so named after the author of the measure. It continues the classification of spirit-dealers, as under former statutes, into (1) inn or hotel keepers, (2) public-house keepers, and (3) grocers and provision dealers. The sale of spirits in the first class is only permitted between eight o'clock in the morning and eleven o'clock at night during week days, except to *bonâ fide* travellers and lodgers. On Sunday the sale is prohibited except to lodgers and *bonâ fide* travellers. The same regulations apply to the second class, without any exception in favour of lodgers or travellers. No certificate is allowed to be granted to any grocer or provision dealer for the sale of excisable liquors to be 'drunk on the premises,' if in these premises a sale is carried on of provisions to be consumed elsewhere. This latter class is also prohibited from keeping their premises open on Sunday, and from any sale of liquor between eleven at night and six in the morning. These are the leading provisions of this Act, which has given rise to so much vehement controversy N. of the Tweed. The supporters of the Act have cited voluminous statistics, which they contend prove that the Act has diminished drunkenness in Scotland. Its opponents, again, by a different manipulation of the figures, maintain that these statistics show a contrary result, and that even if they do show an apparent diminution in Sunday-drinking, the fact proves nothing; because to diminish public drinking on Sunday is only to increase drinking in private and in illicit houses. And public drinking, they maintain, is the smaller evil of the two; because it is better, they hold, that people should drink where the law can take cognisance of them than in places where it cannot. A bewildered public is thus almost led to acquiesce in Sydney Smith's celebrated dictum, that, except facts, there is nothing so misleading as figures. A Royal Commission was appointed in 1859 to inquire into the working of the Act. Its report, with two large volumes of conflicting evidence, threw little light on the vexed question. The *bonâ fide* traveller has also been a source of infinite perplexity to magistrates. The Act has been in some degree amended by Statutes 25 & 26 Vict. c. 35, and 50 & 51 Vict. c. 38.

Forbidd'en Fruit, a species of the genus *Citrus*, belonging to the *Aurantiacea* or orange order, also known by the name, 'Adam's apple.' The Shaddock (q.v.), another species of *Citrus*, is sold under the name of F. F. in the shops. F. F. is common on the Continent, and appears to have been originally brought from China. The fruit is pear-shaped and has an irregular surface. The rind is thick, and constitutes the chief part of the fruit, the pulp being present in small quantity, and of an acid taste. The name F. F. has been occasionally given to the fruit of the *Tabernæmontana dichotoma* of Ceylon, a plant nearly allied to the cow-tree of Demerara, both species belonging to the Dogbane order (*Apocynaceæ*).

Force, according to Newton, is any cause which alters or tends to alter a body's state of rest or of motion; and the change of motion is proportional to the impressed force, and takes place in the direction in which the F. acts. (See MOTION, LAWS OF.) This at once gives a method for measuring F., and implies that forces are to be composed and resolved in precisely the same manner as velocities, or indeed as any directed quantities. (See QUATERNIONS.) Now, change of motion is an evidence of a transformation of energy from a less to a more apparent form, and is the direct consequence of such a transformation, so that our definition leads us to regard F. as merely a convenient term for transformation of energy, and as having, therefore, no objective reality. When the effects of forces acting on a material system mutually balance, the result is equilibrium, and the study of this branch of dynamics is called Statics (q.v.) See ENERGY.

Force and Arms were words always inserted in an indictment and formally inserted in a declaration for trespass, but have been rendered unnecessary since the passing of the Common Law Procedure Act of 1852.

Forcelli'ni, Egid'io, an eminent Italian lexicographer, was born near Padua, 26th August, 1688. Although his education was so much neglected that he had almost reached manhood before he commenced regular study at the seminary of Padua, his industry and abilities soon attracted the attention, and secured him the lifelong favour, of Facciolati, its chief. The two co-operated in the production of a great Latin dictionary, entitled *Totius Latinitatis Lexicon Consilio et Cura Jac. Facciolati, Opera et Studio Æg. Forcellini Lucubratum* (4 vols. Pad. 1771). F. died at Padua, 4th April, 1768, three years before the publication of this great work. Various editions of it have since appeared, the most complete being that of Furlanetto (Pad. 1828-31). It is the basis of all later lexicons of the Latin tongue, and is really a splendid treasury of scholarship and skill. Two new editions have appeared in Italy, that of Corradini (1859 *et seq.*), and De Vit (1860 *et seq.*).

For'ceps (Lat.), in surgery, are pincer-like instruments used for seizing, cutting, or removing substances that cannot be readily got at by the fingers. A complete set of F. are employed in tooth-drawing. Special kinds are required for securing a bleeding artery, extracting bullets, cleansing internal sores, &c. Bones of great thickness can be cut by Liston's F.

For'cible En'try, in English law, is the public offence of violently taking or keeping possession of land or of a tenement without legal authority. Both a civil and a criminal offence are committed by the offending party. The corresponding Scotch law terms are Ejection and Intrusion (q.v.).

For'cing, in horticulture, consists in stimulating the vegetation and growth of native or acclimatized plants at seasons other than their natural period of activity. It is practised by the application of artificial heat in hothouses and F. frames, and is resorted to in order to obtain fresh vegetable products in succession during periods when they cannot be procured by cultivation in the open air. In Great Britain F. is extensively prosecuted for obtaining early crops of culinary plants and vegetables, such as rhubarb, potatoes, and green peas. The strawberry, tomato, melon, and cucumber are also forced, besides vines, peach-trees, &c.

Ford, John, an Elizabethan dramatist, was the second son of a Devonshire gentleman, and was born at Ilsington, N. Devon, in 1586. He entered at the Middle Temple in 1602, and in 1606 published *Fame's Memorial*, an elegy on the Earl of Devonshire. He was never called to the bar. As a dramatist he produced *The Lover's Melancholy* (1628), a beautiful romantic comedy; *The Broken Heart* (1633), a tragedy of intense power, which is one of F.'s greatest works; *Love's Sacrifice*, a tragedy (1633); *The Chronicle Historie of Perkin Warbeck* (1634), an historical drama; *The Fancies Chaste and Noble*, and *The Lady's Trial*, comedies (1638). F. was a part author with Dekker, and probably with Rowley, in the domestic tragedy entitled *The Witch of Edinarton* (1623), and his masque *The Sun's Darling* (1624) was seemingly founded on Dekker's *Phaeton*. He appears to have retired to his birthplace before his death in 1640. The genius of F. is profound and sombre, but limited. He is wanting in variety, ease, and lightness; of humour and wit he has almost none, his comic scenes being the grossest and most tedious in the Elizabethan drama. As a tragic poet, however, he depicts passion with unerring subtlety and thrilling force. F.'s language is pure and vigorous; his verse has neither the effusive sweetness nor the charming felicities of Fletcher's; it is limpid and equably musical, though at times somewhat hard and unspontaneous. See *The Works of F.* by Gifford, Swinburne's *Essays and Studies*, Minto's *English Poets*, and Ward's *English Dramatic Literature*.

Fords (from Old Eng. *faran*, 'to go,' hence 'to cross') are shallow parts of a river, which can be crossed simply by wading, without the aid of a bridge or a boat. They are of special importance in military operations; and in choosing a ford, great consideration must be given to its position, its depth in relation to the flow of water, the nature of its bottom, and the manner in which it may possibly be affected by changes of season, &c. For infantry the depth should not exceed 3 feet, and for cavalry 4 feet. Many of our towns, such as Oxford, Bedford, Bradford, Stratford, &c., indicate by their names their own origin, as well as the position of ancient and important F. now superseded by bridges.

For'dun, John of, a 14th c. chronicler, belonging (according to the slender authority of Camden) to Fordun, Kincardineshire, who is supposed to have died about 1385. He was probably a chantry priest of Aberdeen Cathedral. F. wrote what is now known as a *Scotichronicon*, or Chronicle of Scotland, tracing the history of the Scots from the times of Noah to 1153. He had collected additional materials before his death, which passed into the hands of Walter Bower, Abbot of Inchcolm, who carried the Chronicle of F. as far down as 1437, and whose work in 16 books, bearing the title of *Scotichronicon*, appeared between 1440 and 1447. A comparison of Bower's so-called 'Continuation' with the best MSS., especially with the Wolfenbüttel MS., has revealed the startling fact that Bower has so grossly tampered with the text of F. that the original is often unrecognisable and its character completely misrepresented. The best, indeed the only valuable, edition of F. is by Skene (Edinb. 1871) in the series of *The Historians of Scotland*.

Fore'castle (pron. *foks'le*), in a ship, strictly an elevated foredeck (see DECK) above the maindeck or the spardeck. Vessels are not frequently built with such a F. now, and the name is generally given to that portion of the fore part of the ship which constitutes the quarters for the crew.

Foreign Bill of Exchange. A bill is said to be foreign when drawn by a merchant abroad upon his correspondent in England, or the reverse; or when it is drawn and accepted abroad. Even England, Scotland, and Ireland were at one time so far foreign to one another that a bill drawn in any one of these countries on a person in any other was held to be a F. B. of E., but by statute 19 & 20 Vict. c. 97 any such bill has been held to be an *inland* bill. Formerly, foreign bills were held by the law to be more important than inland ones, but now they are on nearly the same footing. Every bill drawn in this country must be stamped, and a bill drawn abroad, if no adhesive stamp of *ad valorem* value be already affixed and cancelled, must be stamped before it is presented for payment or endorsed, or transferred, or negotiated, or paid. In enforcing a bill drawn and accepted abroad, the courts of the United Kingdom will hold that whatever relates to the nature of the obligation—*ad valorem contractus*—is ruled by the law of the country where the contract is made, but that the mode of remedy is according to its own forms. The holder of a F. B. of E. is bound to protest when the bill is not paid, or is not accepted so soon as the acceptance may have become necessary. See BILL OF EXCHANGE.

Foreign Debts, Recov'ery of. See DEBTS, RECOVERY OF; ENGLISH DEBT.

Foreign Enlist'ment Act. Under the statute of 1870, any British subject who, without the license of Her Majesty, enlists in the service of any foreign state at war with any friendly state, or who induces another to do so, is guilty of an offence punishable by fine and imprisonment. The master or owner of any ship who takes illegally-enlisted persons on board, is guilty of an offence punishable in the same way. Penalties are also imposed on any one who, without Her Majesty's leave, builds, or agrees to build, any ship for the service of a foreign state at war with a friendly state. The Act gives special power to the Secretary of State for carrying out its provisions. It makes regulations with regard to foreigners enlisting in the Queen's service.

For'eigner. See ALIEN.

Foreign Law, Applica'tion of. It has been provided by statute 24 Vict. c. 11 that the High Court of Justice may remit a case with queries to the courts of foreign countries, with which a convention exists for that purpose. If no such convention exists between our country and that to the court of which the case is sought to be remitted, then no remission can take place. Should the case be remitted and the queries be answered, then the High Court may apply the information to the case before it.

Fore'land, North (the *Cantium* of Ptolemy), is a chalky headland, 184 feet high, in the N.E. extremity of Kent, 2 miles E. of Margate. It has a light visible at a distance of 24 miles.—**South F.,** a promontory, also of chalk, 16 miles S. of the N. F., and between Deal and Dover. It supports two lights, at an elevation respectively of 372 and 275 feet above the sea. Between the two Forelands are the Downs and the Goodwin Sands.—**Bloody F. or Farland** is the promontory on the N.W. of Donegal, Ireland, and stretches out to a distance of 38 miles.

Foreshort'ening, in painting and drawing, is the representation in correct perspective of an object presented obliquely to the eye, and the effect should be to give the object the appearance of projecting from the canvas. Cimon of Cleonæ was the first to apply the method to the human figure in any attitude, and in more recent times the art has been carried to perfection by Raphael, Angelo, Tintoretto, and Correggio.

For'est Fly, the name given to flies belonging to the family *Hippoboscidæ* of the *Diptera* (q.v.). In this family the head is distinct, the legs short, and the fifth joint of the tarsi longest. The wings are large, and the nervures or supporting ribs do not extend to the tip. The *horse F. F.* is the most familiar species. It receives its popular name from its inhabiting forests, and its specific name of *horse* from its attacking horses by means of its suctorial mouth. The F. F. is about one-third of an inch in length, and is of brown colour, with yellow markings on the thorax. The eggs are retained within the body of the female until the larvæ are hatched, and ready to pass into the pupa stage.

Forest Mar'ble, a local deposit in the southern and midland counties of England, belonging to the Lower Oolites of the Jurassic period, and overlying the Great Oolite group. It consists of hard limestones, marls, shales, and fine oolitic freestone, and contains numerous lamellibranch shells characteristic of this period.

Foresters, Ancient Order of, a very flourishing association, which may be described as a benefit society. In 1790 a Court of Foresters was opened at Leeds and was called Court No. 1, of the Royal Ancient Order of Foresters. In 1834 a split occurred in the association, which led to the founding of the A. O. of F. and the depression of the older body. In 1835 the first meeting of the A. O. of F. took place at Salford, and by that time 16,510 persons had been certified as members. In 1840 a Juvenile Foresters' Society was formed at Hull for funeral benefits only, but before then Forestry had been introduced into Canada and the U.S. of America, and had eminently thriven. The funds of the Order now amount to £5,266,824, and the list of members contains 724,375 male adults, 3657 female adults, 16,829 contributing widows, and 112,227 juveniles, besides 19,405 honorary members. The general meeting in 1895 took place at Brighton.

Forest Oak, a species of Australian trees, belonging to the *Casuarinaceæ* or beef-wood order. They are named beef-wood trees from the dark-red colour of their wood, which is hard and heavy, and used for ornamental upholstery.

Forests, Chas'es, Parks, and Warr'ens. By the common law of England, the possessor of land has the exclusive right to all the wild animals found upon it, and he may pursue and kill them. Besides the absolute right which the owner of land has over the soil, there may be a privilege of taking or killing wild animals to the exclusion of others, in virtue of a franchise to have a forest, chase, park, or warren. A forest is a royal domain for the preservation of the Queen's beasts and fowls of forest, and is subject to its own laws, courts, and officers. Before the *Charta de Foresta*, the sovereign could make a forest of any extent over the lands of his subjects. It is the highest franchise relating to game. There are sixty-nine forests in England, the three principal of which are New Forest in the county of Southampton, Forest of Dean in Gloucestershire, and Windsor Forest.

A *chase* is a franchise whose nature is between that of a *forest* and that of a park. It may be held by a subject, and is governed by the common, not by the forest, law. It is not enclosed, yet certain distinguishable bounds must be provided for it. A man may have the right of chase over the ground of another, with privilege to keep royal game on it, protected even from the owner of the land. There are, we believe, thirteen chases in England.

To constitute a *legal* park there must be a royal grant; it must be enclosed by pale, wall, or hedge, and it must be stocked with deer; and if the deer be all killed, it is no longer a legal park, which is composed of *best venison* and *enclosure*, and failure in one is a total disparking. There are in England 780 parks.

The *warren* is a place privileged by prescription or royal grant for the keeping of beasts and fowls of the warren, which are hares and rabbits, partridges and pheasants. Some add quails, woodcocks, and waterfowl. Twenty years' undisturbed exercise of a claim of a warren or park will afford presumptive evidence of right in the party who has exercised it for the period. The owner of a warren may lawfully kill any dog found injuring the warren.

The rights of any forest, chase, or warren are not affected by the Game Laws (q.v.). The franchises mentioned above may be destroyed by reversion to the Crown, or by surrender or forfeiture in consequence of a breach of the trust for which they were granted. In Scotland, lands granted by the Crown with a right of forestry carried all the privileges of a royal forest, which were very oppressive to the country, and accordingly the right was reprobated in 1680 by the Court of Session. Nevertheless, the pretensions of royal foresters have survived to present times. In 1862 the Duke of Athole, in virtue of his supposed right of forestry, claimed the right to prevent his neighbour, the Laird of Lude, from killing deer on his own lands, and maintained that he, the Duke, and his servants, were entitled to enter the lands of Lude and drive any deer found on them into the forest of Athole. Both points were decided against the Duke (1st March, 1862).

In England there were *Forest Courts*, which are now no longer held. They were courts of justice-seat (courts of *record* and where the cases were tried before the judge on circuit), seveinmote (courts of freemen), of attachments (verderers' courts), and of regard.

For'far, the capital of Forfarshire, in the valley of Strathmore or 'Howe of Angus,' near a small lake, 15 miles N.E. by N. of Dundee and 485 from London, by railway. It has a large parish church, with a spire 150 feet high, a handsome townhall, and a considerable manufacture of brown linen and 'brogues.' F., along with Montrose, Arbroath, Brechin, and Inverbervie (the Montrose District), sends one member to Parliament. It is supposed to be the ancient *Orrea*, and received a royal charter in the reign of David I. There was formerly a royal castle here. F. was a great place for hunting out witches, and the 'bridle' or gag, used at the burnings, is said to be still kept here. A dispute arose at one time between the inhabitants of F. and those of Dundee as to the ownership of the bell of the parish church. The silver clapper was lost and in order to obtain it the F. folk were compelled to purchase the ground it passed over between the Quay and the Dundee boundary. Pop. parl. and royal burgh 11,982; civ. town and royal burgh 12,057.

Forfar'shire, or **An'gus,** a county on the E. coast of Scotland, bounded N. by Kincardine and Aberdeen, E. by the North Sea, S. by the Firth of Tay, and W. by Perthshire. It is entered in the N. by many spurs of the Grampians, known as the Braes of Angus, alternating with many romantic glens, as the Esk, Clova, Prosen, and Isla. The flat fertile belt of Strathmore bisects F. from S.W. to N.E., while to the S. the Sidlaw Hills run at a distance of 8 miles from, and in a direction parallel to, the Firth of Tay. The chief rivers are the Isla, an affluent of the Tay, and the N. and S. Esks. F. has a coast 45 miles long, part of which, from Arbroath to the promontory of Redhead, is a line of sandstone cliffs worn into many deep caverns. Buddon Ness juts out at the entrance of the Tay Firth, and 13 miles to sea rises the Bell Rock Lighthouse. The soil of F. is partly fine alluvium, partly peat; and the chief formation is Old Red Sandstone. Of the 562,162 acres, comprising the area of F., 89,908 are under corn crops (oats 51,534); 48,795 under green crops (potatoes 12,386); 82,214 under clover, sainfoin, and grasses in rotation; and 31,391 under permanent pasture or grass not broken up. Small fruit is cultivated over 179 acres, and bare fallow or uncropped arable land represents 91. Mountain and heath land, used for grazing, amount to 186,995 acres, and 84 are laid out as nursery grounds. Woods and plantations cover 34,733 acres. See also CATTLE, HORSE, PIG, and SHEEP. The chief manufactures are coarse linen and jute, the former chiefly at Arbroath, the latter at Dundee; there are also at the latter place iron and engine works, and iron shipbuilding. Quarries of limestone, whitestone, and sandstone are worked in the county, and cod, herring, and ling fisheries are very productive. Among the towns are F. (the capital), Brechin, Montrose, Arbroath, and Kirriemuir. The county sends one member to Parliament. Angus, which was a possession of old Celtic Maarmors, was known as an earldom in the 12th c., and became subsequently a seat of the Umphravilles, the Stewarts, and Douglases. The antiquities are numerous, including several Roman camps, a vitrified fort at Finhaven, many sculptured stone pillars, the round tower and cathedral at Brechin, the ruins of Arbroath Abbey, Restennet Priory, the 'Bonnie House of Airlie,' and Edzell, a noble ruin overlooking the North Sea. The old baronial castle of Glammis is one of the finest in Scotland. Cortachy Castle, belonging to the Earl of Airlie, is imposing, but does not occupy a commanding site. Pop. civ. co. 277,788; parl. co. 67,515.

For'feiture and Corrup'tion of Blood was formerly a penalty consequent on Attainder (q.v.) for treason or felony.

Forfeiture of Lands was in feudal law the penalty incurred by a tenant for an act of disloyalty to his over-lord.

Forfic'ula. See EARWIG.

Forge (Fr. *forge*, Prov. *faurga*, from Lat. *fabrica*, 'a workshop'), a place in which wrought-iron in the shape of bar or scrap is fashioned into the forms required in construction. Where only light work has to be done the F. is generally called a *smithy*. In such a F. the furnaces for heating the iron are open hearths, air being supplied to each fire through a blast-pipe entering at the bottom of it. In the smithies of engineers a fan or Blowing Machine (q.v.) is employed to produce the blast, each hearth having a valve by which to regulate the quantity of air passing through it. Each hearth is attended to by at least two men, a smith and a striker, whose names sufficiently show their respective shares in the work. All the smaller forgings, which are hammered by hand, are made by these men. All smithies, except the smallest, are furnished with one or more Steam-Hammers (q.v.) to be used for larger work. In the F. proper, heavy forgings, such as crank shafts, armour plates (when not rolled), rudder posts, wrought-iron guns, &c., are made. Here large air-furnaces take the place of the open hearths, and all hammering is done by large steam-hammers instead of by hand. The 'portable F.' is a small iron hearth supported upon a movable framework (generally upon wheels), and fitted with a pair of bellows, or a small blowing machine worked by hand.

For'gery ('the art of fabricating') is the fraudulently making or uttering of a document to the injury of another, or the making or falsifying of a stamp to the loss of the revenue. To constitute F. it is not necessary that the whole instrument should be fictitious. Making a fraudulent insertion, alteration, or erasure in any material part of a true document, by which another may be defrauded, the fraudulent application of a false signature to a true instrument, or of a real signature to a false instrument, the alteration of the date of a bill after acceptance with fraudulent intention, are forgeries. A note being payable at a banker's who fails, to fix a piece of paper over the name of that banker, writing over it the name of another banker, is F. So is it also to put a fictitious signature to a bill of exchange. The essence of F. is an intent to defraud; therefore where the imitation of a signature or alteration of a writing can injure no one, the offence is not committed; but if the act can injure any one, there will be a presumption of fraudulent intention. If the counterfeited document be such as would be ineffectual if real, the crime may still be committed. Uttering (q.v.) is essential, and merely to show the forged instrument is not uttering. To have, without lawful excuse, the proof of which lies on the accused, forged bank-notes, or any appliances for making them, is punishable with penal servitude. (See BANK-NOTE.) Knowingly to make a false entry in any public register is F. Further provisions have been made against the crime by the Statute 24 & 25 Vict. c. 98, which imposes severe penalties on the F. of stock certificates issued under the National Debts Act, and on the personation of owners of stock, and on engraving plates for stock certificates. The extreme penalty for F. is now penal servitude for life. Five years are the minimum punishment of penal servitude, and two years the maximum of imprisonment. Companies and local boards have been relieved from the liability of compensating an innocent loser by reason of a forged transfer or transfer under a forged power of attorney (Statute 54 & 55 Vict. c. 43).

Forget'-me-not, a well-known species of plants belonging to the *Boraginaceæ* or borage order. It is sometimes known also by the name of 'scorpion grass,' from its peculiar inflorescence. F. is a herb of annual or biennial nature. The calyx is five-cleft, and the corolla is *rotate* or *salver-shaped*. The flowers are blue, the leaves being alternate, and the stem of rounded form. An allied species is *Myosotis sylvatica*, which has its calyx covered with stiff expanded hairs. *M. Azorica* occurs at the Azores, and *M. versicolor* is a common garden weed, the flowers of which are first coloured yellow, and then develop a blue colour. *M. Alpestris* is a mountain-growing species.

Forisfamilia'tion is a term of Scotch law denoting the separation of a child from the family of its father. Where a child has a separate estate from the father, the profits of which become its own, it is held to be forisfamiliated even though it remains in its father's family. F. takes place when a child is married or lives in a separate family with the consent of its father. The term is also used to signify either an onerous or gratuitous renunciation of *legitim* by a child. See LEGITIM, AGE.

Fork (Old Eng. *forc*; comp. Lat. *furca*), an instrument with two or more metal prongs, used, when small, at table for eating with, and, when large, in several farming and gardening operations. The nations of antiquity generally put their fingers to the use to which a table-F. is now applied; but a two-pronged bronze F. was found at Nineveh by George Smith in 1874. Previous to this discovery, nothing had been known of the existence of forks in times so remote. They are first heard of as an article of luxury brought by a Greek princess from Constantinople to Venice at the end of the 11th c. The name is occasionally met with in inventories of the 12th and later centuries, but the paucity of the references only goes to prove the extreme rarity of forks before the 15th c. In the following century they were in general use in Italy; the gastronomic art had then reached the greatest degree of magnificence and refinement in Venice, Florence, and Rome. A table instrument formed of a spoon and a two-pronged F. joined together was known in England long anterior to that time, even in the pre-Norman epoch, but its use was for serving, not feeding. Coryate, the English traveller, visited Italy in 1608, and in his *Crudities* (1611) gives an interesting though quaint account of the use of the 'little F.' in that country. On his return to England he continued its use at meals, and was ridiculed for doing so. Slowly, thereafter, the F. became general at table, not however without opposition on the part of the clergy, who denounced the innovation as 'wicked,' and 'an abominable violation of primitive manners.' The washing of the hands before and after meals, which was rendered necessary by the primitive mode of eating, then fell into disuse. In Ben Jonson's comedy *The Devil is an Ass* an allusion is made to that circumstance—

> 'The laudable use of forks,
> Brought into custom here, as they are in Italy,
> To the sparing of napkins.'

The earliest forks were made of silver, and the introduction of others with steel prongs assisted in spreading the custom of using them among all classes. Asiatics do not use the F.; in China *chopsticks,* two slender rods of wood or ivory, take its place. An instance of the use of the F. among savages is reported of the Fijians, who fifty years ago were the most inveterate cannibals known; when eating human flesh, a large F., made of the hard wood of the *Casuarina*, was used, whereas at ordinary repasts the mode more befitting savages was followed.

For'li (the Roman *Forum Livii*), a walled town and capital of a province of the same name, N. Italy, between the rivers Ronco and Montone, at the base of the Apennines, 40 miles S.E. of Bologna by railway. Pop. 41,720. It is the seat of a bishop, and has many splendid buildings, chief among which are the Palazzo Guerini, designed by Michael Angelo, and the cathedral, containing pictures by Carlo Maratti, Guido, &c. There are some silk and salt industries, and a trade in hemp, corn, woad, and carthamus. The sulphur mines of F. produce about 24,900 tons of sulphur annually. F. was founded by Marcus Livius Salinator in 207 B.C. In the Middle Ages it formed a republic, and suffered greatly in the time of the Guelph and Ghibelline factions.

Forlorn' Hope, in warfare, is the name given to a body of picked troops or volunteers devoted to some desperate enterprise. The corresponding name in German is *Die verlornen posten*, in French *Les enfants perdus*.

For'mâ Pau'peris, In, in the law of England and of Scotland, is the term denoting the mode in which an action may be maintained by one who is too poor to follow the usual way. In England it is provided by statute that any one having just cause of suit, who can take oath that, beyond the subject matter of the cause and his clothes, his possessions are not worth £25, shall be entitled to sue without paying any fee to counsel, attorney, or clerks in court; provided the case for himself has been submitted to counsel for opinion, and provided this opinion and an affidavit of his own or of his solicitor be produced in court, when the court will decide whether he, the pauper, be admitted to sue or not. If the pauper be allowed to sue, then the court may assign him counsel, or solicitor, or both, to act for him gratuitously. In this way the poor man, in this country, is assisted to bring his action when he has good grounds for doing so.

Forma'tion, in geology, is a somewhat vague term applied to a group or series of conformable strata, differing in lithological character and even in their fossil contents.

Formi'ca. See Ant.

For'mic A'cid derives its name from the fact that it is secreted by the ant (*formica*). When the insect is irritated it ejects the acid, which is at once recognised by its peculiar odour and by the stinging sensation it produces if it comes in contact with the skin. It also occurs in the free state in the nettle (*Urtica urens*), and is the cause of the disagreeable effect produced when the plant is touched. It may easily be obtained in a dilute state by distilling oxalic acid with its own weight of glycerine. The glycerine takes no apparent part in the decomposition of the oxalic acid, but simply exercises a catalytic action (see Catalysis) whereby the oxalic acid is split into formic and carbonic acids. In order to prepare it pure and anhydrous, dry sulphuretted hydrogen is passed over gently warmed formate of lead. Pure F. A. is a pungent liquid, having a peculiar odour, and exercising a very corrosive action on the skin. It boils at 99° C., and crystallizes when cooled to — 6° C. Its only compound of any practical importance is formic ether or artificial essence of rum, which is prepared by distilling a mixture of starch, alcohol, binoxide of manganese, and sulphuric acid.

Form'ings Island, in the Pacific, to the N. of the Sandwich Islands, has a good harbour, on which account it was occupied by the English in 1860.

Formo'sa (Span.; Lat. *formosa*, 'beautiful'; Chinese, *Tai-wan*, 'terrace'; Malay, *Pekan* and *Pakkando*), an island in the Chinese Sea, 90 miles off the province of Fukien, from which it is separated by the F. or Fukien Channel. It is 237 miles long, with an average breadth of 70 miles, and is of great natural beauty. A central range, rising to about 12,000 feet, divides F. into a fertile western plain, and an eastern Alpine region. The mountains are of volcanic origin, fantastic in outline, and cleft by deep gorges running up from the sea, clothed with bright verdure and watered by many cascades. The western plain is cultivated like a garden by Chinese, who have settled there in some numbers; while the eastern high lands are held by wild tribes named Peppohoans, of Mongolian origin. The area is estimated at 15,000 sq. miles, and the pop. at 3,500,000. Rich coal-mines have been opened in the N. of F. by the Chinese, who have also spread over the E. coast. The mining is carried on very primitively, but much coal is exported to China, especially to Foo-chow. The interior has veins of sulphur and various metals. Besides coal, the chief exports are rice, for which F. is famous, tea, brimstone, timber, &c. The principal places are Tai-wan, the capital, opened to foreigners in 1858, and Ke-lung, a rising port in the N., and the centre of the coal trade. An atrocious massacre of some Japanese sailors who were wrecked on the E. coast of F. in December, 1871, compelled the Japanese Government, who could obtain no redress from the Chinese authorities, to invade the island. General Saigo landed in May, 1874, with a force of 3000 men, and inflicted severe punishment on the guilty tribes. The Chinese were greatly excited, and for some time war seemed imminent between the two empires, but peace was finally maintained, and on the 2nd or 3rd of December the Japanese troops withdrew. One of the conditions of peace, insisted on by the Japanese in 1895, was the handing over of F. to the victors. Directly the Chinese agreed to this, the inhabitants of F. declared themselves to be a republic, and obstinately opposed the landing of the Japanese forces, which, however, before the end of the year, succeeded in capturing all the principal places, and in driving off their opponents either across the seas or into the wildest parts of the island.

Formosus, a bishop of Porto and missionary among the Bulgarians, who incurred the displeasure of Pope John VIII., and was charged with being implicated in the latter's death. The new pope, Marinus, however, raised the anathemas and loaded him with honours. F. crowned Pope Stephen V. and was chosen as his successor. The election led to much protest and disorder, caused by the partisans of Sergius and two other candidates for the papacy. F., having sided with the German Arnulf, was placed over Rome, that had revolted from F., when the city was captured by the German host. Arnulf then proceeded on his conquest of Italy, but was suddenly struck down by paralysis. Had not F. died at that time (896), he would very probably have fared badly at the hands of the Italians, who at once rose against the forces of the dead champion.

Pope Stephen VI. had the body of F. disinterred and tried before an ecclesiastical court; and there being no defence, the corpse was found guilty and was cast into the river, whence it was taken out by some fishermen, and at once commenced to work miracles. This produced a revulsion of popular feeling; the remains of F. were buried with every token of honour and respect, and the judgment of the court, already mentioned, was annulled by Pope John IX.

Forms of Address are as various as the rank of those addressed, and a knowledge of the following may prove useful.

THE ROYAL FAMILY.

The Queen—Superscription, 'To the Queen's Most Excellent Majesty.' Commencement, 'Madam;' conclusion, 'I remain, Madam, Your Majesty's most faithful subject and dutiful servant.'

The Prince of Wales—Sup., 'To His Royal Highness the Prince of Wales.' Com., 'Sir;' conclusion, 'I remain, Sir, Your Royal Highness's most dutiful, and most obedient servant.'

Princes of the Blood Royal—Sup., 'To His Royal Highness the Prince ——.' Com., 'Sir;' conclusion, 'I remain, Sir, Your Royal Highness's most dutiful, and most obedient servant.'

The Princess Royal—Sup., 'To Her Royal Highness the Princess Royal.' Com., 'Madam;' conclusion, 'I have the honour to be, Madam, Your Royal Highness's most obedient and humble servant.'

Princesses of the Blood Royal—Sup., 'To Her Royal Highness the Princess ——.' Com., 'Madam;' conclusion, 'I have the honour to be, Madam, Your Royal Highness's most obedient and humble servant;' refer, 'Your Royal Highness.'

Princes of the Blood, embracing the sovereign's nephews and cousins—Sup., 'To His Highness the Prince of ——.' Com., 'Sir;' conclusion, 'I have the honour to be, Sir, Your Highness's most obedient and humble servant.'

Princesses of the Blood, embracing the sovereign's nieces and cousins—Sup., 'To Her Highness the Princess —— of ——.' Com., 'Madam;' conclusion, as above, substituting *Madam* for *Sir*.

NOBILITY AND GENTRY.

Dukes—Superscription, 'To His Grace the Duke of ——.' Commencement, 'My Lord Duke.'

Duchesses—Sup., 'To Her Grace the Duchess of ——.' Com., 'Madam.'

Marquesses—Sup., 'To the Most Honourable the Marquess of ——.' Com., 'My Lord Marquess.'

Marchionesses—Sup., 'To the Most Honourable the Marchioness of ——.' Com., 'Madam.'

Earls, Viscounts, Barons—Sup., 'To the Right Honourable the Earl of ——.' 'To the Right Honourable the Lord Viscount ——.' 'To the Right Honourable the Lord ——.' Com., 'My Lord.'

Countesses, Viscountesses, and Baronesses—Sup., 'To the Right Honourable the Countess of ——.' 'To the Right Honourable the Viscountess of ——.' 'To the Right Honourable the Lady ——.' Com., 'Madam.'

Baronets—Sup., 'To Sir William ——, Bart.' Com., 'Sir.'

Knights—Sup., 'To Sir John ——.' Com. as above.

The Wives of Baronets and Knights—Sup., 'To Lady ——.' Com., 'Madam.'

Sons of Peers—The younger sons of Dukes and Marquesses are also styled Lords, and addressed as such with the addition of their Christian names, as, 'Lord John ——.' The younger sons of Earls, and all the sons of Viscounts and Barons, are styled Honourable, as, 'To the Honourable William ——.' Com., 'Sir.'

Wives of the Sons of Peers—Sup., 'To Lady William ——.' 'To the Honourable Mrs. ——.'

Daughters of Peers—Sup., 'To Lady ——.' 'To the Honourable Miss ——.' Com., 'Madam.'

Privy Councillors—Sup., 'To the Right Honourable Thomas W——.' Com., 'Sir.'

Army and Navy—Admirals when addressed officially have the rank of their flag added to their name and title, as, 'To the Right Honourable the Earl of ——, Admiral of the Fleet.' Commodores and captains take their rank and title *after* their designation on the *Naval List*. In the army all officers take their name and title *after* their rank in the *Army List*.

Governors of Colonies, &c.—Sup., 'To His Excellency Sir ——,' or, 'To His Excellency General ——, Governor of ——,' or, 'Governor and Commander-in-Chief.' Com., 'Sir.'

Archbishops—Sup., 'To His Grace the Archbishop of Canterbury.' Com., 'My Lord Archbishop.'

Bishops—Sup., 'To the Right Reverend The Lord Bishop of ——.' Com., 'My Lord.'

Deans—Sup., 'To the Very Reverend the Dean of ——.' Com., 'Very Reverend Sir.'

Archdeacons—Sup., 'To the Venerable the Archdeacon ——.' Com., 'Venerable Sir.'

Lord Advocate (of Scotland)—Sup., 'Her Majesty's Advocate for Scotland,' but by courtesy, 'The Right Honourable the Lord Advocate.' Com., 'Sir,' but by courtesy, 'My Lord.'

Lord-Lieutenant of Ireland—Sup., 'His Excellency the Lord-Lieutenant.' 'His Grace the L.-L.' (if a Duke).

Lord Mayors are six in number, those of London, York, Liverpool, Manchester, Belfast, and Dublin—Sup., 'To the Right Honourable the Lord Mayor of ——.' Com., 'My Lord.'

Lady Mayoresses are addressed in the same style as their husbands.

Lord Provost of Edinburgh—Sup., 'The Right Honourable the Lord Provost.'

Forms of Proced'ure. See PROCESS.

Forr'es, an old royal burgh of Scotland, in Elginshire, on the Findhorn, 2 miles from the sea, and 10 miles W.S.W. of Elgin by railway. It stands on an old sea-terrace at the base of the Cleeny Hills, four gravelly elevations, on the highest of which—on the site of ancient fortifications—is the Nelson Tower (66 feet), erected in 1806. F. was formerly the seat of the Archdeacon of Moray, and there still remains a portion of the 'mantle wall' which once surrounded the college or cathedral kirk, and which contains the Paris Port, or bishop's entrance. To the W. are the ruins of a castle; to the E. a rudely-hewn pillar, 25 feet high, called Sueno's Stone, or the 'Stan'in' Stane,' a sandstone pillar, 20 feet high, and carved with representations of men and animals said to have been erected in 1014 to commemorate the expulsion of the Danes by Malcolm II. The chief industries are distilling, brewing, and dyeing. F., along with Inverness, Nairn, and Fortrose, forms the Inverness District, and returns one member to Parliament. Pop. parl. and royal burgh 3691; civ. par. 4801; royal burgh and civ. town (each) 3971.

Forr'est, Edwin, a celebrated American actor, born in Philadelphia, 9th March, 1806, first appeared on the public stage at the age of fourteen as Douglas (27th November, 1820). After playing in the chief western cities during a long professional tour, he appeared at the Park Theatre, New York, as Othello, in 1826, and at once achieved reputation. He visited England in 1835, again in 1837, when he married Catherine Sinclair, and a third time in 1845. On the third visit to England the friendly relations that had previously subsisted between F. and Macready, were severed; and on the occasion of the professional tour of the latter in America, F.'s partisans were the cause of a riot, 10th May, 1849, from which the English tragedian barely escaped with his life. F. continued to play till 1871, after which he gave a few Shakespearian readings. He died at Philadelphia, 12th December, 1872. F. added a fine presence to a distinct and even powerful histrionic genius. He is said to have left a fortune of over one million dollars, the greater part of which he devised for founding an institution for aged and destitute actors. His splendid library was destroyed by fire at his house in Philadelphia in 1873. See W. R. Alger's *Life of E. F., the American Tragedian*.

For'ster, Johann Reinhold, a celebrated naturalist and traveller, was born at Dirschau near Danzig, 22nd October, 1729. Educated for the Church, F. for some time after 1753 officiated as a pastor at Nassenhuben, but being devoted to philosophy, science, and mathematics, was employed by the Russian Government to investigate the condition of a colony at Saratov. He afterwards removed to England, and taught natural history and the French and German languages at Warrington, Lancashire. In 1772 he accompanied Captain Cook in his second voyage round the world as naturalist. On his return, in 1775, the University of Oxford conferred on him the degree of LL.D., and three years later he published the results of his botanical observations, and *Observations made during a Voyage round the World*. Some disputes arising between F. and his English friends, he took the position of Professor of Natural History, &c., at Halle, in Saxony, and produced a number of works. F. was a good scholar in classics and literature, and is said to have been able to speak and write seventeen different languages. He died at Halle, 9th December, 1798.—**Johann Georg Adam F.**, son of the preceding, was born at Nassenhuben, 26th November, 1754. He was with his father in Russia and England, accompanied him in his voyage along with Captain Cook, and became Professor of Natural History first in Hesse Cassel (1778), and then in Wilna (1784). He settled in Mainz as a bookseller, and as librarian to the Elector. In 1790 he accompanied Alexander von Humboldt to Britain, France, and the Netherlands; finally he embraced republican opinions, and in 1793 was sent to Paris to solicit the incorporation of Mainz with the French Republic. When Mainz was taken by the Prussians, F. appears to have lost his books, MSS., &c., and was on the point of leaving for India and Turkestan when he died in Paris, 12th January, 1794. He wrote on ethnology, philosophy, politics, geography, and natural history. A collection of his letters was published by his widow, a daughter of Heyne (Leipz. 1828-29), and his complete works were edited by his daughter (Leipz. 1843-44).

For'ster, John, an eminent journalist and biographer, was born at Newcastle in 1812. Educated for the bar, he devoted himself to literature and journalism. He succeeded Charles Dickens as editor of the *Daily News*, but retired from the post in a year. A connection which F. formed with the *Examiner*, during the brilliant editorship of Albany Fonblanque, lasted for eighteen years, F. in the course of it becoming editor in 1846, and retiring from the office in 1856, on his having been appointed the year previous Secretary to the Lunacy Commission. Five years later he became Commissioner in Lunacy. He died 1st February, 1876. F. will be chiefly memorable for his historical and biographical works. He devoted himself largely to the period immediately prior to the advent of Cromwell, and in discharge of his duty of 'righting wronged reputations,' as Fonblanque styled it, wrote *Statesmen of the Commonwealth of England* (1831-34), *Arrest of the Five Members*, and the *Grand Remonstrance* (1860), and *Sir John Eliot, a Biography* (1864). F. was the intimate friend of a number of the most eminent literary men of the day, such as Landor, Dickens, and Carlyle. He published a biography of Landor in 1868, and of Dickens in 1871-74. He also wrote a *Life of Oliver Goldsmith* (1848), and shortly before his death published the first volume of a *Life of Swift*.

Forster, Rt. Hon. William Edward, was born at Bradpole in Dorset, 11th July, 1819, was educated at the Friends' School, Tottenham, and became engaged in the worsted trade at Bradford. He married Jane, the eldest daughter of Dr. Arnold of Rugby. He was elected for Bradford in 1861, and during the following 25 years retained the seat in the House of Commons. In 1865-66 he was Under Secretary of State for the Colonies, and in 1868 became Vice-president of the Council of Education, and was sworn in a member of the Privy Council. In 1870, as a member of the Cabinet he brought forward and passed the Education Act, which altogether changed the elementary education system of the country. In 1872 he also passed the Ballot Bill. In 1875 he was elected Lord Rector of Aberdeen University. In 1880 he again became a Cabinet supporter of Mr. Gladstone, and this time as Chief Secretary for Ireland, which post he held for two years, and during that time he was vilified by the Nationalist party, threatened by the 'Invincibles,' and in the end deprived of the support of his colleagues. Thereupon F. resigned office, but continued to take an active part in parliamentary affairs. He showed himself to be an opponent of Mr. Gladstone's policy both in Irish affairs, in S. Africa, and in the Sudan. He was nominated at the general election for his old constituency of Bradford, and elected, though he was too ill to be present. On 5th April, 1886, F. died, and in him the country lost a bold, honest, earnest, unselfish patriot, whose influence in the House of Commons arose more from straightforward and vigorous dealing and speaking than from oratory and tact.

Fort, Fort'ress (Lat. *fortis*, 'strong'), a place of strength, within the defences of which a small body of men may repulse a considerable force. The name *fort* is commonly applied to a star-shaped or bastioned work of military engineering; the term *fortress* is of wider application, and may be used to designate a group or series of fortified works. See FORTIFICATION.

Fort, in British North America, is the name applied to the different posts or trading stations of the Hudson Bay Company (q.v.) or other fur-trading corporations. These posts, usually log-built structures with sleeping, dining, and store rooms, are not in any sense strongholds.

Fort Augus'tus (Gael. *Cilla-Chuimein*, 'the cell or church of Cumin,' probably the 'Cumineus albus' who was abbot of Iona 657-669), a small fort at the S. end of Loch Ness, 29 miles from Inverness, and in the very centre of the great glen of Scotland, built in 1716 with the view of bridling the N. Highlanders. It received its present name in 1730 in honour of the Duke of Cumberland. F. A. is a quadrangle with bastions, and was well fitted for about a hundred soldiers. It was in 1857 sold by Government to Lord Lovat, whose son handed it over to the Benedictine order. Since 1882 it has been used as a college, abbey, &c., of the Benedictines.—F. A. is also the name of a village in the immediate vicinity of the fort, having a pop. of 611.

For'te (Ital. 'strong or loud'), used in music as a mark of expression, and signifies 'loud.' *Fortissimo* means 'very loud.'

For'tescue, a noble English family said to have sprung from a certain Richard *le Fort* who accompanied William of Normandy to England, and at the battle of Hastings covered him with his shield, on account of which he received the name *Fort-escue* ('strong shield'). This pretty legend is embodied in the motto of the F. arms, *Forte scutum, salus ducum*. The most distinguished member of the family was **Sir John F.**, son of one of the bravest generals of Henry V. He was born about 1395, studied at Oxford, and in 1442 was Chief-Justice of the King's Bench. On the outbreak of the Wars of the Roses, he sided with the Lancastrians, and in 1461 fled with Queen Margaret to the Continent, where he wrote (1463) for the young Prince Edward his famous treatise in dialogue, *De Laudibus Legum Angliæ*. In 1471 F. returned to England, submitted to the House of York, and died in 1485 at his estate of Ebrington in Gloucestershire. Another valuable work of F.'s is *The Difference between Absolute and Limited Monarchy* (Lond. 1714). In both of these F. proves himself a sound English Constitutionalist. **Sir Hugh F.**, a lineal descendant of Sir John, became Baron F. in 1746, but the first earl in the family was **Hugh F.** (born 1753, died 1841). **Hugh, second Earl F.** (born 1783, died 1861), took an active part in the great debates on the first Reform Bill, and was Lord-Lieutenant of Ireland till the fall of the Whig Government in 1841. **Hugh, third Earl F.**, born 4th April, 1818, was educated at Harrow, entered Parliament in 1841, as Viscount Ebrington was called to the Upper House in his father's Barony of Castle Hill, Devon, in 1859, and in 1861 succeeded his father, the second Earl F. He has throughout his public career been an indefatigable sanitary reformer. He has written several pamphlets on social, political, and educational questions.

Fort George (Gael. *Aird-nan-saor*, 'height of the carpenters'), a fort in the county of Inverness, on a sand-spit in the Moray Firth, 12 miles N.E. of Inverness. It has barrack accommodation for over 2000 men, and unlike the two smaller forts at one time connected with it, Fort Augustus and Fort William, is still kept in use. It mounts seventy guns, and is very scientifically defended, but would be of little avail against the artillery of the present day. It was built shortly after the Jacobite rising of the '45, at a cost of £160,000, and embraces an area of 12 acres. The depot of the Seaforth Highlanders (the Duke of Albany's Ross-shire Buffs) is located here—Regimental District No. 72.

Forth, one of the most picturesque rivers of Scotland, rises in the N.W. of Stirlingshire, and has a direction mainly E. by S., forming part of the boundary between the shires of Perth and Stirling, and expanding into the Firth of F. near Alloa, after a very sinuous course of 70 miles. Its upper waters are the Duchray, 16 miles long, from the E. base of Ben Lomond, and the Avendhu, 12 miles, from the W. side of Ben Venue. The latter flows through Lochs Chon, Dhu, and Ard, and the united stream leaves the romantic region of the Highlands at Aberfoyle. From the N. the F. receives the Teith, Allan, and Devon; the principal town it passes is Stirling, to which it is navigable for vessels of 100 tons. Below Alloa the estuary gradually widens, occasionally contracting, as at Queensferry (three-quarters of a mile), till it reaches its greatest breadth of 25 miles between Musselburgh and Largo Bay. The *Firth of F.* separates the counties of Stirling, Linlithgow, Edinburgh, and Haddington on the S. from Clackmannan, Perth, and Fife on the N.; and the chief towns on its shores are Leith, Portobello, North Berwick, Queensferry, Grangemouth, Culross, Burntisland, and Kirkcaldy. At its entrance from the sea stand the Bass Rock and Isle of May. It contains the islands of Inchcolm, Inchkeith, Cramond, and others. It receives from the S. the Carron, Avon, Almond, and Esk, from the N. the Leven, and its waters have a maximum depth of 30 fathoms. St. Margaret's Hope, above Queensferry, is one of the safest of British roadsteads.

Fortifica'tion, the art or science of strengthening a military position by means of defensive works, is resorted to equally by forces in attack and on defence. In warfare, the ultimate purpose of defensive works is to oblige the enemy to fight under the most disadvantageous circumstances, mainly by making use of natural or artificial cover as a protection against his fire, and as a shield from under which counter-fire may be delivered. Natural F. is the utilisation of natural objects—rivers, marshes, forests, ravines, &c.—to delay the assault of an enemy, and to render it more or less ineffectual when made. Artificial F. is constructive, and has been described as military architecture, or the art of strengthening natural obstacles to an enemy's advance, or, where such natural obstacles do not exist, of constructing works to serve the same purpose, by the skill of the engineer. The latter division of the subject falls to be considered under the two headings *Permanent* and *Field or Temporary F.* The purposes of both permanent and field works are identical, and in their construction the same principles are brought to bear. The principal features of both are a ditch to impede the enemy's assault, and a parapet on the side of the ditch occupied by the defence to afford the defenders protection against the enemy's fire, and at the same time enable them to deliver their own fire without exposing themselves to the enemy's marksmen. Field-works, thrown up for a temporary purpose, by unskilled labour, and with such materials as the locality affords, are often rude and slight; permanent fortifications, however, intended for the permanent protection of countries, capitals, arsenals, dockyards, &c., are deliberately built by the most skilful engineers, and with the best materials the age and the country can command, and are, so far, perfect as works of military engineering.

Permanent Fortification.—In the history of military science, the art of defence has gradually developed so as to meet the exigencies of a gradually-developing art of attack. In early days enclosing walls—the original *enceinte*—were considered sufficient to protect a city against a besieging force. Later the walls were strengthened by projecting towers at bowshot distance from each other, and from the loopholes of which an effective flank fire could be delivered along the face of the wall. After the invention of gunpowder and the introduction of artillery, the defensive wall and tower were lowered, so that guns mounted upon them might be fired at a level low enough to sweep the ground occupied by the enemy, and thus the tower became practically a *bastion*, and one of the chief features of modern F. was created. The bastioned system of F., due originally to the ingenuity of the Italian engineers of the early part of the 16th c., was developed by the genius of Vauban (q.v.), Cormontaigne, and other engineers, and all the French and many of the Continental fortresses of our own day are built on this system. The favourite type of permanent F. at present, however, the adoption of which has doubtless been due to the changed conditions of war consequent upon recent improvements in artillery, was advocated a century before Vauban's day by no less a person than Albrecht Durer, who in his work on F. in 1527 recommends what has always been known as the 'polygonal system.' This system was first adopted in Germany early in the present century, was subsequently employed (with modifications) by Belgium, and more recently by Great Britain in the construction of the defences of the great English dockyards. Of the polygonal system the chief characteristics are that the lines of parapet are traced with reference to the space they have to enclose and the direction from which it is probable an attack would be made, and not with reference to the reciprocal *flank defence of the ditches.* Still, in the polygonal system, the defence of the ditch is provided for, in the event of its being reached, by placing casemated buildings (masked batteries in fact) within the ditches, and in such positions as to sweep them to right and left, or otherwise, by reverse galleries in the counterscarps. The profile and arrangements of the works of the bastioned and polygonal systems of F. are similar though not identical. The accompanying figure will readily familiarise readers with the names, relative positions, &c., of the principal parts of the Enceinte (q.v.) of all regularly-fortified works. The *rampart* (*a*) is a mound of earth raised above the natural level of the country, and formed of the soil obtained by excavating the ditch, which extends in front of it all round the work. The *terreplein* (*b*) is the platform on which the guns are placed and worked. The *banquette* (*c*) is a tread or step of earth upon which the infantry stand to deliver their fire. The *parapet* (*d*), the highest part of the rampart, is a *breastwork* 30 feet thick and about 8 feet higher than the terreplein, the purpose of which is to protect the troops working the guns and the infantry on the banquette from the musketry and cannon of the enemy. The parapet is pierced with embrasures, usually about 18 feet apart, through which the guns are fired. The *crest* of the parapet (*c*) is usually about 22 feet above the natural level of the country. The *superior* or *upper slope* of the parapet is about 18 feet broad, and has a slope of 1 in 6. The *exterior* or *lower slope* (*e*), the remaining part of the parapet, has a slope of nearly 1 in 3. At the foot of the exterior slope in bastioned works is the *berm* (*f*), a narrow level space or path which affords a means of communication round the outside of the works. The same purpose is served in polygonal F. by the *chemin des rondes*. The *escarp* (*g*) is the inside wall of the ditch, lined with mason-work to

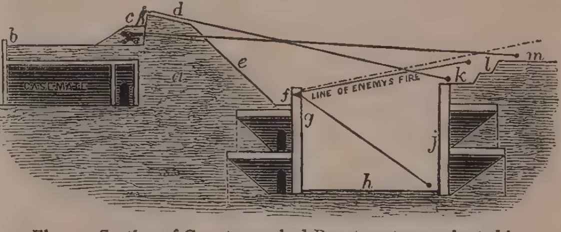


Fig. 1.—Section of Counter-arched Revetments, as adopted in England.

retain the earth of the rampart in its place. (The strong structure of mason-work is called the *revetment.*) The *main ditch* (*h*) is usually about 12 feet deep, and is often from 100 to 180 feet wide, though usually its width is from 13 to 18 feet wide. The *counterscarp* (*j*) is the wall round the outside of the ditch. The *covered way* (*k*) is a space of about 30 feet extending round the counterscarp, enclosed or covered from fire by a parapet. The *glacis* (*m*), with a banquette (*l*), is the sloping space beyond the covered way. The slope of the glacis brings the troops of the enemy within direct fire of the cannon and musketry from the parapet. The enceinte, consisting of the ditch and rampart, with its subdivisions of parapet, banquette, and terreplein, runs completely round the fortress whatever be its shape, and presents the same profile of glacis, covered way, ditch, rampart, parapet, and terreplein on all sides of it. Where water can readily be procured the ditch is flooded, and its depth of 12 feet obliges the enemy to construct rafts to cross it, and thus delays the assault at the very moment when the defenders are delivering their most destructive fire. The defensive works of a fortress are not all on the interior side of the ditch. There are *outworks* placed outside the ditch but within the glacis. The chief outwork in either of the systems of F. above mentioned is the *ravelin,* a large *Redan* (q.v.), which is useful as affording an advanced position for artillery to flank the glacis and enfilade the enemy's trenches. It is defended by ditches, which in the bastioned system are flanked by the guns of the bastions, and in the polygonal system by low casemated batteries in flanks connected with the ravelins themselves. *Advanced works* are open works beyond the glacis, under the protection of the guns of the enceinte, and the use of which is to protect ground unprotected by the guns of the fortress. *Retrenchments* are works *within works,* so that when the outer lines are carried, the defence may still be maintained by the inner lines. In the bastioned system, retrenchments are of frequent occurrence, especially within the bastions of the enceinte and in the ravelins, portions of the faces of which are isolated by a small ditch and parapet called a *coupure. Casemates* are arched chambers, which are bombproof under all ordinary circumstances. Magazines are always casemated. In a gun casemate the embrasure is made in the end wall of the casemate. In the Spithead Forts, Portsmouth, these end walls of casemates are constructed of iron. *Caponieres,* in the polygonal system, are large casemated stone structures built within the ditch, the purpose of which is to defend the ditches of polygonal fortifications. In German enceintes, the caponieres are detached from the escarps, are built in two stories, and are situated in the middle of each long *face* or *side* of the angle. In England they are generally attached to the escarps, have only one floor, and are placed at the angles of the ditches, so as to command both faces of the work. Communication between the works and the caponieres is maintained by a tunnel, which, when it also communicates with the ditch and outworks, is called a *postern.* A novel feature in modern F. is the mortar casemate, a vaulted chamber, without a front wall, in which the mortar is secured against vertical fire, and from which its fire can be brought to bear on the enemy advancing over the glacis. Mortar casemates are placed behind the rampart of the enceinte. Unseen by the enemy, they are the means of a most destructive fire of large shells being thrown among his advancing troops. Having reached the covered way, there is nothing to obstruct an enemy's entrance into the works of a fortress except the escarp, for the counterscarp wall may readily be blown in by mining. Nor in these days does the escarp offer a very serious obstacle, for the accuracy of the curved fire of the present day, and the weight of the shells now used, enable the artillerist to strike and destroy the strongest escarp, unless the latter be well concealed below the crest of the glacis. To neutralise as far as possible the great improvements in the accuracy and range of large guns used in attack, the tendency in modern F. is to make the ditch narrower and deeper, so that the top of the escarp wall shall be 10 or 15 feet lower than the crest of the glacis. In the profile of the English forts (Fig. 1), in which a *chemin des rondes* (*f*), or path of communication, extends round the works, between the escarp and the exterior slope of the parapet, this plan has been adopted. It may here be stated, that in *counter-arched revetments* the pressure or lateral thrust of the earth of the rampart falls upon the arches, and not upon the actual wall of the revetment. The arches are arranged usually in two tiers, and the space they afford is sometimes converted into loopholed galleries for musketry-fire through the escarp. These galleries, known as escarp or counterscarp galleries, are utilised in English and German fortresses to flank the caponieres, and thus aid in defending the ditch. In the bastioned system, bastions are connected by a curtain, in front of which is an outwork called a *tenaille,* with a parapet for the musketry defence of the ditch. The tenaille also acts as a counter-guard, and to protect the postern and escarps of the curtain and flanks from being breached. The main differences between the bastioned and polygonal systems of F. having already been adverted to, it remains to describe Fig. 2, which exhibits the arrangement of works on a front of the German polygonal system, merely premising that the great fortified works of England are constructed on similar, if not identical, principles. The figure given represents a portion of the enceinte which surrounds the work (if it be circular), and the profile of which is the same on all sides of the polygon. Beginning from the *interior* of the F., A A is the 'body of the place,' or the space enclosed by the enceinte; B B are casemated flanks in the *escarp of the rampart,* the purpose of which is to defend the ditch of the caponiere; C is a casemated caponiere, provided with two tiers of five guns, and built in the middle of the main ditch, which it commands to right and left; D is a ravelin with a ditch in front defended by the casemated flanks E E; F F are casemates in the ravelin to defend the ditch in front of the counter-guards G G; H H is the covered way, and J J the glacis.

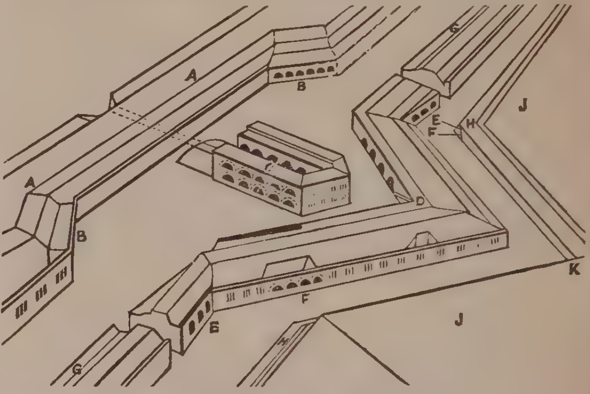


Fig. 2.—Arrangement of Works in a Front of the German Polygonal System.

The original works of Vauban were arranged, as to dimensions, &c., to be in harmony with the range, weight, &c., of the firearms of 1650, and are now obsolete. But apart from the matter of dimensions or relative proportion, the general arrangement of the fortified works of which he was the designer is still retained throughout France, and forms the basis of all the modern French systems, as exemplified in the fortifications of Paris, Metz, Lille, &c. One of the chief disadvantages of the Vauban or bastioned system, still prevalent in France, is the liability of the works to be swept by Enfilade (q.v.) or reverse fire. In the Franco-German war, Forts Issy and Vanvers in Paris, and a number of the bastions of the Paris enceinte, were thus swept by the enemy's cannon, and the great number of *traverses* or covering parapets which the French found it necessary to erect along the lines of, and at right angles to, their covered ways and terrepleins, so as to afford protection against enfilade fire, is sufficient evidence to prove that, to this extent, they were forced to acknowledge the defect of their system. Perhaps the most complete and most interesting permanent works of modern Europe are the magnificent fortifications of Antwerp constructed by General Brialmont. They consist of a most formidable and extensive enceinte, strengthened by a series of detached forts along the line at a distance from each other of about 2000 yards. A similar arrangement of defences—a continuous enceinte and a cordon of forts—may be seen at Paris, Metz, Lyon, Cologne, Coblentz, Mayence, &c., but Antwerp is *sui generis*, from the circumstance that in the construction and arrangement of its works the principles and details of the polygonal system have been applied and utilised with the greatest possible success.

Field Fortification.—The object of field as of permanent works is to enable a smaller to resist the attack of a larger body of men. When time is afforded for their careful construction, they are found to present a profile similar to that presented by permanent works, viz., a sheltering rampart, with parapet, ditch, and glacis. Field-works are of two kinds—open and closed. The simplest *open work* is a straight line, useful to close a gorge or defend an isthmus, but in ordinary ground liable to be destroyed by enfilade. The redan or *flèche* (Fr. 'arrow'), consisting of two straight lines or faces, forms what is called a *salient angle*. The line bisecting this angle is called a *capital*, and a line between the open ends of the two lines or faces is called the *gorge*, which, being undefended, exposes the work to the liability of being taken in rear. A Russian redan was captured at Borodino by French cavalry riding in at the rear of the work by the gorge. Another defect of this field-work is that no provision is made for the defence of its ditch. Redans are commonly constructed for the defence of a bridge, defile, or any narrow passage. When flanks are added to redans at an angle of 100°, the work is vastly strengthened, as the flanks command the ditch as well as the ground in front of the salients. A *lunette* is a redan with two flanks running parallel to the *capital* or bisecting line of the two faces or lines forming the redan. A double redan is a work in which two redans are joined together, and provision is thus made for the reciprocal defence of the inner ditches. *Enclosed field-works*, or such as are entirely surrounded by a parapet, are called *forts* when the ditches are flanked by the parapets; but where no flanking defence is afforded by the parapets, the work is called a *redoubt*. *Redoubts* may be of any shape, regular or irregular, provided the fire from any face of the rampart does not defend any line of ditch. Such works are readily constructed, and are defended by fewer men than forts. In redoubts, however, as in the polygonal system of F., the defence of the ditch is often provided for by placing caponieres so as to sweep it right and left, or by the construction of loopholed galleries in the counterscarp. Field-works comprise three kinds of forts—star, demi-bastioned, and bastioned forts. The bastioned fort is an elaborate work, constructed only in cases in which an important spot is to be fortified and an obstinate defence intended. Its ditch should be 12 feet deep, and its parapet 10 feet high and 16 feet thick, to resist a fairly heavy gun. *Blockhouses*, usually formed of logs of wood, loopholed, and arranged vertically in the shape of a rectangle, polygon, or cross, are proof against rifle bullets, but offer no defence against artillery, and are only valuable in mountainous or thickly-wooded country, impracticable for field-guns. When built in the form of a cross, the blockhouse permits of a flank defence. In the Turko-Russian war (1876), field-works of this description were eminently serviceable. *Fortified lines* are either continued or interrupted by intervals. *Continued lines* are a connected line of field-works, the purpose of which is to enclose a front or connect isolated forts by a continuous parapet. They are now seldom used, from the circumstance that a parapet broken by salient and re-entering angles requires more men for its defence than are required for an ordinary line of battle, and that when once broken by the enemy, the lines may be regarded as lost. *Redan lines*, designed by Vauban, consist of a series of redans, the salients of which are 240 yards apart, and the inner faces connected by curtains. *Indented* or *cremaillère lines* consist of a series of alternate long and short faces, forming salient and re-entering angles of 90°. The defects of this trace are that the fire from the short faces is ineffective until the enemy arrives at the counterscarp of the line, and that they are exposed to enfilade fire. *Bastioned lines* consist of a series of connected bastions. The salients of the bastions are 360 yards apart, the perpendiculars are not more than 45 yards. In this trace the faces are much exposed to enfilade. *Lines with intervals* have, for almost all purposes, superseded continued lines, (1) because, as there is less extent of parapet to defend, they do not drain the garrison to an equal extent; (2) because, when one part of the line is forced, the whole does not fall; and (3) because the defending force can readily advance to the attack between the intervals. *Têtes-de-pont* or *bridge-heads* are bastioned works thrown up to cover the advance or retreat of an army across a river.

Obstacles.—In field F. the parapet is practically the only actual defensive work, and is usually constructed in haste, and often—in cases in which an earthen rampart cannot be thrown up—of materials which afford only insufficient cover. During the American civil war a favourite form of parapet was constructed by cutting down trees and of these raising a rude breastwork. All such parapets, however, may be readily taken by assault, unless the approach to them (the glacis) is rendered difficult by what are termed obstacles. The purposes of obstacles are to impede the advance of the enemy at those points upon which the defenders can pour their most destructive fire. Obstacles may be of endless variety, dependent upon the ingenuity and resources of the commander; but 'good' obstacles must be placed well within the defenders' fire, must be sheltered from the artillery fire of the enemy, must afford no cover to the assailants, and must be so constructed as not to be easily removed or destroyed. The following are the obstacles most commonly used in field F.:—The *trou-de-loup* ('wolf-hole'), a pit of the form of an inverted cone, from 6 to 10 feet deep, 6 feet diameter at the surface, and 1 foot wide at the bottom, into which a pointed stake is driven—a contrivance which, peculiarly successful in disabling cavalry, was used with effect at Bannockburn, and is still held in esteem; *pickets* or pointed stakes, one or two inches broad, and three feet long, driven firmly into the ground close together, also effective against cavalry, and when planted on the brow of a parapet (above the escarp), cause much trouble to escaladers; *crow's feet*, which fall so that they may always present an upward-pointing iron spike,—another contrivance *pour encourager* the enemy's cavalry; *Abattis* (q.v.); *entanglements*, young trees or brushwood picketed down to the ground; *Chevaux-de-frise* (q.v.); and *fougasses*, small mines filled with stones or shells, charged with gunpowder, and fired either by a hose or by electricity.

Fortiguerr'a, Niccolo, an Italian churchman and poet, attached as Chamberlain to the household of Pope Clement XI., was born at Pistoia, 7th November, 1674, and died at Rome, 7th February, 1735. His fame rests chiefly on his light epic poem *Ricciardetto* (first published at Venice in 1738), abounding in comic incident and in satire on the morals of the clergy.

Fortrose', or **Fortross',** a royal burgh and seaport in Ross-shire, on the W. side of the Moray Firth, 10 miles N.N.E. of Inverness, and opposite Fort George, with which it has communication by ferry. It was formerly a centre of culture in the N., and had a cathedral and bishop's palace, the stones of which were taken by Cromwell to build a fortress at Inverness. There is still some trade in grain, pork, eggs, &c. F., along with Inverness, Forres, and Nairn, sends one member to Parliament. Pop. entire village and parl. burgh (each) 871.

Fort Royal' (properly Fort-de-France), fortress, seaport, and capital of the island of Martinique (French) in the West Indies. Its bay of the same name is said to form the best port in the Antilles. There are grand promenades, some fine edifices, an art school, a law college, and 17,190 inhabitants.

Fort St. Da'vid, formerly a maritime fortress of India, in the province of Madras, 1½ mile N. of Cuddalore. It was a strong position during the contests of the French and English, and was dismantled by the former in 1758, who restored it in 1783; but after it came into the possession of the British it fell into the ruined condition which it now presents.

Fort St. George ('white town'), the first fortified settlement of the British on the mainland of India, erected in 1639, and the nucleus of the present city of Madras (q.v.). It was captured by the French in 1746. Three years later the British re-entered it and forthwith improved the fortifications and made it as it now appears—a strong place, but not against modern artillery. The place is mainly occupied by government offices.

Fort Sumt'er, a celebrated stronghold of the Confederates during the War of Secession in S. Carolina, U.S., on the S. side of the entrance to Charleston inner harbour, and 3 miles from the city. It was begun in 1829, and at the time of secession was not completed, and only a few of the guns were mounted. It was held by a small body of troops under Major R. Anderson. Occupying a commanding position in the harbour of Charleston, it early became the centre of interest. The civil war was begun here by the Confederate batteries of General Beauregard on the 12th of April, 1861, and the fort was surrendered on the following day. It was held undisturbedly for two years, repulsed a force of nine Northern ironclads, 17th August, 1863, was partly demolished by the land batteries, but was not evacuated till the final surrender of Charleston, 18th February, 1865.

Fortu'na, among the Greeks **Tyche,** was the goddess of chance or luck. She was extensively worshipped in Greece and Italy, and was held in special honour at Rome. The Romans applied to her numerous epithets, such as *publica, privata, muliebris, conservatrix, regina*, indicative of the circumstances under which, and the persons to whom, she showed favour. F. was represented with a rudder, an emblem of her guiding power, and with a globe, to express her mutability.

For'tunate Is'lands. See CANARIES.

Fortuna'tus, the hero of an old popular story, who after undergoing great sufferings, obtains a wishing cap and exhaustless purse of gold, which eventually ruin F. and his sons. The story is of German origin, and has been recast in various forms in most of the languages of Europe. Its author is unknown, but F. seems at first to have been identical with Fortunio, another character in popular tales. The first printed edition of the story appeared at Augsburg in 1509. A Danish version was published at Copenhagen in 1664, a French at Rouen in 1670, an Italian at Naples in 1676, an Icelandic about 1690, and a Swedish in 1694, and a Dutch version at Amsterdam in 1796. The tale was dramatized in Hans Sachs' *Der F. mit dem Wunschseckel* (1553), and in Dekker's *Pleasant Comedie of Old F.* (1600). The tale is related poetically in Tieck's *Phantasus* (Berl. 1816), and the exhaustless purse reappears in Chamisso's story of *Peter Schlemil*, who sold his shadow for it.

For'tune, Robert, a Scottish botanist, was born in Berwickshire, 1813, and was engaged at the Botanical Gardens of Edinburgh, and later at those of Chiswick. In 1842 he was sent by the Botanical Society of London to N. China, and the result of his visit appears in *Three Years' Wanderings in China* (1847). He spent other three years in China in the interest of the East India Company, and produced his *Two Visits to the Tea Countries of China* in 1851. This was followed by his *Residence among the Chinese Islands on the Coasts and at Sea, being the Third Visit*, 1853-56. In 1859 F. collected in China for the United States Patent Office the seeds of the tea-shrub and other plants. His work, entitled *Yedo and Pekin* (1863), treats of the natural products of Japan and China. Died 16th April, 1880.

For'tune-Telling. Every person pretending or professing to tell fortunes, or using any subtle craft, means, or device, by palmistry or otherwise, to deceive and impose on any of Her (His) Majesty's subjects, is to be deemed a rogue and vagabond, and any Justice of the Peace may commit the offender (being thereof convicted before him by his own confession or by the evidence on oath of one or more credible witness or witnesses) to prison with hard labour for any time not exceeding three months (see statute 5 Geo. IV. c. 83). This law also applies to Scotland (by statute 34 & 35 Vict. c. 112) where F.-T. was at one time punishable by death but afterwards by imprisonment for one year and compulsion to find a surety for future good behaviour.

Fortu'ny, Mariano, a modern Spanish painter, was born of poor parents at Reus, near Barcelona, 11th June, 1839. His first experience in art was gained by assisting his grandfather, a showman, to paint wax figures. Later he studied at Madrid, and made two journeys through Marocco during the Spanish war, producing a vast number of oil and water-colour drawings. On his return he painted, on commission of the Spanish Government, his great picture, 'The Battle of Tetuan,' which procured for him a high reputation as a bold, original draughtsman, and a master of sunny, scintillating colour. He eventually settled at Rome, where he founded a school which sought inspiration from nature, and threw discredit on the 'Masters.' His splendid studio latterly became one of the public sights on account of its rare collection of enamels, ceramics, tapestries, &c. He died 21st November, 1874. Among his best-known works are 'The Beach at Portici' (sold for £3952), 'The Siesta,' 'Academicians of Arcadia,' 'Marriage in the Cathedral of Madrid,' 'Snake-charmers,' and 'Madrid Procession Caught in the Rain.' He mainly held to Southern or Oriental *genre* painting. 'Le joli F.' was a perverted genius, cynical and frivolous, whose theatrical subjects lack the genuine feeling of humanity, and whose execution is always more or less feverish and flashy. He was influenced banefully by the artistic necromancy of his brother-in-law, Madrazo, and fell under the weird spell of Gérôme. The criticism of Théophile Gautier greatly helped to raise to a fabulous height the price of F.'s pictures. The works left unfinished at his death alone brought over £16,000. See *F., sa Vie, son Œuvre, sa Correspondance*, by Baron Davillier (Par. 1875).

Fort Wayne, a city and capital of Allen county, Indiana, U.S., situated at the point where the St. Joseph and St. Mary form the Maumee river, 94 miles S.W. of Lake Erie. It is a great railway centre, having the workshops of the Pittsburg, Fort Wayne, and Chicago Railway. The Wabash and Erie Canal (1840) passes through it. F. has manufactures of machinery, agricultural implements, boilers, woollen goods, leather, cabinet works, &c.; also several charitable institutions and excellent schools. About 7 millions of dollars are invested in the industries of F. W., and of these railway cars, &c., are produced annually to the value of $1\frac{3}{4}$ million of dollars; foundry work, $1\frac{2}{3}$ million; carpentering, $\frac{1}{2}$ million, &c. The city derives its name from General Wayne, who built a fort here in 1794. It possesses three splendid parks. Pop. 35,393.

Fort Will'iam (Gael. *Inbher Lochaidh*, 'the mouth of the dark river'), a burgh and fort in the county of Inverness, at the S. end of the Caledonian Canal, 63 miles from Inverness. The fort was first built by General Monk, rebuilt by General Mackay in 1689, and called Fort William in honour of King William. It is an irregular work, but withstood a siege by Prince Charlie's forces in 1745. It contained accommodation for 100 men. Like Fort Augustus, it has been sold by the Government, and is now occupied as private dwelling-houses. F. W. (under the Lindsay Act), originally called Mary Burgh, afterwards Gordon's Burgh, contains a pop. of 1870, a public school, banks, and several churches. Lying at the foot of Ben Nevis it is very much frequented by summer tourists.

Fort William, the citadel of Calcutta (q.v.). The original fortification was erected in 1696, but was abandoned after the sack of the city by the Nawab Seraj-ud Dowlah; the present building dates from 1773.

Fo'rum (akin to *foris* and *foras*, hence 'that which is out of doors') meant originally a clear open space, and was applied specially to the central area in towns which in ancient times served as a market-place, and also as a place for the discussion of public affairs and the administration of justice. At Rome the F. was about 224 yards in length, and about

68 yards at its greatest breadth, stretching between the Capitoline and Palatine hills, and surrounded by spacious porticoes and the shops of bankers. It consisted of two parts, the Comitium, and the Lower F., occupying respectively one-fourth and three-fourths of the area. The Comitium was so named from having been the place of meeting of the Comitia Curiata, and contained the tribunal from which the prætor of the city administered justice, and the rostra, a platform from which public speakers addressed the people, and which was so called because it had been adorned with the *beaks* of ships won from the Antiates. In the Lower F. all general business was transacted, and the Comitia Tributa met. The famous Sacra Via was the boundary of the F. on the E. and N., entering near the temple of Vesta, and leaving at the Arch of Severus. Of the additional *fora judicialia*, erected by the emperors, the most important were the F. Julium and the F. Augustum, the works of Julius Cæsar and Augustus. There were numerous *fora venalia* in Rome, as the *F. boarium*, or cattle-market; the *F. olitorium*, or vegetable market; the *F. cupedinis*, or market for dainties, &c. F. was also the name of many market and assize towns, as F. Appii, F. Aurelium, &c.

Fosca′ri, Frances′co, a doge of Venice, familiar to English readers from Byron's tragedy. Born about 1372, he was doge from 1423 till 1457. Though during his long administration Venice was prosperous at home, and successful in the almost incessant wars undertaken by her energetic doge, the animosity of his enemies triumphed in compelling F. summarily and ignominiously to resign office in 1457. He had already lost three sons in battle, and had seen the fourth tortured and banished as a traitor. He was unable to survive the crowning calamity of 1457, and died immediately after his resignation.

Fos′colo, Niccolo Ugo, an Italian patriot, poet, and man of letters, borne at Zante, 26th January, 1777, was educated at Venice and the university of Padua. His first tragedy, *Tieste*, was performed with success at Venice in 1797. After Venice had become an Austrian town, F., still hoping great things for Italy from the soldiers of the republic, took service as an officer in the Lombard Legion at Milan, then capital of the Cisalpine Republic. He spent several years with the French army. F.'s first romance, *Ultime Lettere di Jacopo Ortis*, had appeared in 1802, and secured him a European reputation. The poem *I Sepolcri* was well received; and in 1808 F. was called to the chair of rhetoric at Pavia, which he occupied till the professorship was suppressed. The tragedies *Ajace* and *Ricciarda* were performed in 1811 and 1813. F. forsook Italy finally after the events of 1814, and soon settled in England, where he continued to be engaged in miscellaneous literary work, illustrative of Petrarch, Dante, and other great names of Italian literature. In spite of F.'s success as author and lecturer, the exile of this high-hearted but restless and impetuous Italian was embittered by pecuniary distress. He died at Turnham Green, 14th September, 1827. In 1871 his ashes were brought to Florence, amid public solemnities.

Foss′a and Fur′ca. See PIT AND GALLOWS.

Fossa′no (Lat. *Fons Sanus*, 'the healing fount'), a walled town of N. Italy, province of Cuneo, on the Stura, an affluent of the Po, and 32 miles S. of Turin by railway. It is the seat of a bishop (since 1580), and has a cathedral of San Giovanni, a castle of the 14th c., an academy of science and art, a veterinary college, and a theatre. F. has paper, silk, and leather industries, and a trade in corn, hemp, and cattle. F. was an important fortress in the 13th and 14th centuries. It was stormed by the French in 1796, and was taken by the Austrians, 18th September, 1799. Pop. 18,585.

Foss Dyke. See CANAL.

Fosse, or **Foss** (Lat. *fossa*, from *fodio*, 'I dig'), is the dry or wet ditch immediately surrounding the rampart of a fortification.

Foss′il (Lat. *fossilis*, from *fodere*, 'to dig'), originally anything dug out of the earth, but now limited to the remains of plants and animals found embedded in the rocks which form the earth's crust. These organic remains are found in all states of preservation, and are probably due to the replacement of the gradually-decaying organic matter by mineral products. Each stratum has its distinctive fossils or groups of fossils, which are consequently of the greatest value in fixing the age of the formations in which they occur. Without this aid, indeed, palæontology would have no existence, and geology would lose its most important component.

Fossil Ferns. The ferns or *Filices* are first certainly represented in a fossil state in the Devonian and Old Red Sandstone rocks. The Devonian F. F. present a close resemblance to the more luxuriant vegetation which prevailed in the succeeding Carboniferous epoch. The genera *Cyclopteris*, *Neuropteris*, and *Phenopteris* include smaller species, whilst trunks of tree-ferns are also found in Devonian strata, and are referred to the genera *Caulopteris*, *Protopteris*, &c. The former genus also occurs in Carboniferous strata, along with *Palæopteris* and other typical forms. The Coal period is very rich in smaller F. F. belonging to the genera already mentioned as occurring in the Devonian, and in addition to the genera *Pecopteris* (*Alethopteris*), *Odontopteris*, *Hymenophyllites*, &c. In the Permian rocks F. F. are abundant, but resemble those of the Coal period. Many Carboniferous genera also occur in the Trias, *Neuropteris elegans* being a characteristic Secondary form. In Tertiary strata F. F. are comparatively few in number, and are not represented in the profusion characteristic of the earlier formations.

Fossiliferous Rocks, a comprehensive term in geology, embracing all formations which contain organic remains. It is nearly synonymous with *Aqueous Rocks* (q.v.), though not unfrequently fossils are found embedded in volcanic tuff and similar fragmental rocks.

Fossombro′ne (the Roman *Forum Sempronii*), a town and bishop's see in Central Italy, province of Pesaro-Urbino, in the valley of the Metauro, and on the *Via Flaminia*, 16 miles W.S.W. of Pesaro. It has an old castle, and a cathedral, in which are many ancient inscriptions, besides the remains of a Roman theatre and bridge. The Metauro is here spanned by a modern bridge. F. produces the *Seta della Marca*, celebrated as the finest silk in Europe. Near F. Hasdrubal was defeated and slain by the Romans in 207 B.C. Pop. 9300.

Fos′ter, Birket, an English artist, was born at North Shields in 1812. He was educated at Hitchin, Herts, and after practising wood-engraving for some time with Landells, became a draughtsman, in which capacity he early showed an aptitude for the sympathetic treatment of rich pastoral and river landscape. His illustrations of the poetical works of Goldsmith, Cowper, and Scott, of Beattie's *Minstrel*, of *Evangeline*, &c., are artistic gems, crisp yet fluent in drawing, and in chiaroscuro singularly brilliant and true. F. won a high reputation for water-colouring, but his lush bosky dells and bright sunny glades leave an impression more of airy daintiness than of great artistic strength or study. He was elected a member of the Water Colour Society in 1860.

Foster, John, an eminent English essayist, was born in Halifax, Yorkshire, 17th September, 1770. For a brief period he was a weaver, but studied for the Baptist ministry at the Bristol College, and preached at Newcastle-upon-Tyne, Dublin, Downend, and Frome; but although his preaching was universally admitted to be able, it was not successful, and he gave himself up finally to literature. His great work is *Essays, in a Series of Letters*, published in 1805, when he was at Frome, and which have been much admired for their powerful if somewhat rugged thinking, and occasional imaginative outbursts. Marrying in 1808, he retired to lead a life devoted to literature and study at Bourton-on-the-Water, in Gloucestershire, preaching only at intervals. His chief work for eighteen years was writing papers for the *Eclectic Review*, his contributions to which, 'Biographical, Literary, and Philosophical,' were published in 1840. Among his other productions, the chief are *Essay on the Evils of Popular Ignorance* (1819), occasioned by his return to Downend in 1817, which first awoke the British nation to the perfect barbarism that prevailed in certain country districts; *Lectures delivered at Broadmead Chapel, Bristol* (1844 and 1847); and *Introductory Essay to Doddridge's Rise and Progress* (1825). F. died at Stapleton, near Bristol, 15th October, 1843. *The Life and Correspondence of F.*, edited by J. E. Ryland, was first published in 1846.

Fou'cault, Jean Bernard Léon, a French savant, was born at Paris, 18th September, 1819. Though educated as a physician, he devoted his life to experimental research in the physical sciences, and had charge of the scientific section of the *Journal des Débats* from 1845 till his death, which took place at Paris, 11th February, 1868. He is widely known for the calculation of the velocity of light by means of a revolving mirror, and the establishing by direct comparison of the velocities of light in air and water the undulatory theory over the emission theory; for his invention of the Gyroscope (q.v.), and the application of it, as well as of the simple pendulum, to render the diurnal rotation of the earth evident to the bodily eye; and for his electric light apparatus, with the electro-magnetic regulator. F.'s memoirs are published in the *Comptes Rendus*, and some popular scientific treatises appear in the *Bibliothèque d'Instruction Populaire*.

Fou'ché, Joseph, born near Nantes in 1763, first appeared in public life in 1792 as member of the National Convention for Loire-Inférieure. Though a friend of Condorcet and Vergniaud, he showed much 'patriotic ferocity' in voting the king's death, in carrying out the 'Law of Suspects' in the W., and in suppressing with Chaumette the Catholic religion. At Lyon he and Collot d'Herbois perpetrated the judicial murders of which he afterwards ignobly tried to throw the blame on his enemy Robespierre. He was rewarded by the president's chair in the Jacobin Club. By lying and treachery, he survived the Reign of Terror, after which he curried favour with Director Barras by the betrayal of Babeuf's conspiracy. In the Ministry of Police, which he entered in 1799, he found the congenial task of suppressing the Jacobins, whom he had once led. The consuls being established, F. adopted milder measures, especially with regard to royalists, but his administration was disgraced by embezzlement on a grand scale. In 1802 F. was dismissed, the Ministry of Police being suppressed. The office and the man were restored under the Empire in 1804. Meantime F. resisted the murder of D'Enghien and saved the life of Moreau. To the former he applied the famous words—'It is worse than a crime; it is a blunder.' For several years F.'s administration of internal affairs was able, moderate, and popular. In 1809 he was made Duc d'Otrante; and was so popular that Napoleon became suspicious. In 1810 F. was replaced by Savary. He never recovered Napoleon's confidence, but was offered the Ministry of Police by Louis XVIII. in 1814. He resumed office during the Hundred Days, all the while maintaining friendly secret relations with leading royalists. In the Declaration of 1815 he unsuccessfully tried to obtain a recognition of the sovereignty of the people. After Waterloo F. was a member of the Provisional Government of Five, and arranged with De Vitrolles and Talleyrand the entry of the Bourbons. Once more Minister of Police, he exerted himself to reduce the list of proscriptions from 3000 to 57. Among these 57, however, were many of his old companions. This assumed moderation enraged the royalists, and F. was forced to resign. He was, however, appointed ambassador at Dresden, but four months later, in 1816, was compelled to retire from the post under the law of 12th January, which incapacitated from holding office all who had voted for the death of Louis XVI. He then lived for two years at Prague, became a naturalised Austrian subject, and died at Trieste, 25th December, 1820. As regards his moral character, we may say with Robespierre—'He was a miserable impostor.'

Fougères', an old town in the department of Ille-et-Vilaine, France, at the confluence of the Nançon and Couesnon, 35 miles N.E. of Rennes by railway. It is overlooked by a ruined castle of the 12th c., has many quaint arcades, and is famous for its scarlet dye, the delicate tints of which are ascribed to the Nançon waters. Pop. of town 18,221; of arrond. 90,213.

Fou'la, an outlying island of the Shetland group, 32 miles W. of Lerwick. It is an almost inaccessible sandstone and granitic mass, the haunt of myriads of sea-fowl, some 3 miles long, rising, in parts precipitously, 1285 feet above the sea. The inhabitants are chiefly engaged in fishing. F., which may be seen from Orkney, is supposed to be the ancient *Ultima Thule.* It is surrounded by dangerous rocks. Pop. 239.

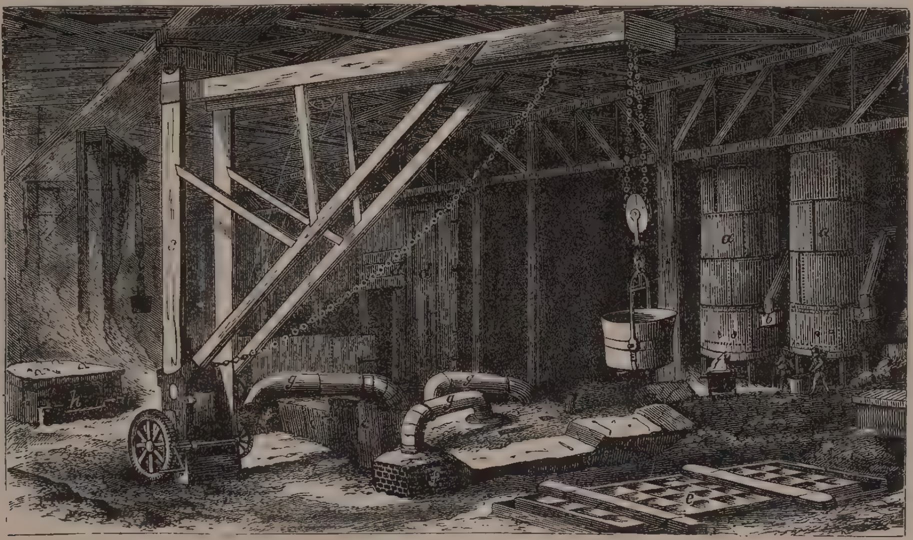
Fould, Achille, a French statesman, born at Paris, 17th November, 1800. He was the son of a rich Jewish planter, and after travelling in Italy and the East, was returned to the Chamber of Deputies in 1842, and again in 1846. He was a member of the Constituent Assembly in 1848, and of the Legislative Body in 1849. Under the presidency of Louis Napoleon he was three times Minister of Finance. In this post he showed great ability and disinterestedness, and though he repeatedly resigned from disapproval of Louis Napoleon's conduct, he was, after the *coup d'état* of 1851, appointed a senator and minister of state. In 1852 he was made Commander of the Legion of Honour, and from 1861 to 1867 was again Minister of Finance. F. died at Tarbes, 5th October, 1867.

Foul'is, Robert and Andrew, two celebrated Glasgow printers, born, the one 20th April, 1707, the other 23rd November, 1712. Robert was originally a barber with a good business, but under the advice of Dr. Francis Hutcheson, Professor of Moral Philosophy in Glasgow University, whose class he had attended, became a bookseller. The first work that brought him into reputation was an edition in Greek of *Demetrius Phalereus on Elocution* (1742). Next year he was appointed printer to the University, and soon after took into partnership his brother Andrew. During the next thirty years there followed a succession of classical reprints—Latin, Greek, English—among which may be mentioned Horace, Cicero, Homer, Herodotus, Milton, Pope, and Gray. Some of these were models of accuracy and elegance. Andrew died in 1775; Robert, in 1776. The sons of the latter maintained for some time the reputation of the firm.

Founda'tion (from the Lat. *fundus*, 'a bottom or basis'), a word applied both to the lowest part of any building or structure, and to the ground upon which it rests. The walls of a building are increased in thickness at the bottom —step-wise—in order to distribute the pressure due to the superincumbent masonry over a considerable area. Where the ground below is rock, no further preparation is needed than dressing its surface approximately level, or into a number of horizontal beds at different levels, if the surface slopes greatly. In ordinary cases, however, foundations have to be made upon material which is not only soft in itself, but which is liable to be rendered softer by the permeation of water. In these circumstances it is usual to provide a hard and impermeable base for the masonry or brickwork, and at the same time to extend the area over which the pressure acts, by putting down a layer of concrete of a thickness and breadth proportioned to the weight of the building and the nature of the soil underneath. *Submerged* foundations, such as those for bridges, piers, &c., frequently present great difficulties to the engineer.

Found'er, a name given to an inflammation of acute type of the laminar structures of the horse's foot, resulting usually from over-exertion. Occasionally the affection may appear as the result of derangement of the digestive system. The fore-feet are those most generally affected, but the disease is sometimes found in both fore and hind feet. The symptoms consist in heat and swelling of the feet, and in the inability of the horse to stand upon the affected feet. The treatment must first be directed to the removal of the inflammatory symptoms by antiphlogistic remedies. The shoes are to be removed and the hoofs pared. Bleeding may be indicated, and the feet must be poulticed with bran-bags. Aperients may be freely administered, and if pus forms in the foot, it must have free vent given to it by incisions. Mild blisters may be afterwards required to reduce swelling.

Found′ling Hos′pitals are institutions for the nurture of children abandoned by their parents. It has been a much-mooted question whether or not the laws of political economy sanction the endowment of F. H.; the argument of the opponents of these institutions being that they promote immorality, the parents being relieved of the charge of maintaining the child resulting from it. If it were the rule of the institution to receive no child unless deserted by its parents, this argument would have no more force against the maintenance of F. H. than it has against the present law of England, which obliges the *parish* to maintain a deserted child. It may be doubtful whether the law of political economy carried out in full rigour would sanction any general system for the keeping alive of deserted children; because there can be no doubt that the existence of such a system does promote immorality, for the reason above stated. But the laws of political economy apply only to the *wealth* of nations, and human benevolence and moral culture frequently require a mitigation of these. And they do require it regarding the matter in question. We could not see helpless children dying of hunger. We think, therefore, that under wise management F. H. are at all events harmless institutions. They simply relieve an individual, a parish, or a state, of a pecuniary burden. France, Germany, Italy, Spain, Austria-Hungary, Sweden, Belgium, Russia, China, Mexico, Brazil, and the U.S. of America possess F. H.



Interior of Iron Foundry.

Foundling Hospital of London, The, was established by Captain Coram in 1739 as 'an hospital for the exposed and deserted children.' The applications for admission soon became most numerous, and in 1754 the governors of the hospital were compelled to appeal to Parliament for assistance to carry on the establishment, which had then become filled. The King supported the appeal and Parliament responded generously. A basket was placed beside the gate with a notice to the effect that all children under two months of age would be received. Within less than four years so many as 15,000 are said to have been handed over in this way to be brought up in the hospital or in the nursing establishment connected therewith. A high death-rate among the children (68-72 per cent.) caused Parliament to interfere by cutting off the grant, and the governors, left to their resources, put a stop to this indiscriminate reception of abandoned children, and adopted another system, under which every child would be received without question, provided £100 were sent with it. In 1801 this system was also abolished, and the present one took its place. Under this the application must be made after the birth of the child and before it is twelve months old. The committee of management must then be satisfied that the father has deserted both child and mother, and that the relief thus extended to the mother, by taking her child off her hands, will help her to regain her position and to earn a livelihood honestly and properly. The child of a widow or married woman is not received. The boys are trained as mechanics till they are fourteen, the girls as domestic servants till they are fifteen years of age. Deformed and chronically infirm members of the hospital are after these ages assisted, or maintained altogether when necessary, from the funds of the institution. It would be difficult to find throughout the world a more truly benevolent institution than this, or one more deserving of the support of the friends of mankind or of the followers of the Master—the true and eager friend of all children, be the parents what they may.

Foun′dry (from the verb 'to found,' Lat. *fundare*, 'to flow out'), a place where metal in the shape of 'pig' or ingot is cast into the forms required in construction or the arts. In the common iron F., the metal (pigs broken into pieces) is melted in a Cupola (q.v.) furnace with coke as fuel, and then run into large buckets or 'ladles,' which are slung from cranes, and so can be easily and quickly moved from the furnace to any part of the F. The sand or loam moulds into which it is then poured are made as follows:—A wooden pattern is prepared, having externally exactly the form of the required object, but having projections or 'prints' on it instead of holes whereever that object has openings. If the object be hollow, a box is then made, called a 'core-box,' having *internally* exactly the same shape as the interior of the required object, plus the prints upon the pattern just alluded to. A mould is then made from the pattern in soft sand or loam (the *inside* of the mould having the same form as the *outside* of the object), and a 'core' is made of the same materials by means of the core-box (the *outside* of the core having the same form as the *inside* of the object); both mould and core are dried separately, and then the latter is placed inside the former, resting in it by means of the projections corresponding to the prints. The space between the core and the mould now corresponds exactly in form and thickness with the object to be cast. The whole is built up and strengthened as may be necessary (to prevent bursting); suitable air-holes and pipes are provided; and when all is ready, the molten metal is poured in. Sufficient metal is used, not merely to fill the space left between the mould and the core, but also to form a 'head' above the casting, which can afterwards be cut or broken off, and which will contain impurities and sponginess that otherwise would spoil the casting itself. After the metal has had time to cool, the mould is broken up, and the casting cleaned by the removal of the sand still adhering to it, and of burrs or conspicuous roughnesses.

The process of casting other metals than iron does not essentially differ from that described above. For brass or gun-metal an air-furnace takes the place of the cupola, and steel is most often melted in crucibles. With some geometrical forms, such as the cylinder, a complete pattern is not required, and in certain cases, when a number of copies of the same object are to be cast, the pattern is made of iron instead of wood.

Foun'tain (Fr. *fontaine*, Lat. *fons*), a jet of water springing up through a natural or artificial orifice in the surface of the earth in virtue of a hydrostatic law (see ARTESIAN WELLS); or a structure, usually decorated, from which water spouts forth, either by hydrostatic pressure, by the elasticity of compressed air, or by mechanical means. In Southern Europe, nearly all the water for domestic uses is drawn from public artificial fountains. Rome and Paris are noted for the number and beauty of their fountains, and the *Grandes Eaux* of Versailles are justly admired. London is exceptionally poor in fountains; those in Trafalgar Square are supplied from an artesian well. The Crystal Palace, at Sydenham, has one of its chief attractions in its fountains, and others of great beauty may be seen in the grounds of Chatsworth in Derbyshire. The Emperor F. at Chatsworth is the most remarkable *jet-d'eau* in the world; it rises to a perpendicular height of 267 feet.

Fountain, in heraldry, is one of the *roundels* formed of six alternate wavy lines, *argent* and *azure*, or more properly barry wavy of six. The F. is represented flat (Boutell and Aveling).

Fou'qué, Friedrich Heinrich Karl, Baron de la Motte, a German romance-writer and poet, was born at Brandenburg, 12th February, 1777. He served in the campaigns of 1793, 1794, 1795, and, after living in rural retirement, in the war of 1813. He spent the rest of his life at his estate of Nennhausen, at Halle, Paris, and Berlin, where he died, 23rd January, 1843. F. was an ardent romanticist, and wrote many tales on mediæval and Scandinavian themes, full of wild fancy, and written in a poetic style, of which the best known are *Sigurd*, the exquisite fairy-story of *Undine*, *Der Zauberring*, *Sängers Liebe*, and *Die zwei Brüder*. He likewise wrote many poems, dramas, &c. He has been blamed for the fantastic unreality of his conceptions, and the shadowiness of his characters. 'His heroes,' says Heine, are all iron and sentiment, without body or reason.' A selection of his works, edited by himself, was issued in 12 vols. (Halle, 1844-46). Carlyle has translated F.'s beautiful tale *Aslauga's Knight*. See Carlyle's notice of F. in *Miscellaneous Essays*.

Fou'quier-Tin'ville, Antoine Quentin, public accuser in the Reign of Terror, was born at the village of Hérouelles, department of Aisne, in 1747. He was educated for the bar, but led a dissipated life, and for misconduct lost a post he held as procurator at Châtelet. F. threw himself, however, with such vehemence into the Revolution, always giving his vote for death in the Assembly, that Robespierre made him public accuser. As such his name will be infamous for all time; he called the guillotine the coining machine of the Republic, and sent to it men of all opinions that came before him—Danton, Hébert, Camille Desmoulins, and even his master, Robespierre. Finally he himself was guillotined, 7th May, 1795.

Four'chambault, a town in the department of Nièvre, France, near the right bank of the Loire, 5 miles N.W. of Nevers by railway. It has large iron-foundries, forges, and smelting furnaces, and an extensive manufacture of arms. The Loire is here crossed by a suspension bridge. Pop. 6020.

Four'croya, a genus of Exogenous plants, allied to the Agaves (q.v.), and belonging to the natural order *Amaryllidaceæ*. The stamens are shorter than the corolla. These plants grow in tropical climates.

Four Evan'gelists, the most easterly four of the group of twelve islands known as the Twelve Apostles, lying to the W. of Magellan's Strait, 50° 30′ S. lat., 70° 5′ W. long.

Four'ier, François Marie Charles, born at Besançon, 7th April, 1772, was the son of a wealthy merchant, lost his father's fortune during the Lyon insurrection of 1793, and served for a short time in the army. Returning to commerce, he received, it is said, his first inspiration of social reform from seeing a vessel of rice sunk at Marseille in order to raise the market price of the remainder. His article in a Lyon newspaper on the Continental triumvirate and the final struggle between France and Russia attracted some attention. In 1808 he published his *Théorie des Quatre Mouvements*, followed in 1822 by his *Traité d'Association*, republished by his disciples as *Théorie de l'Unité Universelle* (1841). His whole life was now given to the propagation of his doctrine, and in 1826 he fixed himself at Paris, where he died, 8th October, 1837. In 1829 appeared *Le Nouveau Monde*, and in 1831 a violent attack on the 'charlatanism' of Saint-Simon and Robert Owen, in which he offered to reorganize society in two months, with a profit of 300 per cent. In spite of the strange nomenclature (sometimes hieroglyphics were used) in which it was presented, F.'s theory became very popular, especially among women. The earth was for 80,000 years to pass through certain stages of development, the normal population being 30,000,000,000, all of whom should be seven feet high, and live for 144 years. The spirit, as well as the body, would become perfect. There would be 37,000,000 Homers, Newtons, Molières. Not less striking the industrial progress. One result of the universal *remboisement* would be restoration to equilibrium of the climate, and this would cause the ice at the N. Pole to melt. Each human soul lived through the 80,000 years until the golden age, but having alternately an existence within and without the material world. The unscrupulous selfishness of capitalists is constantly denounced, and F. looks forward to a time when the whole race, with one language, one coinage, and one system of weights and measures, would be employed harmoniously in one organization of productive labour. His plan of reform was based on the transparent fallacy that psychological phenomena are amenable to the physical laws of motion. No institution—property, succession, marriage, the Church—was to be sacrificed. There are three forces, he says, in the individual—the desire for luxury, the tendency to separate in groups, the tendency to unity. On the combination of these depends the primitive group. By a gradual change of combinations the groups form a series, which finally compose the famous 'phalanx' of 1800 persons, chiefly pursuing different tasks of their own free will, on a piece of ground a square league in extent. There is what is pompously called an 'alternation of functions,' a protest against the mechanical effects of subdivided labour. The produce is partly profit on capital, partly wages for work, and partly given to talent. The scale of wages varies with the agreeable or disagreeable character of the work; but a minimum is first set aside for the subsistence of every person, whether capable of work or not. The capital may be owned in unequal shares. The phalanx would live in one building and have one store, so as to minimise the profits of distribution; but voluntary association in families would go on as before. The fundamental idea is that labour may and ought to be rendered attractive by the opportunity of free choice, and the prohibition of excess.

Fourier, Jean Baptiste Joseph, Baron, a French mathematician, was born at Auxerre, 21st March, 1768, became Professor of Mathematics at the Central School of Public Works in 1794, was one of the *savans* who accompanied Napoleon to Egypt in 1798, was appointed prefect of Grenoble under the Empire, but after 1815 lived a retired life at Paris, where he died 16th May, 1830. His great work is his *Théorie de la Chaleur* (Par. 1822), a work which abounds in mathematical investigations of the highest originality, and which introduced a new epoch in the study of the laws of thermal conduction and absorption. Of his other works may be mentioned his *Discours Préliminaire*, or preface to the *Description d'Égypte*, his *Recherches Statistiques de la Ville de Paris*, and a posthumous work, *Analyse des Équations Déterminées*, published by Navier in 1831.

Four Lakes, a beautiful chain of lakes in a fertile part of Wisconsin, U.S. First Lake, the lowest and smallest, is 3 miles by 2, having its outlet in Catfish River. The largest, called Mendota, is 6 miles by 4. Between it and Third, or Monona, stands the state capital, Madison.

Foveaux' Strait separates the South or Middle Island of New Zealand from Stewart's Island. At its narrowest point it is 17 miles in width.

Fow'ey, or **Foy**, a seaport in the S. of Cornwall, near the mouth of the river of the same name, 28 miles W. of Plymouth, with which it is connected by railway. It carries on active pilchard-fisheries, has a good harbour, and exports iron ore and 'china stone.' The ruins of St. Catherine's Castle, which was built in the reign of Henry VIII., are on the W. side. In the 13th and 14th centuries F. was a place of considerable importance and possessed many ships. Two forts guarded the entrance to the river, and a chain was stretched across between them. F. despatched 47 ships and 770 men to the siege of Calais in 1347, was partly burned by the French in 1457, and captured by Fairfax in 1646. Pop. reg. sub-dist. 7020; civ. and ecc. par. 1957.

Fowl (Old Eng. *fugel* and *fugol*; Fris. *fugel*; Swed. *fogel*; Dut. and Ger. *vogel*; from a verb signifying 'to fly'), a name sometimes given to any bird of large size, but usually restricted to Gallinaceous or Rasorial birds domesticated by man, as the common barndoor fowls, turkeys, guinea-fowls, &c. Such birds form a typical group of *Rasores* or 'scratchers,' are distinguished by their strong beak and claws, adapted for picking up seeds and for scratching in the ground respectively. The head is usually provided in the males with *wattles*, often brilliantly coloured and erectile. Fowls are polygamous, one male mating with several females. They form subjects of interest to the naturalist, from their susceptibility to variation under the hand of man. Their original habitat appears to have been E. Asia. The Bankiva jungle-F. is credited with being the progenitor of all our domestic breeds. This F. is a native of Java. The male closely resembles the English gamecock. Its comb and wattles are bright red, the *hackles* or drooping feathers of the head and neck orange-red, and the upper part of the back a deep bluish-black. The tail, which is long and drooping, is also bluish-black, glossed with green, and the breast and underparts are black. The chief breeds or varieties of fowls which may be more or less clearly traced to the Bankiva stock are:—The Cochin-China F., whose ungainly aspect is so well known. Fabulous prices were given for pure-bred Cochins on their first introduction into this country, but the breed has now somewhat deteriorated from its frequent mixture with other varieties. The game-fowls were formerly greatly cultivated for the sake of their pugilistic qualities. The Polish fowls are known by the great plume of feathers borne on the head. The Spanish breed is a particularly fine variety, possessing a large comb, and a patch of white skin destitute of feathers below the ear. The latter variety is of large size, and is in high repute amongst poultry fanciers, from the regularity with which the birds lay. The Dorking fowls are short-legged birds, and have frequently one or more supplementary toes. The bantams are fowls of small size, noted for their courageous bearing, but rarely bred save as fancy fowls. The name common F. or barndoor F. has now come to denote a large number of fowls belonging to no special breed, but representing the effects of interbreeding between the preceding well-marked varieties. The typical F. is the jungle-F. of India, but it has had less influence in the formation of the domesticated breeds than was formerly supposed. At any rate, its peculiarities are seldom, if ever, seen in domesticated fowls in the same proportion as those of the Bankiva F.

Fowler, Sir John, Bart., K.C.M.G., LL.D., civil engineer, was born at Sheffield in 1817. He assisted in the construction of the London and Brighton and other lines, and was appointed engineer of the 'Underground' or Metropolitan Railway, and consulting engineer of the Great Western, Great Northern, Brighton, and Highland Railways. He was engineer-in-chief of the Forth Bridge and many other works, and has been also engaged in the construction of large docks. He was President of the Institute of Civil Engineers 1866-68. For his services as consulting engineer in the public works in Egypt he was made K.C.M.G. in 1885, and in 1890 was created a baronet.

Fowl'er's Solu'tion, or **Liq'uor Arsenica'lis**, a well-known preparation of arsenic and potassa introduced into medicine by Dr. Fowler, is used in various forms of skin-disease.

Fowl'ing, the name given to the killing of birds of various kinds, for the purpose of obtaining their feathers, flesh, or other products. This practice is carried on with much skill and daring, and in many different ways, in various parts of the world—*e.g.*, in the Faröe, Shetland, and Orkney Isles, Norway, Sweden, and other portions of N. Europe. The art of the fowler depended in former years much more on personal daring and prowess than in the present day. The introduction and general use of firearms have greatly aided and extended the capture of birds, although in some districts, from the nature of the birds to be caught, and from other considerations, the use of firearms is prohibited, and the pursuit of the birds is therefore attended with as much danger as before. Small birds are caught for the cage or for table by nets or snares of various kinds. But the exercise of the art of F. in its highest development can only be seen to advantage in rocky and inaccessible situations. In the northern islands, where such birds as gannets, guillemots, gulls, solan geese, and their allies are sought after and valued, not only for the sake of their feathers, but for their flesh and fat—the former serving as food, and the latter affording oil—F. is carried on by the hazardous proceeding of letting the fowler down the face of cliffs by means of a rope; and while thus slung in mid-air, he contrives to secure the eggs as well as the birds themselves. The ropes used are made of raw cowhide, and are very durable. A second rope is usually attached to the fowler for the purpose of giving signals to the persons on the top of the cliff, and for hoisting up the birds he secures. A simpler method of F. consists in securing birds by means of nets slung on the end of poles, but even in such a case the fowlers have to be let down the cliffs often for considerable distances.

Fowls of Warren. There would appear to be some difference of opinion as to the birds which may be placed in this category. Coke holds that the pheasant, partridge, quail, woodcock, mallard, heron, rail, &c., are F. of W.; but Manwood excludes all but the partridge and pheasant, and in the case Duke of Devonshire *v.* Lodge (7 B. and C. 36) it was decided that grouse are not F. of W. See FORESTS, CHASES, WARRENS, and PARKS.

Fox (Old Eng. *fox*, Dut. *vos*, Ger. *fuchs*; perhaps allied to the Old Eng. *feax*, 'hair,' and so signifying 'the hairy animal') is the name given to *Canis vulpes* or *Vulpes vulgaris*, a genus of Carnivorous *Mammalia* closely allied to the dog and the wolf, but distinguished by the elongated pupil of the eye. The ears are pointed and triangular in shape, and the tail very bushy. The dental formula is similar to that of the dog, the teeth numbering forty-two, and consisting of six incisors, two canines, eight præmolars, and four molars in each jaw. Minor characteristics may be found in the peculiar scent or odour proceeding from the secretion of the tail glands, this scent often furnishing a clue to the whereabouts of the animal. The colour of the common F. is a reddish fawn, mixed with black and white hairs. The fur is coarse, and grows very thick in winter. The tail is tipped with white. The average length of the body is about 2½ feet, and the height about 12 inches. The F. lives in burrows, which he excavates in the ground, or forms by enlarging some natural opening. The burrow generally winds in a complicated manner, the entrance often being made in a circuitous fashion between the spreading roots of a large tree. The cunning and intelligence of the animal have become proverbial. When hunted, it will adopt ruses of the most extraordinary kind to throw its pursuers off the scent—*e.g.*, it will feign death when captured by man, taking advantage of a relaxed guard to escape quickly and noiselessly. A tame F., which was on friendly terms with the dogs of the household, cheated the cats of their milk by simply walking round the cats' dishes, well knowing that the cats, which exceedingly dislike the vulpine odour, would not taste the milk, which thus fell to reynard. The same animal was seen to rub himself against the dairymaid's pails so as to impregnate the milk with his odour, a due supply of the useless fluid naturally falling to his share. The female F. produces from four to six at a birth, and breeds but once annually. Varieties of the common F. are numerous. The cur F. is a small variety, and the greyhound F. has more slender limbs and a better-proportioned body than the common F. The genus *Vulpes* as now constituted includes several other well-marked species of F. The American F., sometimes named the red F. or cross F., varies much in colour, but is most generally of a pale yellow hue. Its name of cross F. is derived from the almost invariable presence of a blackish stripe across the shoulders. The Arctic F. is celebrated for the glossy nature of its white winter fur, the summer fur being grey or greyish brown. This F. occurs, and is greatly hunted for its fur, in N. Europe and N. America. The soles of the feet are hairy, a peculiarity of structure which assists the animal to walk on the ice. The average length is about 3 feet. The asse or caama is a species of F. inhabiting S. Africa, the fur of which is highly valued. Other species are the black-bellied F. of S. Europe; the F. of the Himalaya slopes; the Deccan F.; the black or coal F. of Central Europe. The grey F. of Virginia is a commoner species than the American F., and exhibits all the characteristic traits of the British F.

Law Regarding Foxes.—Foxes may be pursued and destroyed as vermin even on the property of another, the only liability being the damage done in pursuit. In England by common law, and Scotland, fox-hunting for sport without leave is punishable as a trespass.

Fox, Charles James, a Whig statesman and orator, born 24th January, 1749, was third son of Right Honourable Henry Fox—created Lord Holland in 1763—and of Lady Georgiana Carolina, daughter of Charles Duke of Richmond, and was thus descended on one side from Charles II. He was educated at Eton and Oxford, had more Continental travel than most young men of his class, and before he had reached his majority was elected member for Midhurst, as a supporter of the Grafton Ministry. F.'s father, an old follower of Walpole, had left the Whig party, and F. began public life by supporting the absurd and unconstitutional defiance which the Commons, led by the Government, gave to the constituency of Middlesex, which had thrice returned Wilkes as member. Under Lord North's Ministry he was successively Lord of the Admiralty and Lord of the Treasury. A difference with the Premier on the Royal Marriage Bill was followed in 1774 by a serious quarrel relating to the censure of Woodfall, Horne Tooke's publisher. F. in consequence joined the Whig or Rockingham party, and came under the influence of Burke. This influence fixed and intensified his political principles, but though his reputation as an orator continued to grow, the scandal of his life (his father had recently paid £140,000 for the gaming debts of a single season) deprived him of moral leadership. He had, however, inherited the Walpole traditions of peace and civil liberty; and when in 1782 General Conway's motion for ending the American war was carried, and Rockingham, through the mediation of his rival Shelburne, constructed a cabinet, F. became Foreign Secretary. When Shelburne, the representative of Lord Chatham's policy, succeeded, F. with Keppel and Cavendish withdrew. By a junction of Lord North with the old Whig party a vote of censure was obtained (February, 1783). The Portland or coalition Ministry which followed was wrecked by the animosity of the King to F.'s East India Bill. From 1784 to 1792 F. was therefore reduced to the leadership of a powerful opposition to Pitt, and delivered great speeches on the Westminster Scrutiny, the Regency Bill, the Libel Bill, and the Russian Armament. He spoke with great effect against the abatement of impeachment by dissolution of Parliament, by which legal fiction it was attempted to defeat the trial of Warren Hastings, of which F. was a manager. In 1789 he moved the repeal of the Test and Corporation Acts, and supported Wilberforce in his holy crusade. The taking of the Bastille was hailed by him 'as the best event the world had seen.' The debate on the Quebec Government Bill (1791) severed the friendship that had so long existed between him and Burke. The Reign of Terror must have caused hesitation in the most sanguine minds; but F. from 1792 to 1797 vigorously pled the cause of peace with France. In 1795 he led the agitation against the Treason and Sedition Bills. He seconded the Grey motion for reform, called attention to the grievances of the Irish Catholics, and exposed the tyranny of Crown and Bench in the Scotch cases of Muir and Palmer. Though thoroughly persuaded of the advantages and necessity of party government, he retired into private life in 1797, saying that the House of Commons had ceased to discuss. His time until 1802 was occupied with literature and sport, and the beginning of his *History of James I.*, which he intended as an antidote to the brilliant misrepresentations of Hume's Charles I. After the death of Pitt, in January, 1806, F. again became Foreign Secretary under Granville. A further negotiation for peace, the passing of the Limited Service Bill, and a resolution to abolish the slave trade, were the fruits of this short season of power. He died 13th September, 1806. Opinions have varied much as to F.'s true character. Walpole describes him as first in Parliament, at Newmarket, and at the gaming-table. Pitt spoke of him as a magician. Mackintosh and Burke have confessed the splendid power of his passionate speech. Hazlitt and Bulwer Lytton accuse him of deserting Lord North through pique. He was doubtless the great champion of parliamentary freedom at a critical time, and Catharine II. did right to place his bust with those of Cicero and Demosthenes. He had the instinct of civil and religious liberty, and Villemain truly says he was the only English statesman who understood the French Revolution. His speeches were edited by Erskine (Lond. 1815). See Lord John Russell's *Life and Times of F.*, and *Memorials and Correspondence of F.*

Fox, George, the founder of the Society of Friends (q.v.) or Quakers, born at Drayton, in Leicestershire, in 1624, was first a shepherd and afterwards a shoemaker. About the age of nineteen he became deeply convinced that he had received a special call from God, and began to wander through the country rapt in religious dreams. His garb was somewhat grotesque, consisting of a single garment of leather made by himself. About 1646 he resolved to give up attendance on Church ordinances, and content himself with the teaching of the 'Spirit.' Two years later he appeared as a preacher at Manchester, urging men to trust in the 'inner light,' and to cast aside as useless or pernicious the forms and ceremonies of worship. This was the burden of all his discourses. For upwards of forty years he may be said to have done nothing else than beseech men in a pathetic, wistful, and half-bewildered fashion to have faith in the 'inner light.' The dogma-loving Puritans could not endure his wayward mysticism, and in spite of the fine moral simplicity and purity of his character, he and his 'people' suffered a great deal of persecution. In 1655 F. was brought to London, and had an interview with Cromwell, who recognised an honest soul under the 'leathern hull,' and dismissed him in a friendly way. In 1669 he married the widow of Judge Fell, one of his converts in Lancashire, after which he went to America, and on his return paid a visit to the N. of Germany. Before his death, 13th January, 1691, the 'Society of Friends' had acquired considerable importance. F.'s writings, including his curious autobiographical *Journal*, were collected and published in 1694-1706. See also the Biographies of Marsh, Janney, Watson, and Spurgeon.

Fox, sometimes **Foxe, John,** the martyrologist, was born at Boston, Lincolnshire, in 1517. Educated at Oxford, he was elected to a fellowship of Magdalen College, but having accepted the doctrines of the Reformation, was expelled from it, 22nd July, 1545. After some time he became a tutor, first in the family of Sir Thomas Lucy of Charlecote, and then in that of the Duchess of Richmond. In the reign of Edward VI., F. was ordained a deacon of the Reformed Church, but in that of Mary had to flee to the Continent, living for a time at Basel as a corrector of the press. Returning to England in the reign of Elizabeth, he held various offices in the Church, including a prebendal stall in the cathedral of Salisbury, and would have received further preferment, had he not been suspected of holding Nonconformist opinions, a belief strengthened by his refusal to subscribe to the Thirty-Nine Articles, and his interceding with the Queen for some Anabaptists who had been condemned to death. He died in 1587. F., who in early life had written some Latin 'Moralities,' one of which, *De Christo Triumphante*, was printed at London in 1557, and who was towards the end of his career a keen ecclesiastical controversialist, is remembered chiefly for his *History of the Acts and Monuments of the Church*, popularly styled *Foxe's Book of Martyrs* (first Latin ed. Stras. 1554; 2nd Latin ed. enlarged, Basel, 1559, of which the English translation of 1563 was made), which has gone through innumerable editions, and is still looked upon as one of the manuals of Protestant literature. The first idea of the work was suggested to him by Lady Jane Grey. The truth of many of its statements has been questioned by Catholic critics, who have styled it *la légende dorée de F.*

Fox, William Johnston, an orator and preacher, the son of a small farmer, was born at Uggeshall, near Wrentham, Suffolk, in March, 1786. He was educated for the Independent ministry, but went over to the Unitarians, and finally took an independent position as a Rationalist, preaching for some time at the South Street Chapel, Finsbury. He was one of the earliest members of the Anti-Corn-Law League, the object of which he advocated with great ability, both as a speaker and a writer. He was returned to Parliament in 1847 for Oldham, which he represented with short intervals until his death, in London, 3rd June, 1864. F. was a Radical in politics, a 'Theist' in religion, a clear and vigorous writer, and a singularly effective orator. His chief works are *Letters of a Norwich Weaver-Boy*, *Letters addressed chiefly to the Working Classes*—telling political pamphlets—and *Religious Ideas*. F. was a frequent contributor to the *Westminster Review* and other periodicals. An edition of his selected works was published in 1868.

Fox-Bats, the name applied to a family and section of *Cheiroptera* (q.v.) or bats. They are so named from the resemblance of the head to that of the fox. They are Frugivorous or fruit-eating, and possess a long pointed snout. The ears are of moderate size, and destitute of appendages. Incisors and cutting canine teeth are developed in both jaws. The F.-B. feed chiefly on vegetable matters, but they also subsist on small birds and mammals. The molar teeth have blunt tuberculate crowns. The tail is short or absent. Of the F.-B. the best-known species is the Kalong bat in the Eastern Archipelago, which attains an expanse of wing from 4 to 5 feet. The F.-B. are absent from the New World.

Fox'glove. See DIGITALIS.

Fox'hound. See FOX-HUNTING.

Fox'-Hunting, a thoroughly English sport, pursued with courage and ardour in the autumnal and winter months. It demands much organization, not only as regards the breed and quality of the dogs employed, but in the training and appointment of the men connected with the pack and with the management of the dogs in the sport. The horses employed in hunting require also a certain degree of training and breeding; the qualities which render a horse a first-rate hunter being courage, agility, and a certain fondness or disposition for the work. The management and control of the pack of foxhounds is vested in a gentleman named the *master*, the appointment being generally given to some prominent country gentleman, who is elected by the subscribers to the pack, and who holds office either for a stated number of years, or for such time as may suit his tastes and convenience. Under the master are the *huntsman* and several *whippers-in* or *whips*. On the former devolves the duty of attending to the health of the dogs, and of seeing that they are properly housed and fed. He also directs their journey to the field, and exercises supreme control over their movements in the chase. The huntsman, in fact, is the active director of the sport, and is regarded as the leading character in the field, and as one whose directions all are expected to follow. The *whips* are so named from the fact that part of their duties consists in 'whipping' or bringing up lagging hounds to the front. But this duty — discharged in some instances by the second whipper-in—is a very subsidiary one in the office of *whip*, and this latter official may be said to be simply a qualified assistant to the huntsman himself. The dogs used in hunting the fox are named foxhounds, and 'Stonehenge' has justly remarked that 'the modern foxhound is one of the most wonderful animals in creation.' His acute scent, his wonderful sagacity in comprehending the difficulties of any position in the field, his efforts to circumvent the natural cunning of the fox, his speed and power of endurance, form traits which only require mention to be thoroughly appreciated. The breeding and training of foxhounds are tasks of no ordinary difficulty; the modern foxhound representing in itself a combination of a great variety of breeds. The average height of these dogs, in their thoroughbred state, is from 20 to 25 inches, and those forming a pack are usually selected of the same height. Their speed is sometimes very great. 'Bluecap,' a famous hound, ran over the Beacon course at Newmarket—a distance of 4 miles, 1 furlong, and 132 yards—in 8 minutes and a few seconds. The racehorse 'Flying Childers' ran the same distance in about 30 seconds less time. The country best adapted for F.-H. is that in which level and undulating ground, with a fair mixture of pasturage and plantation, are intermingled. The 'earths' or burrows of the foxes are duly 'stopped' by the *earth-stopper* or gamekeeper on the night preceding the hunt, after the foxes have left their dens on their nocturnal foraging expeditions. The foxes, shut out of their homes, usually seek refuge in thickets, and the localities of the 'stopped' earths being duly noted, the efforts of the huntsman are directed to these spots. The huntsmen and the hounds being assembled in the neighbourhood of the coverts, the dogs are 'thrown off,' and are encouraged to seek the fox in his temporary lair, the huntsman and whip following the pack. The master's duty chiefly consists in regulating the acts of the riders, in conformity with the huntsman's operations. Occasionally the riders may assist in searching the covert, and those outside watch eagerly for the first symptoms on the part of the hounds of having found or 'scented' a fox. Some old hound acts as leader, and betokens the presence of the fox or scent by a peculiar whimper. Sometimes a fox may be at once seized and *chopped* or torn to pieces, before he can escape; an incident which is of course a catastrophe so far as the sport is concerned. Sooner or later the fox leaves or *breaks cover*, and is allowed to gain a certain distance from the hounds. The person who notices his escape then gives the *View halloa!* as the warning cry is named. The *Tallyho!* of the huntsman is then heard, and the hounds are called together by the sound of the horn, while the whips collect the stragglers. Speedily the dogs *settle* to their work, and the pack, accompanied by the riders, are soon in *full cry* after the quarry. The sport thus begun continues to increase in excitement, the chase leading the huntsmen over mile after mile of country, quickly or slowly as the scent is good or fails. In the latter case the dogs are said to be *at fault*, the sportsmen in such a case remaining at some distance, while the huntsman endeavours to set them once more on the scent. If the scent be recovered the chase is resumed; but if it be lost a fresh fox is drawn. The rider first *in* at the death of the fox lashes the hounds off, and secures the head, feet or *pads*, and tail or *brush* of the fox. Both in England and in Ireland the pastime of F.-H. is very popular, and in some parts of Wales and Scotland some hunting is carried on every year. The grass counties of England are the localities where it meets with the greatest success and where large sums of money, amounting to thousands of pounds, are annually spent on hounds and their maintenance.

Fox River, the name of two streams in the United States, both rising in Wisconsin, the more important of which, also known as the Neenah, is connected by canal with Wisconsin River, flows into Green Bay, after a course of 150 miles, is improved by means of a system of locks and jetties, and forms the connecting link between the great lakes and the Mississippi and its tributaries. The other flows S. and S.W. into the Illinois River, provides ample water-power, and has a course of 200 miles.

Fox-Shark, a species of shark, also known as the 'thresher-shark,' from the excessive development of the upper lobe of the tail, which is thus more typically *heterocircal* or unequally lobed than in other sharks. This fish occurs in the Atlantic Ocean and Mediterranean Sea, and has been frequently found off the English coasts. It attains an average length of 12 or 13 feet. Its food consists of herrings and other fishes. The colour is slaty blue above, and the same hue mottled with white prevails on the under parts. The snout is shortened and conical, and the gill-openings are small, the hinder gill-slit being placed over the pectoral fins. The teeth are flat and three-sided. The tail is used as a defensive weapon. The other names applied to this fish are *sea-fox* and *sea-ape*.

Foxtail-Grass, a genus of *Gramineæ* or grasses having a *spiked panicle* of flowers with equal *glumes*. The meadow F.-G. is a familiar meadow-grass, and attains a height of from 1 to 2 feet. Another species is the jointed F.-G., which has its culm bent at the joints. The slender F.-G. grows favourably on sandy and dry soils. The black F.-G. is a European and a N. Asiatic species, which thrive in Britain.

Foy, Maximilien Sébastien, a French general and orator, was born at Ham, in Picardy, 3rd February, 1775. He first served in 1792 under Dumouriez, and subsequently under Moreau, Massena, and finally Napoleon himself, gaining distinction by his daring bravery. Although opposed to the ambition of Napoleon, his ability was such that he was promoted to high and important commands. He successfully defended Constantinople in 1807 against Admiral Duckworth, became brigadier-general in Portugal in 1808, fought at Salamanca in 1812, was severely wounded at Orthez in 1814, and received his fifteenth wound at Waterloo. Retiring from military life, F. was elected in 1819 member of the Chamber of Deputies for the department of Aisne, and became very popular on account of his advocacy of constitutional liberty, his eloquence, and his political and economical knowledge. His health broke down, however, and he died at Paris, 28th November, 1825. In 1826 appeared two volumes of his speeches, with a biography, and in 1827 his unfinished *Histoire de la Guerre de la Péninsule*, edited by Madame F.

Foy'ers, a mountain stream in Inverness-shire, rises in the Monadhliadh mountains, flows N. through Strath Errick, and enters Loch Ness, 10 miles N.N.E. of Fort Augustus, after a course of 15 miles. It is famed on account of the two falls near its mouth, 90 and 30 feet high respectively, the former of which is a magnificent cascade, romantically hidden in a wild gorge.

Foyle, Lough, an extensive arm of the Atlantic in the N. of Ireland, separates Donegal from Derry, is of triangular shape, and has a length from N.E. to S.W. of 16 miles. It contracts at its mouth to 1 mile, is navigable to vessels of 200 tons along its W. side, but on the E. is very shallow. On the flat eastern beach was measured the base line of the Irish survey. The Belfast and Northern Counties Railway runs along its S. and E. shores.

Fra Angel'ico (often named *Giovanni da Fiesole*, but whose baptismal name appears to have been *Giovanni Guido Santi-Tosini*) was born at Mugello, a few miles N.E. of Florence, in 1387. In 1409 he entered the order of Predicants at the convent of Fiesole, and lived there eighteen years, during which he beautifully illuminated many of the books used in the choir, and painted a large number of frescoes and easel pictures in distemper. Invited to Florence in 1436, he there decorated the convent of San Marco and other public edifices with frescoes. About 1445 Pope Eugenius IV. called him to Rome to decorate a private chapel in the Vatican and the cathedral of Orvieto with frescoes. At the command of Niccolo V., the successor of Eugenius, and a liberal patron of the arts, F. A., leaving his works unfinished at Orvieto, repaired to Rome to decorate a chapel to be used as the Pope's private oratory. There he spent the remainder of his days, and died in 1455. He was offered the archbishopric of Florence by Niccolo, but declined it on the plea that to govern or to lead were equally incompatible with his nature. His art is distinguished by an ecstatic reverential sentiment, the truth and purity of which made his works the model for religious painters of his own and succeeding generations. Every work he began with prayer, and every original idea was welcomed as a divine inspiration. F. A. may be studied to most advantage in the convent of San Marco, Florence. Here are his 'Christ Appearing to St. Dominic,' 'The Image of St. Thomas Aquinas,' 'St. Peter the Martyr,' a 'Christ,' in which the expression of the features reaches the sublime. Here also is his greatest fresco, the 'Passion,' a work embracing twenty-three large figures, with Christ in the centre, and saints and founders of religious orders ranged below. Placed around are numerous figures and medallion portraits. All these works are in excellent preservation. Vasari has said that F. A.'s saints and angels 'must look the same in Heaven.' The chapel of Niccolo V. is decorated on three sides with frescoes illustrating the lives of St. Stephen and St. Lawrence, works unrivalled in finish and in sweetness and harmony of colour, and evincing a command of light and shade which almost justifies the opinion that in chiaroscuro F. A. anticipated Correggio.

Fracasto'ro, Girola'mo, a physician and poet, distinguished for his miscellaneous learning, was born at Verona in 1483. At the age of nineteen he was Professor of Dialectic at Padua, where a bronze statue was erected in his honour, as was also a marble one at Verona. His most famous work is a poem in three books, in excellent Latin verse, published at Verona in 1530, and frequently reprinted. Other works are *De Vini Temperatura*, *De Sympathia*, &c. F. died 8th August, 1553. His *Opera Omnia* were published at Venice in 1555.

Frac'tion (Lat. *fractio*, 'a breaking into parts'), in arithmetic, is one or more aliquot parts or sub-multiples of unity. For instance, divide any magnitude into *eight* equal parts, and take *five* of these parts: this quantity is the F. *five-eighths*, and is written $\frac{5}{8}$, the lower number being termed the *denominator* and the upper the *numerator*. Such an expression as $\frac{11}{8}$ is termed an *improper* F., because it is greater than unity, being really *one* and $\frac{3}{8}$. It is immaterial whether we regard $\frac{5}{8}$ as being *five* of those parts, *eight* of which make up unity, or as being the eighth part of five units. It is this latter conception which is chiefly present to the mind in algebra, in which a F. is simply a symbol of division, $\frac{a}{b}$ being equivalent to and treated as $a \div b$. From this definition the following rules for the four fundamental operations with respect to fractions follow naturally: $\frac{a}{b} + \frac{c}{d} = \frac{ad}{bd} + \frac{bc}{bd} = \frac{ad + bc}{bd}$; $\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$; $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c} = \frac{ad}{bc}$. For the usual rules for reduction and combination, reference must be made to an elementary treatise on algebra or arithmetic. When the denominator is a power of *ten*, the F. is called a *Decimal F.* (q.v.).

A *continued F.* is one which has in its denominator a F. which again in its denominator has a F., and so on. Such as

$$F=a+\cfrac{1}{b+\cfrac{1}{c+\cfrac{1}{d+\cfrac{1}{e+\&c.}}}}$$

or, more conveniently, $F=a+\frac{1}{b+}\,\frac{1}{c+}\,\frac{1}{d+}\,\frac{1}{e+}\,\&c.$

If the *quotients* a, b, c, &c., are finite in number, then we have a *terminating* continued F., and any ordinary F. may be expressed as such. Conversely, by breaking off at any quotient, the continued F. may be expressed as an ordinary F. If we write

$$a+\frac{1}{b}=B,\ a+\frac{1}{b+}\,\frac{1}{c}=C,\ a+\frac{1}{b+}\,\frac{1}{c+}\,\frac{1}{d}=D,\ \&c.,$$

B, C, D, &c., are termed *convergents* of the continued F., and these convergents are alternately greater and less in value than the F. Further, each convergent is nearer in value to the F. than the one immediately preceding it is, so that they may be said to oscillate from excess to defect with ever-decreasing amplitude. The theory of this branch of pure mathematics has been much studied by Wallis, Euler, Legendre, Sylvester, &c.

A *vanishing F.* is an algebraic F. which for a certain value of the variable takes the form $\frac{0}{0}$, or $\frac{\infty}{\infty}$. For instance, $\frac{x^2-1}{x-1}$ and $\frac{\log. x}{x-1}$ both become $\frac{0}{0}$, when $x=1$. Now this shows that there is a common factor in numerator and denominator which becomes zero for the special case. In the first example this common factor is evidently $x-1$, and the value of the F. becomes $x+1=2$, when $x=1$. The value of the second example may be found by putting $x-1=z$, when the expression becomes

$$\frac{\log.\ (1+z)}{z}=\frac{1}{z}\left(z-\frac{z^2}{2}+\frac{z^3}{3}-\ldots\right)=1 \text{ when } z=0, \text{ that is}$$

when $x=1$.

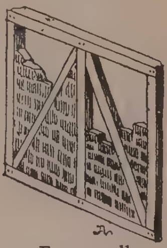
Frac'ture, in mineralogy, is the surface exhibited by a crystal when broken in a direction not coinciding with the planes of cleavage. The terms *conchoidal, even, uneven, hackly, splintery*, are used to distinguish the several kinds of fractures.

Fractures are almost invariably the result of direct or indirect external violence, the former being the more serious lesion, and generally complicated with considerable mischief to the soft parts. When caused by indirect violence, the bone is broken by being snapped between a resisting medium on one side, and the weight of the body on the other. F. are predisposed to by old age, cancerous diseases, scurvy, fragilitas ossium, frosty weather, &c. F. are called *simple* when the bone is broken across; *impacted* when one fragment is wedged into another; *comminuted* when the bone is broken into several fragments; *compound* when the soft parts covering the broken ends of bone are torn through so that the fracture communicates with the surface of the body; *complicated* when conjoined with other circumstances which may be of more importance than the fracture itself, as injury to some important internal organ, the laceration of a principal artery, or a dislocation. In general, F. are easily detected, the most obvious symptoms being increased mobility, displacement conjoined with crepitus, and a peculiar rough feeling caused by the broken extremities grating against each other. A fractured bone is ultimately united by the deposition of new bone around, within, and lastly between the broken fragments, the material for repair being termed *callus*. The callus deposited round the fracture is called *provisional*, as it merely serves as a wrapper and support, and is afterwards in great part reabsorbed, while that deposited between the broken ends is permanently left, and is called *definitive callus*. Treatment:—Wherever the fracture may be, the broken ends of the bone must be brought into as perfect apposition as possible; appropriate appliances must be adapted to prevent the recurrence of displacement; and the constitutional condition of the patient must be properly attended to. Various appliances are in use to prevent the recurrence of displacement. Splints are generally made of wood, pasteboard, gutta percha, or iron; and the bandage with which the limb is enveloped may be converted into a splint by means of starch or dextrine, or a shell may be formed for it by plaster of Paris. A simple fracture is pretty firmly united by the sixth or eighth week, but formerly three or four months elapsed before union of compound fractures took place. When compound fractures are treated by the antiseptic process, introduced by Professor Lister of Edinburgh, union takes place almost as speedily as in the case of simple F.

Fra Diav'olo, a name better known among musical connoisseurs than among students of history, was the *sobriquet* of one Michele Pezza, an Italian adventurer, born in Calabria about 1760, and who successively became a weaver, a soldier, a monk, and a brigand. His cruelty and rapacity were almost equalled by his ingenuity and resource. When pursued, he retired to the Calabrian mountains, amid which he frequently defeated the armed forces sent against him, though these were numerically superior to his own. Ardently loyal, he warmly espoused the cause of the royal house of Naples against the French in the beginning of the century. He was, however, taken prisoner, and executed in November, 1806, for an attempt to raise a rebellion against the invaders. The name has been immortalised in Auber's famous opera, though his hero is a 'Devil' of much milder disposition than the Calabrian brigand.

Frame-Bridge, a name sometimes given to a timber bridge with trussed girders similar to those now used frequently in iron bridges. See BRACES, LATTICE GIRDER, TRUSS.

Frame-Wall, a wall consisting of beams between which brickwork, or plaster, or terra-cotta work is arranged, so that both wood and other material are of the same thickness throughout.



Frame-wall.

Fram'lingham (*i.e.*, 'strangers' town') a pleasant market-town of Suffolk, on the Alde, 14 miles N.N.E. of Ipswich, and 90 N.E. of London by railway. It has extensive remains of an old castle, with thirteen towers, several of which are about 60 feet high, and a gateway carved with heraldic devices. To this the Princess Mary retired when Lady Jane Grey was proclaimed queen. The church of F. is built of flint, has a fine tower 100 feet high with a peal of eight bells, and contains many illustrious tombs and monuments, including those of the Howards, Fitzroys, &c. The Albert Memorial Middle Class College, for boys, was opened in 1865. F. has some trade in corn and other agricultural produce. Pop. reg. sub.-dist. 5837; and civ. par. 2525.

Franc, the current silver coin or monetary unit of France, introduced in 1795 to supersede the *livre tournois*. Its value is about $\frac{1}{25}$ of a pound sterling, or about 9½d. The coin has also been adopted by Belgium and Switzerland. The *leu* in Roumania, the *lira* in Italy, the *peseta* in Spain, and the *drachma* in Greece, are equivalent to the F.

Francavill'a (*Francavilla Fontana*), a town in the province of Lecce, S. Italy, 23 miles W. of Brindisi, is the seat of a college, and has cotton and woollen industries. The public buildings comprise three hospitals and many convents and churches. Pop. 18,826.

France (Lat. *Francia*, Ger. *Frankreich*), one of the largest and most important countries of Europe, extends from 42° 20′ to 51° 5′ N. lat., and from 7° 40′ E. long. to 4° 54′ W. long. It is bounded N. by the English Channel and the Straits of Dover; W. by the Bay of Biscay; S. by the Pyrenees and the Mediterranean Sea. The E. boundary begins in the S. with the Maritime Alps, the line running along the principal ridge from Colla Lunga to Mont Blanc. It then descends to the lake of Geneva, and curving round the canton of Geneva follows the Jura mountains to the pass at Belfort, crossing which it keeps along the ridge of the Vosges. At 48° 15′ it leaves the range and ceasing to depend on natural features, becomes an arbitrary line, passing about 15 miles to the W. of Metz, and holding a north-westerly direction, crosses the Meuse, Sambre, and Scheldt, and reaches the Straits of Dover 8 miles from Dunkirk. The country, which is of hexagonal shape, is extremely compact, its greatest extension from N. to S. being 600 miles, and from E. to W. 550, while in a diagonal direction from Finistère to Mentone it measures nearly 700 miles. The coast, which is flat and marshy in the S. along the Mediterranean, and bold and broken in the N.W., has an extreme length of 1500 miles, including Corsica. Among the promontories are the Gris-Nez, in Pas-de-Calais, the nearest point to England; Cap la Hague and Pointe de Barfleur in the N. of Manche; Pointes St. Matthieu and Raz in Finistère; and in the Mediterranean the Caps Sicie, Camarat, &c. The coast is in part fringed with small islands, of which the chief are Corsica, now forming a department (Corse), Ushant and Belle Isle to the S. of Morbihan, Noirmoutier and Île d'Yeu to the W. of Vendée, Ré and Oléron to the W. of Charente-Inférieure, the isles of Hyères and Lerins off the coast of Var. F. comprises about $\frac{1}{18}$th part of the area of Europe. The population and area of its divisions are as follow, according to the latest returns:—

Departments.	Population.	Area in sq. miles.	Chief Towns.
Ain	356,907	2239	Bourg.
Aisne	545,493	2839	Laon.
Allier	424,382	2822	Moulins.
Alpes, Basses	124,285	2685	Digne.
Alpes, Hautes	115,522	2158	Gap.
Alpes, Maritimes	258,571	1482	Nice.
Ardeche	371,269	2136	Privas.
Ardennes	324,923	2020	Mézières.
Ariège	227,491	1890	Foix.
Aube	255,548	2317	Troyes.
Aude	317,372	2438	Carcassonne.
Aveyron	400,467	3376	Rodez.
Belfort, Territoire de	83,670	235	Belfort.
Bouches-du-Rhône	630,622	1971	Marseille.
Calvados	428,945	2132	Caen.
Cantal	239,601	2217	Aurillac.
Charente	360,259	2294	Angoulême.
Charente-Inférieure	456,202	2635	La Rochelle.
Cher	359,276	2780	Bourges.
Corrèze	328,119	2265	Tulle.
Corse	288,596	3377	Ajaccio.
Côte d'Or	376,866	3383	Dijon.
Côtes-du-Nord	618,652	3659	St. Brieuc.
Creuse	284,660	2150	Guéret.
Dordogne	478,471	3546	Périgueux.
Doubs	303,081	2018	Besançon.
Drôme	306,419	2518	Valence.
Eure	349,471	2300	Evreux.
Eure-et-Loir	284,683	2268	Chartres.
Finistère	727,012	2595	Quimper.
Gard	419,388	2253	Nîmes.
Garonne, Haute	472,383	2429	Toulouse.
Gers	261,084	2425	Auch.
Gironde	793,528	3761	Bordeaux.
Hérault	461,651	2393	Montpellier.
Ille-et-Vilaine	626,875	2597	Rennes.
Indre	292,868	2624	Châteauroux.
Indre-et-Loire	337,298	2361	Tours.
Isère	572,145	3201	Grenoble.
Jura	273,028	1928	Lons-le-Saunier.
Landes	297,842	3599	Mont-de-Marsan.
Loir-et-Cher	280,358	2452	Blois.
Loire	616,227	1838	St. Étienne.
Loire, Haute	316,735	1916	Le Puy.
Loire-Inférieure	645,263	2654	Nantes.
Loiret	377,718	2614	Orléans.
Lot	253,885	2012	Cahors.
Lot-et-Garonne	295,360	2067	Agen.
Lozère	135,527	1996	Mende.
Maine-et-Loire	518,589	2749	Angers.
Manche	513,815	2289	St. Lô.
Marne	434,692	3159	Châlons-sur-Marne.
Marne, Haute	243,533	2402	Chaumont
Mayenne	332,387	1996	Laval.
Meurthe-et-Moselle	444,150	2025	Nancy.
Meuse	292,253	2405	Bar-le-Duc.
Morbihan	544,470	2625	Vannes.
Nièvre	343,581	2632	Nevers.
Nord	1,736,341	2193	Lille.
Oise	401,835	2261	Beauvais.
Orne	354,387	2354	Alençon.
Pas-de-Calais	874,364	2551	Arras.
Puy-de-Dôme	564,266	3070	Clermont-Ferrand.
Pyrénées, Basses	425,027	2943	Pau.
Pyrénées, Hautes	225,861	1749	Tarbes.
Pyrénées-Orientales	210,125	1592	Perpignan.
Rhône	806,737	1077	Lyon.
Saône, Haute	280,856	2062	Vesoul.
Saône-et-Loire	619,523	3302	Mâcon.
Sarthe	429,737	2396	Le Mans.
Savoie	263,297	2224	Chambéry.
Savoie, Haute	268,267	1667	Annecy.
Seine	3,141,595	183·6	Paris.
Seine-Inférieure	839,876	2330	Rouen.
Seine-et-Marne	356,709	2215	Melun.
Seine-et-Oise	628,590	2164	Versailles.
Sèvres, Deux	354,282	2317	Niort.
Somme	546,495	2379	Amiens.
Tarn	346,739	2217	Albi.
Tarn-et-Garonne	206,596	1436	Montauban.
Var	288,336	2349	Draguignan.
Vaucluse	235,411	1370	Avignon.
Vendée	442,355	2588	La Roche-sur-Yon.
Vienne	344,355	2691	Poitiers.
Vienne, Haute	372,878	2130	Limoges.
Vosges	410,196	2266	Epinal.
Yonnes	344,688	2868	Auxerre.
	38,343,192	204,092·6	

Physical Aspect.—The surface of F. is on the whole a somewhat monotonous plain, inclining gently downwards from the Alps and the Pyrenees in a north-westerly direction to the Atlantic. It is rarely marked either by grandeur or variety. The mountain ranges may be divided into (1) an outer girdle, comprising the Pyrenees in the S., and the Vosges, Jura, and Alps in the E.; (2) the range of the Cevennes (q.v.), which stretch from the Pyrenees in a line parallel with the range of Lyon, and then N. along the western side of the Rhône basin, to be continued by the Côte-d'Or and Plateau de Langres in a direction N.E. to the Vosges; (3) the mountains of Auvergne, separating the basins of the Dordogne and Lot in the S. from that of the Loire in the N., and sending off Mont Margeride towards the Cevennes in a south-easterly line, and several low ranges, as the Hauteurs de Gatine, in a direction N.W. and parallel with the Indre and other southern affluents of the Loire; and (4) the mountains of Bretagne, which run in sinuous masses E. and W., and extend into Lower Normandy, sending a spur N.N.E. into the peninsula of Cotentin. The Alps extend for about 280 miles along the frontier, and contain the highest summits in France, as Mont Blanc in Haute Savoie (15,783 feet), though claimed by some to be within Italian territory, Grand Pelvoux (13,440), Mont Genèvre (11,782), and Mont Viso (12,600). Many ramifications trend E. towards the Rhone, forming a wild highland region, in which are the Alps of Valais, Faucigny, Chablais, &c. The Jura range has a sharp rocky contour, and stretches N.N.E. for 450 miles. The Vosges, to the N. of the Jura, gradually lose the Alpine character, and are noted for their vast forests of beech, fir, &c. A considerable depression (Valdieu), known as the Pass of Belfort, divides the Jura mountains from the Vosges, and forms the great eastern gateway to F. Along the N.E. boundary the country rises to the wild, broken plateau of the Ardennes (q.v.). The Pyrenees (q.v.), though inferior in height to the Alps, are wilder and gloomier, consisting of sharp conical groups and ridges, crossed by difficult passes. The Cevennes have a length of 295 miles, and are precipitous mountains, rising in the S.E. in Mont Mezen to a height of 5794 feet, and sinking gradually in the N., where they give place to the Côte-d'Or, on the slopes of which are produced some of the finest wines of France. The mountains of Auvergne are volcanic, and include the Puy de Saucy (6187), Cantal (6093), Mont d'Or (6188), and Puy de Dôme (4806). The chain of the Puys extending N. is a singular series of extinct volcanoes (*chéires*), now clad with verdure, but whose craters and lava-streams are easily distinguishable. To the S. of Auvergne stretches the vast expanse of the *Causses*, calcareous plateaux deeply cut by the Lot, Tarn, Aveyron, and other streams.

Hydrography.—The three great rivers of F. flowing W., the Seine, Loire, and Garonne, have their sources in the Cevennes. The Rhône, entering F. after issuing from the Lake of Geneva, flows S. on joining its great affluent, the Saône. The rivers to the N. of the Faucilles and Plateau de Langres, the Meuse, Moselle, and Scheldt, flow through Rhenish Prussia and Belgium to the Rhine or directly to the North Sea. F. has about 200 navigable streams, which are utilised to the extent of 5500 miles. Smaller rivers with basins of their own are the Somme and Orne, the Vilaine and Charente, and the Adour. Affluents of the Seine are the Aube, Oise, Yonne, and Marne; of the Loire, the Sarthe, Loir, Allier, Maine; of the Garonne, the Dordogne, Lot, and Tarn; of the Rhône, besides the Saône, the Durance, Isère, Ain, and Ardèche. The extensive river system has been supplemented by 100 canals, with a total length of about 3000 miles. The rivers of F. flowing S. are liable to rapid inundations. Among the lakes of F., which are few, the largest are Bourget in Savoie, 12½ miles long and 2½ broad, and Grandlieu in the Vendée. There are numerous lagoons (*étangs*) along the coasts of Gascony, Roussillon, Languedoc, and especially about the mouth of the Rhône.

Climate.—Lying mainly between the annual isotherms 50°-60° F., F. enjoys a singularly fine climate. The climate of the N. generally corresponds to that of the S. of England, but in the S. the winters are much shorter and milder, and the sky is almost invariably clear. Along the Mediterranean the mean temperature is 57°. The regions towards the Alps and the Pyrenees are exposed to wild tempests and piercing winds. In the Rhône valley the temperature is subject to sudden change, owing to the alternations of the hot blast of the sirocco from the S., and the cold impetuous mistral from the N.W. The annual fall of rain on the W. coast is 24 inches, on the S. 23, on the N. 22. The number of rainy days on the W. coast is 152, in the interior 147, on the S. coast 66, at Paris 105.

Geology and Mineralogy.—The geology of F., like that of England, embraces almost all the stratified and non-stratified formations. The greatest area is covered by the Secondary strata, which prevail chiefly in the departments in the E. and N.E., stretching from the Mediterranean to the Moselle. In the W. also they extend from the Garonne to the mouth of the Seine, excluding Bretagne, which is mainly Silurian. The Tertiary series, next in extent to the Secondary, occurs between the Pyrenees and Garonne, and along the E. banks of the Rhône and Saône, and forms the extensive *Paris basin*. The Bretagne hills are chiefly of granitic rocks, and in Cantal and Puy-de-Dôme the rugged angular mountain masses are of volcanic origin. The coal deposits are most abundant in the central departments, in the Cevennes, and along the N.W. coast. French coal is unaccompanied by ironstone. Iron is widely distributed, and about 3,500,000 tons of iron ore are produced yearly. Lead and silver are mined in Finistère, Isère, Puy-de-Dôme, &c.; copper in the N.E., the Rhône, and Basses-Pyrénées. In the E. the salt-mines are of great value. Besides marble and alabaster, there are also among the natural products some argentiferous galena, manganese, antimony, porcelain clay, lithographic stones, slates, &c. There are many mineral springs, of which the most frequented by invalids are in the Pyrenees at Vichy, Mont d'Or, Plombières, and Bourbonne.

Botany and Agriculture.—In the number and variety of its indigenous plants F. surpasses all the other countries of Europe. Ruskin gives a verdict in favour of the trees of F. over those of all other countries for grace of stem and perfection of form in their transparent foliage, and for their beautiful modes of grouping and massing. The forest-trees occupy nearly one-eighth of the entire surface, and include the oak, beech, elm, ash, birch, &c. The largest forests are those of Compiègne, Chantilly, St. Germain, Fontainebleau, Orleans, and the Ardennes. Pines are plentiful in the Pyrenees and Landes, firs in the Jura and Vosges, larches in the Alps, cork-trees only in the basin of the Adour and in Provence. On the mountains of the S. and centre the chestnut abounds, and the walnut is found almost everywhere. The mulberry-tree, cultivated as support for the silk-worm, is chiefly confined to the basin of the Rhône. Of the fruit-trees the principal is the vine, which grows in nearly all except the mountainous parts of F., yielding the best wines in Champagne, Burgundy, Franche-Comté, Dauphiné, Languedoc, and the Bordelais. Among the other fruits are the olive, apple, pear, cherry, plum, orange, citron, fig, pomegranate, lemon, and pistachio.

The country is essentially agricultural, and while the S. is rich in vines and fruits, the N. is equally productive in cereals. As a result of the equal division of land between the children of a proprietor, the area of F. is already held by some 5,550,000 owners, of whom 5,000,000 possess, on an average, not more than 6 acres each. At the present time it is estimated that 92,442,745 acres are under cultivation, and 20,942,728 acres are covered by forests. About $\frac{1}{5}$th of the cultivated area is under wheat, about $\frac{1}{10}$th is under oats, about $\frac{1}{22}$nd under rye, and the same under potatoes. Vineyards cover about $\frac{1}{18}$th, and about $\frac{1}{7}$th is occupied by meadows and permanent pasture. Three great agricultural belts traverse the country from S. to N. Thus the growth of the olive extends to a line stretching from the Corbières to the Alps of Dauphiné, the maize is cultivated to a boundary running from the island of Oléron to the middle of the Vosges, and the vine grows as far N. as the mouth of the Loire and the source of the Oise. Less than formerly of the surface is now covered with the vine, but the French have long borne the character of being the first of wine-makers. The production of wine greatly varies, and among the chief disturbing causes in recent years have been the fungus oïdium and the insect phylloxera. The produce of wine in 1894 was estimated at 859,144,000 gallons (or less than half the production in 1874), and that of cider at 341,902,000 gallons; and although of this quantity the great proportion is consumed in F., the export to Great Britain alone amounted to, in 1894, 3,494,483 gallons of red wine in casks (£698,639); 92,515 gallons of white wine in casks (£19,291); 393,322 gallons of still red wine in bottles (£206,779); 26,624 still white wine in bottles (£13,226); 9436 gallons of sparkling burgundy (£6591); 1,291,261 gallons of champagne (£1,734,269); 129,030 gallons of Saumur (£62,810); 655 gallons of white burgundy (£614); 2640 gallons of moselle (£1245), &c.; total 5,441,900 gallons, valued at £2,744,873. The chief cereal in the W. is wheat, of which a considerable quantity is exported. In the S.W., as well as in the N., there is an extensive cultivation of flax and hemp, while the mulberry is a speciality in the vicinity of Lyon, the great centre of the silk manufacture. Among the other products are barley, oats, rye, buckwheat, hops, beans, peas, potatoes, and beetroot. There is also in the S. considerable production of rice, colza (145,000 acres), tobacco (35,101 acres), chestnuts, walnuts, olives, apples, and plums, madder, saffron, and other dye-stuffs.

Zoology and Live Stock.—The few wild animals yet remaining include the lynx, wolf, boar, chamois, and wild goat. Among the commoner animals are the roebuck, fox, marmot, ermine, hamster, squirrel, polecat, &c. Most kinds of game abound, but the red and fallow deer are scarce. Of birds the songsters resemble those of England; the more formidable birds of prey are the eagle, falcon, and buzzard. The flamingo haunts the Mediterranean shores. Several species of frogs, of vipers, and harmless snakes, and of tortoises are the principal reptiles. Herring, mackerel, sardine, pilchard, turbot, sole, whiting, &c., are caught on the W. coast; tunny and anchovy in the Mediterranean, and salmon in the river estuaries. In the basin of the Arcachon, &c., there are large oyster and mussel beds. *Live stock.*—Of horses there are 2,767,648 as against 3,312,637 in 1866 (highest record); of asses, 357,965 as against 518,837 in 1866 (highest record); of horned cattle, 12,154,641 as against 13,661,533 in 1891 (highest record since 1862); of sheep, 20,275,716 as against 30,386,233 in 1866 (highest record); of goats, 1,466,451 as against 1,794,837 in 1873 (highest record); and of swine, 5,860,592 as against 6,337,100 in 1892 (highest record). The finest horses are reared in Normandy, while the Jura, the Vosges, and the basin of the Rhône are equally noted for their breeds of cattle. The yearly production of eggs is valued at £4,000,000, and eggs to the value of £1,182,800 are exported. There are £760,000 worth of honey and wax produced yearly in F. from 3,000,000 hives; the best honey is from Aude. Ardèche, Vaucluse, Drôme, and Gard are the great seats of the silk-culture, and previous to 1853, when disease broke out among the silkworms, the yield of cocoons amounted to 25,000 tons.

Industries.—F. has many and important industries, and of these perhaps the principal is the production of silks and velvets. Besides the raw silk produced at home, which amounts to over 20,0000,000 lbs., the amount yearly imported is over £10,000,000 worth. The weaving is done chiefly at Lyon, and in the department of Rhône, at St. Étienne and St. Chamond (ribbons and brocades), at Nîmes (light stuffs), and at Tours (silk furnishings). Silk lace is made at Alençon, Bayeux, Lille, Arras, &c. The northern towns (Rouen, St. Quentin, Amiens, &c.) are most important seats of the cotton and woollen manufactures, while the linen industry is chiefly confined to Lille, Cambrai, &c. Since 1870 the making of printed calicoes has been much limited to Paris and Rouen. Paris is noted for the variety and extent of its manufactures, including machinery, chemicals, porcelain, mirrors, clocks, watches, gloves, hosiery, *modes*, and above all jewellery. Another watchmaking centre is Besançon, where are mounted the pieces made in the Jura mountains. Over half a million tons of beet-sugar are produced (at Paris, Lille, Douai, &c.) from roots grown in F. Raw sugar from abroad is refined at Marseille, Bordeaux, Havre, and Nantes. St. Étienne has great manufactures of firearms and hardware; Sèvres, of porcelain and glass wares; Reims, of merinoes; Gobelins, of tapestry and cashmeres. Perfumery is extensively made in Paris and also in Provence.

Commerce.—In regard to commerce F. ranks next to Britain among the countries of Europe. Its foreign trade nearly trebled in value from 1860 to 1883, rising from £167,000,000 to £417,936,000. In 1893 the value of the imports was estimated at £197,000,000, and that of the exports at £172,000,000. The five chief articles of import were raw silk, corn and breadstuffs, wool, raw cotton, and coal. In 1893 the export of horses numbered about 25,000; the value of spirits exported was over £2,000,000; of fruit £1,400,000; of haberdashery, fancy wares and toys, £5,000,000; of hides, £3,000,000; of silks, £14,000,000; of sugar, £4,500,000; and of wool about £4,500,000. The foreign commerce is mainly with Great Britain, Belgium, Germany, Spain, United States of America, and Italy, Great Britain ranking far above any other country. The mercantile navy, exclusive of 'bateaux de la pêche côtière,' number 15,376 vessels of 895,423 tons, including 1186 steamers of 498,841 tons. The chief ports are Bordeaux, Marseille, Havre, Nantes, Brest, Calais, Dunkirk, and Boulogne.

Railways, &c.—The growth of the modern railway system in F. dates from about 1840. The various railways, which are all subsidised by the state, are entirely in the hands of six great companies, viz., the Paris, Lyon, and Mediterranean, the Paris-Orleans, the Northern, the Southern, the Western, and the Eastern, having a total length of 22,561 miles. There are 59,693 miles of telegraph lines.

Finance.—The accounts of actual revenue and expenditure are seldom published by the Government of F. till the lapse of some years. The estimated public revenue in 1895 was (including Algeria) £136,976,305, and the estimated expenditure (including Algeria) was £136,955,750, thereby showing a slight surplus, which will be entirely consumed by the cost of the Madagascar expedition, in fact we must expect a large deficit. The sources of the revenue are the direct and indirect taxes arising from stamps, imposts, customs, *droits d'octroi*, produce of forests and telegraphs, &c. The enormous increase of expenditure of recent years has been met by the imposition of new indirect taxes on sugar, wines, salt, transport by railways, &c. In 1793 all the Government debts, annuities, &c., were consolidated in a perpetual five per cent. *rente*, entailing an annual charge of 174 millions of francs. At first the dividends were only paid in *assignats* or paper of fictitious value, but six years later the Government was forced to compound with its creditors, which it did out of the confiscated property of the Church and the nobles. Thus at the beginning of the 19th c. the annual charge of the national debt was reduced to £1,600,000, or less than one-tenth of that of Britain. By the date of the restoration (1814) the interest of the debt had only increased to 63 millions of francs, but under Louis Philippe (1830-48) the indemnity to the *émigrés* and other heavy war-debts raised it to 244 millions. During the Empire this sum was gradually augmented, and in 1870 it amounted to 358 millions, representing a capital of 11,500 millions of francs or £460,000,000. Having been more than doubled by the war of 1870-71, and by the indemnity to Germany of five milliards of francs, it amounted on 1st January, 1875, to a nominal capital of £937,584,280, bearing an interest of £29,936,196. The public debt has been now estimated at £1,224,467,405, costing the country in interest and annuities at the rate of £1 6s. per head of population.

Army.—The army has been reorganized on the basis of a law of 1872, which enacts universal liability to arms, and disallows substitution or exemption for money. The law of 1872 has been expanded and modified by further regulations of 1873, 1875, 1882, 1887, 1889, and 1892. All Frenchmen between the ages of twenty and forty-five, not legally exempted, must serve for three years in the active army, for ten in its reserve, for six in the territorial army, and for six in its reserve. Among the exempted are those physically unfit, the pupils of the École Polytechnique and the École Forestière, teachers in public schools, professors, ecclesiastics, and artists who have gained the Grand Prix of the Institute. Soldiers of the active army who have learnt their duties, and can read and write, may at the end of a year procure a furlough for an indefinite time. As to the effective force of the French army, see ARMIES, MODERN. The expenditure for the army in 1869 was £15,359,192, in 1880 £22,811,203, and in 1895 (estimated) £25,923,428. The whole of F. is divided into eighteen military regions, each containing a mobilised *corps d'armée*. Included in the effective force are 145 divisional regiments, and 18 regional regiments of the line, 30 battalions of *chasseurs-à-pied*, 5 battalions of African Light Infantry, 77 regiments of cavalry, 38 regiments of Field Artillery (besides fortress artillery, &c.), 4 regiments of engineers, in addition to military train, 4 regiments of Zouaves, 4 of Algerian *tirailleurs*, 6 regiments of *chasseurs d'Afrique*, 4 of Spahis, and 2 regiments of *étrangers*. Since the German annexation of Metz and Strasbourg the fortified *chefs-lieux* or headquarters have been Arras, Avignon, Bayonne, Besançon, Brest, Cherbourg, Grenoble, La Rochelle, Havre, Lille, Marseille, Montpellier, Nantes, Perpignan, Quiberon, Rouen, St. Omer, Toulon, and Toulouse. Paris and Lyon are separate military centres.

Navy.—At the end of 1894 the navy (including vessels being built or projected) was composed of 33 battleships, 18 Port Defence ships, 155 cruisers, and 230 torpedo vessels, in addition to a large number of unarmoured cruisers and troopships, with 2084 officers and 41,536 men. There are in active service 2 admirals 16 vice-admirals, 30 rear-admirals, 115 captains of first-class men-of-war, 217 captains of frigates, &c. The navy is manned partly by conscription, and there are constantly on the rolls some 114,000 names, (See also NAVIES, MODERN.) The great Government docks are at Toulon, Brest, and Cherbourg.

Constitution and Government.—The present constitutions voted by the National Assembly of 1871, bearing date of 25th February and 16th June, 1875, and subjected to modifications in 1884, 1885, and 1889, vests the legislative power in an assembly of two Houses, a Chamber of Deputies, and a Senate of 300 members, and the executive in a chief magistrate, called President of the Republic, and his ministry. The Chamber of Deputies is elected by universal suffrage under the uni-nominal vote. By this law every arrondissement elects one deputy for four years, and if its population exceeds 100,000, an additional deputy for each 100,000, or portion thereof. Deputy and voter must each have the qualification of citizenship, while the former must be twenty-five and the latter twenty-one years of age. There are now 584 deputies. Of the 300 senators, who are elected for life or for nine years (one-third of these retiring every three years), 225 are elected for nine years by the departments and by the colonies, while 75 are nominated for life by the Senate and the Chamber of Deputies united. The only necessary qualifications of a senator are that he be a Frenchman and forty years of age. The two houses of legislature must remain in session for at least five months in the year. The President is bound to convoke an extraordinary meeting if it is demanded by one-half of the members of each chamber; he can also adjourn the Chambers, but the adjournment may not exceed the term of a month, nor occur in one session more than twice. The President, who is nominated for seven years, and is eligible for re-election, is elected by a majority of votes by the two Houses united in National Assembly. He has the control of the army, promulgates the laws when they are voted, and appoints to all civil and military posts. But every act of the President must be countersigned by a minister; and the ministers, of whom there are nine, are responsible to the Chambers for the general policy of the Government. The President is only responsible in case of high treason. His salary is fixed at £24,000, with an extra allowance of £24,000 for household expenses. Each Senator and Deputy receives £360 per annum, and the President of each Chamber receives an additional £2840.

Administration of Justice.—A special Minister of State presides over the administration of justice. There are *tribunaux de première instance* for the arrondissements, police courts, tribunals of commerce, and courts of appeal. A *cour de cassation*, of three chambers, pronounces on all the sentences of the police and assize courts; and a *haute cour de justice* gives final judgment on state offences. There are 380 department prisons, besides central prisons, political prisons, the *dépôt de forçats* of St. Martin-de-Ré, agricultural penitentiaries in Corsica, and the penal settlements of Guinea and New Caledonia.

Education, &c.—Public education of France and Algeria is now entirely under the direction of the Government. In 1886 it was decided that the male teachers at the public schools should be laymen, and though the Roman Catholic *Facultés* had been suppressed in 1885, their universities were permitted to be carried on under certain conditions. There are at present some 4400 teachers and 9500 pupils at the ecclesiastical seminaries.

The public institutions consist of universities, secondary and elementary schools.—*Universities.* There are *facultés des lettres* and *facultés des sciences* at Besançon, Bordeaux, Caen, Chambery (combined), Clermont, Dijon, Grenoble, Lyon, Montpellier, Nancy, Paris, Poitiers, Rennes, and Toulouse. At Aix there is only a *faculté des lettres*, and at Marseille only a *faculté des sciences*. Besides these there are six *facultés* of medicine, six of law, and two of Protestant theology.—*Secondary Schools.* There are 105 Lycées, 238 Communal Colleges, and 50 schools for girls.—*Elementary Schools.* There are 69,865 primary and 2603 infant schools, besides over 20,000 private schools, of which 11,830 are denominated clerical schools. There are about 95,000 children attending the secondary schools, and about 6¼ millions being educated at the primary schools. The school age is from six to thirteen. In the budget estimates for 1895-96 public education cost the country about £7,700,000, which is considerably below the estimated charge in the United Kingdom in the same year.

There are in addition to these public and private schools many industrial and technical schools, and also military and naval schools.

Among the great literary and scientific institutions are the Institut de F. (q.v.), the Conservatoire de Musique, the École des Beaux-Arts, the Bibliothèque Nationale, &c. There are rich art and scientific collections, and many charitable institutions receiving yearly from the state as much as nine millions of francs.

Religion.—The population consists of 38,343,192 (according to the latest returns) of all denominations, about 2 per cent. of whom are Protestants (Reformed and Lutheran), and ⅛th per cent. Jews. All religions are allowed by law, but only the Roman Catholic, Protestant, and Jewish Churches receive state allowances, which are paid only to those sects that number over 100,000 members. In this way the Roman Catholics obtain £1,688,260, the Protestants £61,916, and the Jews £6450. In the Roman Catholic Church there are 86 prelates, 17 archbishops, and 67 bishops, 192 vicars-general, 723 canons, 3531 *curés* or incumbents, and 31,569 *desservantes* or curates. The Lutheran Protestants are governed by a general consistory, while the Reformed Protestants or Calvinists are under a council of administration, the seat of which is at Paris.

Colonies.—The foreign possessions of F., both colonies and protected countries, cover an aggregate of 2,484,783 sq. miles, with a population of 43,750,000. They are situated in Asia, Africa, America, and Oceania. The most important colonies are, in Asia—Cochin China, Tonquin, and Anam; in Africa—Algeria, Congo, Senegal, Guinea Coast, and Obock; in America—Guiana, Martinique, and Guadeloupe; and in Oceania, New Caledonia. The chief protected countries are Cambodia, Madagascar, and Tunis. See separate articles.

History.—The earliest historic inhabitants of F. were Celts, known as Gauls, who held all modern F. except the S.W., and who, a considerable time after they had settled in the land, were driven into the E. and S.E. by the Belgæ, a Celtic people with probably an infusion of Teutonic blood. The S.W. of the country belonged to the Aquitanians or Basques, a shorter and darker people akin to the Iberians, and probably a survival from pre-Aryan times. The Gauls and Belgæ were blue-eyed and yellow-haired, eminently brave and intelligent, the Belgæ being more thoughtful and patient than the Gauls, who were above all mobile and keen-witted, full of unstable heroism, and delighting in brilliant colours and barbaric display. Both peoples were ruled by Druids and chiefs, and were divided into clans. Long before Cæsar's invasion the strength of the Gauls had been sapped by the pleasures and splendours of Rome, which interfered in their tribal quarrels, and before 118 B.C. formed the Rhône valley from Geneva to the sea into a Roman province (*Provincia Romano*, hence Provence). Rome won no fresh land in Gaul until Cæsar's proconsulship, B.C. 58-51. In campaign after campaign he routed the Gauls, until the capture of Alesia laid the whole country at his feet (B.C. 51). From 50 B.C. to A.D. 476 Gaul was a province of the Roman state, and her inhabitants received that Roman impress to which France owes her language, her law, her religion, and even several features in the character of her people. From Rome the Gauls acquired the love for centralised city life, for severe logical theories of government, and for the conceptions of the equality of man and of universal empire which have played so large a part in the nation's career. Southern F. especially was so deeply Latinised as to become a different land from F. north of the Loire, and to retain, during the Middle Ages, part of the law and a faint reflex of the civic life of Rome. Before the 3rd c. Gaul was studded with fair cities, centres of commerce and luxury, whose governments, modelled on the Roman *municipia*, were the germ of the French southern *communes*. But along with the civilisation came the corruption of the dying empire, and Christianity, introduced in its Greek form in 160 by Pothinus, made little progress until Roman missionaries entered the country in the 3rd c. In 251, however, Dionysius founded the church of Paris, and the conversion of the Gauls quickly followed. In the first half of the 5th c. the barbarians, who were breaking up the empire, poured into Gaul, the Burgundians seizing the region between the Rhône and Jura, the Visigoths occupying the S.W., and the Franks making raids through the N. and establishing a fluctuating power along the lower Rhine. These tribes did not seize Gaul by a united invasion, but broke up the unity of the country by intermittent incursions, and by settling in separate bodies through the land. Commerce and agriculture were thus arrested, the national life was palsied, and the towns were cut off from each other and gradually enfeebled. Guizot traces French civilisation to three sources—ancient Rome, the Germanic invasions, and the early Church. Rome, he says, gave F. the ideas of law and order; the Teutons brought the sentiment of individual independence and passionate love of freedom, while Christianity cleansed the land from the impurities of an effete paganism. The Teutons strove in their new settlements to conform to Roman institutions and ideas, while the cities of Southern F. preserved the relics of the Roman municipal government. The Franks consisted of two main branches, the Ripuarians, who dwelt near Köln, and the Salians, who held the districts at the mouths of the Rhine. They were ruled by princes called Merwings, one of whom, Hlodowig (Clovis), in 486 overthrew Syagrius, who governed in the Roman name at Soissons, then embraced the orthodox faith, crushed the Arian Burgundians and Visigoths, and before his death, in 511, established a Frankish monarchy embracing most of modern F. On the death of his son Hlotair (Clotaire), in 567, three clearly-defined kingdoms began to arise—that of N. Gaul or Neustria ('the W. kingdom'), between the Loire and Meuse; that of Austrasia ('the E. kingdom'), between the Maas (Meuse) and the Rhine; and that of Burgundy, including the Rhône valley and part of Switzerland. The Franks were comparatively numerous in the N., where Orleans, Paris, Soissons, and Metz became capitals of Frankish kingdoms, but they had few, if any, settlements in Aquitaine and Burgundy. Under Dagobert, king of Neustria, the power of the Merwings was at its highest, but on his death (638) the Merwing kingdom faded away, and after the battle of Testry (687), in which the Austrasians under Pippin of Heristal defeated the Neustrians, Pippin and his descendants ruled over Austrasia and Neustria as Mayors of the Palace, the *rois fainéants*, or Merwing kings, being allowed to retain the name of royalty until 752, when Pippin the Short, son of Karl the Hammer—the Mayor who drove back the Saracens in the fight of Tours (732)—was proclaimed king of the Franks. The reigns of the Karolings, the empire of Karl the Great, belong to the history of Germany. Under Karl the Great Gaul was simply a province of a great German empire, as it had formerly been of the empire of Rome. The Merwing monarchy was in a degree French, Neustria being mainly peopled by Gallo-Romans, but Austrasia was a purely German land, the Karolings were German in blood, speech, and customs, and their favourite abodes were Aachen (Aix-la-Chapelle) and Engelheim in the Rhine valley. The Merwing monarchy arose from the warrior kingship of the Franks, the Merwings being encircled with peculiar reverence, as the descendants of heroes and demigods; while the Karolings dazzled their subjects by claiming to wield the universal dominion of imperial Rome. From neither of these monarchies is modern F. descended. Modern F. dates from the rise of the Parisian monarchy of the Capets, which gradually absorbed most of the old province of Gaul. The treaty of Verdun (843) severed Neustria, now a distinctly Romance land, from Teutonic Austrasia; and, down to the 14th c., the kingdom of Paris, which grew into modern F., possessed neither Burgundy, Provence, Elsass, nor Lothringen, nor had it for 600 years any firm authority over Aquitaine. Celtic or Romance F., as distinguished from Teutonic F., first appears at the treaty of Verdun in 843; Parisian F. first appears in 888, when Karl the Fat, for a time ruler of Germany, Italy, and Neustria, was deposed, and the Karoling empire split into the W. kingdom or F., and the E. kingdom or Germany, Italy, and Burgundy. From the death of Karl the Great Paris had been steadily rising in power, and her noble defence against the Northmen in 885 decided her future as capital of F. north of the Loire. She was not, however, at once made the capital of an existing French kingdom, but, on the contrary, from being the chief place of the county of Paris, grew into the kingdom of F., a kingdom distinct alike from the Roman province of Gaul and the W. kingdom of the Karolings. In 888 the nobles of the N. of F. chose Odo, the chief defender of Paris against the Northmen, as king, but he had to declare himself a vassal of the king of the E. Franks, and a century of constant rivalry ensued between the Karolings, who held their court at Laon, near the German border, and the house of Capet, which ruled at Paris—between the slightly-Germanised Romance kingdom of the W. and the Teutonic kingdom of the E. About the close of the 9th c. the Northmen made permanent settlements in N. F., and at length in 911 Hrolf (Rollo) received the lordship of the region between the Epte and Brittany, where he founded the great dukedom of Normandy. The Karolings growing more incompetent as the 10th c. advanced, in 987 Hugues (Hugh) Capet abolished the monarchy of Laon, thus breaking the ties between F. and Germany, the native land of the Franks. The subsequent history of F. until the end of the 18th c. is mainly concerned with the slow fusion of various provinces into the monarchy of Paris, and the gradual change of the kingly office from a weak overlordship into a despotism. Hugues Capet was merely one of the great peers of F., having only a faint superiority, except in his own domain, a tract of land hemmed in by Normandy, Brittany, Burgundy, and Aquitaine. The Capetian was distinguished from the Karoling monarchy by making no claim to represent the Roman empire, and by its more essentially feudal nature. The fall of the Karolings had doubtless been hastened by the suspicions which the great barons, whose lands had been at first benefices granted in return for services at court, entertained towards the dynasty whose privileges they had usurped, and which had the right to reclaim the estates. A monarchy with less lofty pretensions was wished for, and was found in the purely feudal monarchy of the Capets. The new kings were more closely allied with the Church than were the earlier dynasties. A vague holiness began to be associated with the kingly office, and it is probably to ecclesiastical influence that we should ascribe the mildness and even feebleness of the early Capets, under whom the land was torn by feudal war, the nobles defying the kings, who could scarcely maintain the slight overlordship held by the first of their line. The Capetian kingdom was little more than a name until Louis VI. (1105-1137), with the aid of the Church, and by making common cause with the people, humbled the great feudatories of the crown. The king began to be looked on as the centre of justice, as the holder of a vague power which was dimly seen to be something apart from feudal overlordship, to represent the people and protect them from feudal oppression. Much of Louis VI.'s work was undone in the reign of his feeble son Louis VII., whose supremacy the nobles shook off, and who was overshadowed by Henry II. of England. That king made war in F., not as an English sovereign, but as a great French feudatory, and held more land in F. than belonged to all the other French nobles together, while his feudal superior, the king of F., was a comparatively unimportant ruler cooped up in a small central district. But the mysterious popular respect still clung to the kingly office, and Louis VII.'s successor, Philippe August (1180-1223) changed an unstable superiority coloured by an indefinite moral influence into a vigorous though still a feudal monarchy. He added Normandy to his realm by the capture of Château Gaillard (1204), and in the victory of Bouvines (1214), where he crushed the feudal barons allied with Otho of Germany, secured the future of royalty in F. He was greatly aided in his struggle with feudalism by the *communes*, which he favoured, and by the lawyers, who were becoming important through the reviving interest in Roman law. During his reign the brilliant civilisation of Southern F. was almost extinguished in the crusade against the Albigenses. Up to this time the S. had held aloof from the N., the Loire flowing between two lands widely different in the customs and even the race of their inhabitants. The Frenchmen of the N. were a mixed people of Celts, Franks, and Norsemen; the Aquitanians were partly Basques, partly Visigoths; and the Provençals had a considerable infusion of Roman blood. The S. had preserved a fragmentary code of Roman law in preference to the northern feudal *custom-right*, and contained many rich free cities, full of refined and democratic citizens, with governments based on the Roman *municipia*. Hlodowig's invasions of the S. had kindled a bitter hatred among the southern Gallo-Romans and Visigoths for the N., the land of the Franks—a feeling which remained throughout the Middle Ages, the early dislike of Aquitaine and Provence for the Merwings and Karolings being transferred to the monarchy of Paris. While the N. was torn by feudal strife, in the S., where the power of the Church was almost extinct, poetry, art, and philosophical speculation were assiduously cultivated. Southern F., imbued with Arabic science and cherishing Roman municipal rights, was bringing on a sceptical, democratic movement, intensely hostile to feudalism and the Catholic Church. Therefore the Pope stirred up a crusade against the Albigenses (q.v.), or heretics of Languedoc, and from 1207 to 1215 the barons of the N. slew and ravaged in the S. country, which never recovered its old wealth, luxury, and culture, though it still is, in the speech, customs, and blood of its people, aloof from F. north of the Loire. Louis IX. (1226-44) added to the royal domains by treaties and purchases, and while scrupulously recognising certain feudal rights, determinedly strove to root out the feudal privileges of private war and judicial duels. He has been called the founder of the French absolute monarchy, and his virtues gave the kingly office a popularity which in a large measure enabled it to grow into the foul despotism of the 17th and 18th centuries. In his reign occurred the last of the crusades, expeditions which had indirectly strengthened the French monarchy. At first the royal power gained by the crusades carrying off hosts of turbulent barons to the East, many of whom never returned to F., while the kings prudently stayed at home; and, afterwards, when the kings became leaders of armies to Palestine, their influence was increased by the lofty position they thus held before all Europe. The cities also throve from the crusades, which quickened their trade, and enabled them to buy privileges from barons who needed money to travel to the Holy Land, while, as each man who became a crusader was thereby freed, a vast number of serfs thus won their liberty, and both the cities and the new freemen were warm supporters of the crown. Under Philippe le Bel (1285-1314) the old feudal monarchy began to change into a despotism. In his reign we see clearly the baneful tendency to concentrate all power in the king, which ended in a systematic depressing of national life, in a general political ignorance, that bore fearful fruits in the days of the Revolution. While in England the free Teutonic institutions always survived in theory, F. in the time of Philippe le Bel had lost all the old Frankish popular rights. Hence reform in F. has always required changes wrought by abstract theory, the country having been, unlike England, deprived of foundations on which to build. Under Philippe le Bel all laws and administration emanated from the crown, the nobles were only consulted when war was intended. The lawyers at this time did good service in lessening feudal and ecclesiastical influence, but lent themselves to foster despotism. Being raised to offices at the will of the king they became his instruments in special commissions, and the monarchy thus won vast judicial power. After Philippe's death the monarchy was severely shaken throughout the 14th c., being assailed both as to the nature of the succession and as to the nature of its power. During the reigns of the three sons of Philippe le Bel (1314-28), peasant rebellions, famine, and disease desolated F., and on the death of Charles IV., last son of Philippe le Bel, the succession to the throne was disputed between Philippe Comte de Valois, cousin of the last king, and Edward III. of England, who claimed the crown as the son of Isabella, Philippe le Bel's daughter. The nobles, along with the 'notables of Paris and the other good towns,' decided in favour of Philippe, who then provoked Edward to war with the hope of annexing Aquitaine, the last remnant of the Continental kingdom of Henry II. of England. In 1337 began the struggle known as the *Hundred Years' War*. Under Edward III. the English won the victories of Crécy (1346) and Poitiers (1356), and took Calais during the first period of the war, which ended at the peace of Bretigny (1360), Edward giving up his claim to the French crown, and being declared the independent ruler of Aquitaine, Calais, and several small districts. At this time the condition of F. was unspeakably wretched, agriculture and commerce were at a standstill, and in 1348 the land was ravaged by the Black Plague. At length the peasantry rose (1358), and slew and plundered until the nobles ruthlessly quelled the revolt. From the common nickname of the peasants—*Jacques Bonhomme*—the name *Jacquerie* was given to this and all succeeding rebellions of like nature. Now, too, the Parisians strove to establish a free commune, under Étienne Marcel the provost, and assumed for the first time a revolutionary cap of red and blue. This effort, like the Jacquerie, was suppressed by the barons. In the reign of Charles V. (1364-80) the French gradually drove back the English, who before Edward III.'s death lost nearly all Aquitaine except Bordeaux and Bayonne. From the death of Edward III. to the invasion of Henry V. there were occasional truces, but no definite peace. During the reign of Charles VI., F. was rent by party strife, and Henry V. of England entered the country, won the battle of Agincourt in 1415, and by the treaty of Troyes (1420) was acknowledged successor to Charles VI. on the French throne. Charles VI. and Henry died in 1422, and war continued between the English regent, the Duke of Bedford, and Charles VII., who, mainly through the patriotic ardour of Jeanne d'Arc, was crowned at Reims in 1429. After Bedford's death the English steadily lost ground, until in 1453 Bordeaux and Bayonne fell, and Calais alone remained of their Continental possessions. Thus ended the Hundred Years' War, which left F. in the darkest misery. The country was desolate; in many provinces there was scarcely a house outside of the walled towns; the roads were overgrown by thickets; the peasantry had fled to the cities, where many of them were sunk into beggary. But the strength of the lesser nobles was broken by the war, and the towns were thus enabled to wring new liberties from them. An upper class of traders arose, and the *bourgeoisie* carried their influence to the side of the crown. Louis XI. (1461-83) favoured the third estate, and jealously humbled the nobles. The 'third estate,' or the people, which now becomes somewhat important, sprang from the Roman municipal towns, which survived through the Middle Ages; from the *communes*, which won their independence by warring with the barons; and from the gatherings round a noble's dwelling of peasants and others, who, as they grew in numbers and practised trades, were enabled to win privileges from their overlord. The royal officers and lawyers, being mostly of low birth, were also a powerful element in the third estate, which rose in influence throughout the 15th c., though the communal liberties were now disappearing. In 1494 Charles VIII. marched into Italy, and, though his conquest of the country was ephemeral, the results of his invasion were momentous, as they committed F. to a ruinous policy, and led to disastrous wars with Spain. The next French king, Louis XII., was likewise inflamed by the hope of Italian conquest, but wasted his strength in intrigues of which Austria reaped the benefit. François I., the successor of Louis, plunged into war with the Emperor Karl V., and was captured at Pavia, the struggle between F. and Spain going on until 1558, when the Spaniards having won the victories of St. Quentin and Gravelines the peace of Cateau Cambresis was concluded. These wars cost F. a lavish waste of blood and treasure, and infected her with the luxury and seductive vices of the South, but they also brought the impressible French into contact with a refined people, imbued with the spirit of the Renaissance, which was now diffused by the French through other nations. From 1562 to 1595 French history is mainly occupied with the civil wars between the Catholics and Protestants. The latter, who were Calvinists, were known as Huguenots. During the reigns of Henri III.'s three sons, François II. (1559-61), Charles IX. (1560-74), and Henri III. (1574-89), great authority rested with their mother Catharine de' Medici, a bigoted Catholic, who foully abused her power in persecuting the Huguenots. In 1572 the massacre of the Protestants known as the Massacre of St. Bartholomew was perpetrated at Paris, and the struggle continued with shifting fortune until 1589, when Henri III. died. Henri of Navarre, a descendant of Louis IX., was now the rightful heir to the throne, but Paris and most of F. would not obey him, until in 1593 he became a Catholic and was made sole ruler, changing the old title *King of the French* for the new title *King of F. and Navarre.* Henri IV. passed the Edict of Nantes (q.v.) in 1598, and, supported by Sully, reformed many financial abuses, chastised the nobles, and protected the people. His popularity and Sully's ability rendered it unnecessary to summon the States-General to confer supplies, and the centralization of power was thus largely confirmed. On Henri's murder in 1610 the government was administered by the Queen until 1614, when Louis XIII. nominally began to reign. At this time the ecclesiastical power somewhat declined in F., the king confirming the Edict of Nantes and other measures in favour of the Protestants, and the Catholic statesmen abandoning their former intolerant policy. Richelieu, the minister who really governed France during the last eighteen years of Louis XIII.'s reign, broke away from the old religious alliances, checked ecclesiastical influence in the state, and enforced the principle that national interests and not religious differences must determine political relations. The kingly power was further strengthened by Richelieu's antagonism to the nobles. He cut down their privileges and political importance, though he could not lessen their social power, which retained its malign influence until the Revolution. Under his indulgent policy the Huguenot party lost its importance and many of its members passed over to Catholicism. The Calvinist clergy, however, stirred up a somewhat factious resistance to Richelieu, and a war broke out, which was ended in 1628 by the capture of Rochelle, the great stronghold of French Protestantism. On the death of Louis XIII. (1648), F. was ruled by Mazarin, whom the queen-mother had made prime minister. Mazarin's unpopularity and the exactions under which the people groaned led to the rebellion of the Fronde (q.v.), in which the nobles, the *bourgeoisie*, and the mob of Paris rose together against Anne of Austria's regency. Even princes of the blood shared in the insurrection, and the Parisian populace, inflamed by over-taxation, was led by one of the ablest of demagogues, the Cardinal de Retz. But the movement only proved the inherent strength of the monarchy. There was no sympathy between the aristocrats who headed the struggle and the people. The nobles were blind to popular interests and large political issues, while the people were too ignorant to produce leaders from their own ranks. Another century was needed to imbue the populace with clear political convictions, with revolutionary ideas as well as revolutionary fervour. In the 17th c. there was nothing to take the place of the monarchy in governing F., and after the Fronde collapsed the royal power shot up into unexampled splendour under Louis XIV. He came to the throne in 1661, and his reign is the culminating epoch of the French monarchy. Before Louis XIV. the kingly power was checked by other influences, and after Louis XIV. it passed into a rapid decay. Up to this reign there was a possibility of the crown and people uniting to remove abuses. But under Louis XIV. all political activity on the part of the nation was frozen, all co-operation ceased between the ruler and the people, on the latter of whom it was now impressed that the king must initiate and carry out everything. The country laboured under evils so vast as to render the warmest co-operation between the crown and its subjects indispensable for their correction; and when the reform could no longer be delayed, the monarchy, isolated from the people by its systematic repression of national spontaneity, was unable to cope with the task of reform. Louis's reign began with success, but closed in gloom. At the end of the Thirty Years' War F. was the chief power in Europe, and under Louis XIV. stepped into the place from which Spain had fallen. Louis's policy of aggrandisement was at first successful, but in the Spanish war of succession his ambitions were shivered. His armies were defeated, the revocation of the Edict of Nantes (1685) deprived F. of a large industrious population, the revenue was scandalously misapplied, and on Louis's death in 1715 the national debt amounted to £140,000,000 sterling. Under Louis XV. costly wars were carried on with England, Spain, and Austria, and by the treaty of Paris (1763) the larger part of the French colonial possessions was given up. So gross was the misgovernment that F. was brought to a state of seemingly incurable bankruptcy and misery. The country was dying under the weight of the monarchy, when, in the days of Louis XV.'s successor, Louis XVI., the changes began which led to the French Revolution. The monarchy had engrossed all power, feudal, legal, and clerical ideas having combined to swell its authority. The feudal theory of monarchy made F. the king's private estate; the lawyer's theory, based on Roman ideas, made him the sole representative of the nation; and the clerical theory made him the delegate of God. And the government, while narrowly concentrated and inquisitorially administered, was rude and ineffective, the king failing to perform the functions which his office had engrossed. The country was overrun by tax-collectors—about 250,000 in number—who veiled their extortions behind the royal name. The nobles, suspected by the king and hated by the people, remained in defenceless isolation, debarred from all share in the government, while they still kept their galling rights and immunities, and spent their lives in the costliest pleasures. Louis XV. made Versailles the scene of habitual revels, recalling the foul orgies of imperial Rome, and consumed one-fourth of the public revenue in keeping up his household. As the 18th c. advanced, the state of the people grew more and more wretched. They were the only class engaged in productive labour, their exertions were hampered by absurd restraints, and upon them rested the sole burden of supplying the public revenues, the nobles being free from taxation except a merely nominal class-duty. In 1715 a third of the poor classes perished from want; in 1725 St. Simon said the king was making F. a hospital of dying men and women; and in the middle of the 18th c. the majority of the rural population could not with the utmost efforts earn enough bread to keep themselves alive, and at the same time pay the subsidies. Wide tracts of land were deserted; the peasants, unable to maintain life in the country, became beggars in the towns; 'starvation,' says M. Taine, 'was an endemic disease.' The ancient régime by its monstrous waste of the public resources, its *lettres de cachet*, its secret system of police, its endless confiscation of individual possessions, its forced services, its grinding taxation, its inquisitorial interference with private rights, had broken F. into bitterly hostile sects, and was actually maintaining an anarchy worse than that of the worst days of the Revolution. Meanwhile the intellectual class was wholly at variance with the existing institutions. The literary men—who had been systematically persecuted by the monarchy, and debarred from all share in public life, while they had no practical knowledge of government, but were inspired by the old Gallic passion for equality, by an ardent belief in the perfectibility of man, and an intense hatred of existing social bonds, sentiments learned from Rousseau—were convinced that they could break with the nation's past, and mould society anew independent of its historic growth. As they were not mere speculative students, but lucid, fiery popular writers, they speedily imbued the people with their convictions; and to their wide influence, ignorance of practical politics, and passion for framing a government by theoretic doctrine, are due many of the wildest, emptiest follies of the Revolution. In 1789 Louis was forced by deficits to convoke the States-General, which had not met since 1614. On 17th June the third estate declared itself the National Assembly, and on 23rd June proclaimed its members inviolable. The king then dissolved the ministry, and gathered a body of troops round Versailles, the result being that on 12th July insurrection flamed wildly out in Paris, and on the 14th the Bastile was taken by the mob. On 4th August the National Assembly—commonly known as the Constituent Assembly—abolished feudal rights; on 6th October the Parisian populace, their rage sharpened by accounts of the Versailles banquets, where royalists drank confusion to liberty, poured out, followed by the National Guard, to Versailles, and brought the king and queen back to Paris. This destroyed all the moral authority and mysterious inviolability which had till then clothed the French monarchy. In 1790 the king promised to conform to a new liberal constitution, while Austria, Prussia, England, Spain, and Saxony allied against his rebellious people. In 1791 the king and queen tried to escape from Paris, but were taken, and the Constituent Assembly gave place to the Legislative Assembly, which met 1st October, 1791. At this time two great parties divided the revolutionists—the Girondins (q.v.) and the Jacobins (q.v.). The Austrians were now heard to be marching on F., and Paris broke out into mad fury. Henceforth until 1794 French history has to deal with two sets of events—with the repulse of the invaders, and with the violent struggles of factions in Paris. Each of 'the famous days of Paris' was prompted by the acts of the foreign enemies. On 10th August the Tuileries was stormed in reply to the atrocious threats of the royalist Duke of Brunswick. The taking of Verdun and Longwy by the Prussians provoked the September massacres, F. being declared a republic 25th September, 1792, and the loss of Cambrai led to the execution of Marie Antoinette. The king was guillotined on 21st January, 1793, and the treachery of Dumouriez and rebellion of La Vendée called forth the rising of 31st May, when supreme power passed over to the Jacobins, who won brilliant triumphs against the foreign enemy, and quelled insurrection at home, but, ignorant of ruling, and cruel through their fears and delusive hopes, plunged into the excesses of the Reign of Terror (q.v.), while the country yielded to them tamely, from its old habit of submitting to the crimes of the ancient regime. Reaction, however, swiftly set in. The leaders of the Jacobins fell, and the party broke up. (See DANTON, MARAT, HÉBERT, ROBESPIERRE, &c.) In 1795 the Convention made a new constitution, committing the executive power to a Directory (q.v.) of five. Then followed the dazzling campaigns of Napoleon, who on 13th December, 1799, overthrew the Directory and became Consul, and in 1804 Emperor of France. (See NAPOLEON.) After Napoleon's final downfall in 1815, the Bourbon Charles X. was restored by the allies. Under him the dishonesty, incapacity, and priestly intolerance of the old regime were revived, until the revolution of 1830 placed Louis Philippe, Duc d'Orleans, on the throne. His stubborn enmity to reform caused his abdication in 1848, and the establishment of a Republic. Louis Napoleon (q.v.) became president in 1848, and by the *coup d'état* of 1851 Emperor of F. The Napoleonic absolutism endured until in 1870 the Emperor declared war against Prussia, and after sustaining a series of the most crushing defeats recorded in history, surrendered with 90,000 men at Sedan, 2nd September, 1870. He was then deposed, and a Republic instituted at Paris, which city, after a resistance of four months, was entered by the Prussians, peace being made in March, 1871. F. ceded Alsace and Lorraine, and paid an indemnity of £200,000,000. The revolt of the Paris Communists was energetically suppressed by the government of Thiers, and a Conservative Republic was established. In 1873 Marshal Macmahon was chosen President for seven years; in 1879 Jules Grévy was elected, re-elected in 1885, and resigned in 1887, when Sadi Carnot was chosen as his successor. In June, 1894, he was assassinated, and Casimir Perier was elected in his place, but he resigned in January, 1895, when Felix Faure was appointed.

France, Isle of. See MAURITIUS.

Franche Com'té ('free county') was a province of the kingdom of France comprising part of the Jura mountains and the lowlands to the westward. It is now represented by the departments of Doubs, Haute Saône, and Jura. Originally possessed by the Celtic Sequani, it was conquered by the Burgundians in the 5th c., and after many changes was finally handed over to France by the treaty of Nymwegen in 1678.

Fran'chise, or **Lib'erty,** in English law, is a privilege by a grant from the Crown, or by prescription which by implication may also mean by grant. It may mean the privilege of corporation, exemption from special tribute, a right over land, as that of *forestry*, the right to vote for a member of Parliament or to hold a fair, the right to fish in certain waters, the right to maintain a park, a chase, or a warren, and so on.

Fran'cia, José Gaspar Rodriguez, popularly known as Dr. F., was born at Asuncion, Paraguay, about 1757. He was of French or Portuguese descent, studied for the Church, and took the degree of doctor of divinity at the University of Cordoba de Tucuman. Subsequently he left divinity for law, and gained a high reputation for ability, uprightness of conduct, and industry as a legal practitioner. The revolution among the S. American republics which made Paraguay independent brought F. to the front. In 1813 he was appointed joint-consul along with General Fulgencio Yegros; next year he was made dictator; and in 1817, such was the confidence of the Paraguayans in him, that he was appointed dictator for life, his death, looked upon as a great calamity, occurring 20th September, 1840. The most widely different accounts are given of this remarkable man. In a celebrated paper of Carlyle, reprinted in his *Miscellaneous Essays*, he is eulogised as a stern administrator of justice, while C. A. Washburn in his *History of Paraguay* (1871) paints him as an absolute tyrant. Unquestionably he did a great amount of good to Paraguay, promoted education, suppressed clerical abuses, encouraged agriculture, cattle-rearing, and every form of industry which he could naturalise in Paraguay, established defences against the Indians, and made injustice almost an impossibility. On the other hand, there can be little question that he was merciless towards those who plotted or were believed to have plotted against his life, and was bitterly opposed to the intermeddling or even the presence of foreigners—*e.g.*, Bonpland the naturalist, and the Swiss travellers Rengger and Longchamp, who published their experiences of him in an *Essai Historique*, &c. (1827). For a full and unfavourable account of F. see three vols. by J. P. and W. P. Robertson, two Scotchmen whom he expelled from Paraguay; *Letters on Paraguay* (1838); F.'s *Reign of Terror* (1839); and *Letters on S. America* (1843).

Fran'cis, St., of Assisi, the founder of the Franciscan order, and one of the most interesting and pure-spirited of Catholic devotees, was born at Assisi, near Naples, in 1182. He was the son of a rich merchant, Bernardone Mariconi, and was named *Il Francesco*, from his command of the Provençal speech. He was early noted for gaiety, kindness to the poor, and lavish splendour of living, the people of Assisi calling him 'the flower of youth.' Having been captured in a feud with Perugia, he was imprisoned for a year; and during this confinement and a subsequent illness at Spoleto, his ideas permanently changed; he resolved to devote himself to a life of worship and charity, abandoning in his twenty-fourth year all his worldly goods, becoming a hermit, and, in his own words, 'taking poverty as a bride.' He preached with loving fervour, wore the meanest dress, performed the lowliest offices to the poor and to the lepers in the hospital of Gubbio, and aided with his own hands in the building of St. Damian's church in Assisi. When as a preacher he visited the Umbrian villages, the people went joyfully to meet him with flags and green boughs and music. Gradually he was encircled by followers, whom in 1210 he formed into the Franciscan Order (q.v.), which was verbally approved of by Pope Innocent III. in the same year, though first confirmed by Honorius III. in 1223. The peculiarity of the order was its utter abnegation of personal property, the brethren disclaiming possession even of their robes and breviaries. The order increased rapidly, and in 1219 had 5000 members. F. likewise founded the orders of *Poor Clares* and of *Tertiaries*. About 1220 he visited the East to convert the Sultan Meledin, whom he induced to promise kinder treatment of Christian prisoners, and to grant the Franciscans the privilege of being guardians of the Holy Sepulchre. On 17th September, 1224, according to the Catholic legend, he received in a religious ecstasy on Monte Alverno the marks of the wounds of the Saviour. He died 4th October, 1226, having caused himself immediately before expiring to be laid on the bare ground of the church. St. F. is the most beautiful character in the history of mediæval Christianity—simple, childlike, and glowing with the purest emotion. His burning ardour was tempered by meek sympathies and undimmed by bigotry. Dante, who tells the story of his life, speaks of him as a 'splendour of cherubic light.' No one since the rise of Christianity brought religion so powerfully home to the people; his mystical raptures never lessened his yearning love for the poor. He completely changed monachism, transformed lonely ascetics into missionaries, and founded the most popular of all the orders. His *Canticle of the Sun*, written in artless Tuscan and thrilling with strange fervour, marks the rise of the lofty religious poetry of the Middle Ages which culminated in Dante. See St. Bonaventura's *Life of St. F.*; the Bollandist *Acta Sanctorum*; Chalippe's *Vie de St. F.* (1728); Chavin's *Vie de St. F.* (1841); Milman's *Latin Christianity*, vol. iv.; Vogt's *Der Heilige F. von Assisi* (Tüb. 1840); Hase's *F. von Assisi* (Leipz. 1856); and Stephen's *Ecclesiastical Biography*. Editions of F.'s works, which consist of letters, monastic treatises, parables, hymns, &c., are numerous. The most accurate is that of Père de la Haye (Par. 1641).

Francis, St., of Paula, born at Paula in the kingdom of Naples, 1416, was named after St. Francis d'Assisi, to whose intercession his parents believed they owed the birth of the child. Having manifested strong ascetic tendencies even as a child, he was sent at twelve years of age into the Franciscan monastery of St. Mark, in Calabria, where he surpassed all the friars in obedience to their *rule*. On the expiry of his year of probation, after making a pilgrimage with his parents to Rome and other holy places, he took up his abode in a cave on the sea-coast, and devoted himself to a life of extraordinary asceticism. The fame of his sanctity soon attracted to him a number of followers, who built for themselves a chapel and cell in the neighbourhood, and he gave to the new order he had thus founded the name of the Eremites of St. Francis. In 1436 the Archbishop of Cosenza sanctioned the building of a cloister and church, and monasteries of the new order soon sprang up in Spain, France, and Germany. In 1474 the *rule* was confirmed by Pope Sixtus IV., and Pope Alexander VI. changed the name of the order to Fratres Minimi. Louis XI. in his last illness summoned F. to France, where in a monastery at Plessis-le-Tours the saint died, 2nd April, 1507. He was canonised by Leo X. in 1519.

Francis, St., of Sales, a bishop and prince of Geneva was born at the château of Sales near Annecy, 21st August, 1567. He studied rhetoric, theology, and Hebrew in the College of the Jesuits at Paris, and law at Padua, passed advocate at Chambery, and was strongly pressed by his father to become a jurist. But his heart was set on a sacred career, and in 1593 he entered the priesthood. The fame which he won by his first sermons pointed him out as a fit missionary for the district of Chablais, then filled with Protestants. In spite of great opposition, the brilliant young Catholic made numerous conversions, and inspired the Pope with the belief that he might perhaps succeed in winning over Beza (q.v.) himself, then the leader of French Calvinism. Three ineffectual conferences were held in 1597. In 1602 F. visited Paris, preached before Henri IV., who greatly admired him, and signalised himself by the miraculous conversion of courtiers. In the same year he succeeded to the bishopric of Geneva, and in 1607 founded the Florimontane Academy, and published his *Introduction à la Vie Dévote*, a work which excited a prodigious interest, was translated into several languages, and in less than half a century had gone through forty editions. Next year he again visited Paris, where his pious oratory once more brought the city to his feet. Every distinguished person sought his friendship or acquaintance. Cardinal Retz begged him to become his coadjutor and successor, but nothing could induce the modest bishop to abandon his Alpine diocese. Between 1610 and 1614 F. established the orders of the Visitation of the Barnabites at Annecy, and of the Carthusians at Ripaille. Two years later appeared his famous *Traité de l'Amour de Dieu*, which may be said to have evoked the admiration of Christendom. He now thought of resigning his episcopal functions, and passing the remainder of his days in some calm retreat, when the Duke of Savoy required his services at Avignon. On his return he fell ill, and died at Lyon, 28th December, 1622. As a writer F. almost equals Montaigne in originality of style and the charm of diction. His *Œuvres Complètes* have been repeatedly published; the best edition is that of Blaise (16 vols. Par. 1835). F.'s letters in particular are exquisitely naïve and graceful. See Hamon's *Vie de Saint François de Sales* (Par. 1854).

END OF VOL. II.

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